‘Sunset’ Stage 2, Googong, NSW

Biodiversity Development Assessment Report

Draft 02 – 30 October 2024
Prepared for Binowee Developments Pty Ltd

Document Information

Report for:	Binowee Developments Pty Ltd
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Capital Ecology project no.:	3329

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Acknowledgements

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- Giselle Ravarian – Director, Urbane Studio Pty Ltd
- Hugh Cooke – Director, Binowee Developments Pty Ltd

We acknowledge the Traditional Custodians of the land on which we work. We pay our respects to Elders past and present.

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Executive Summary

Binowee Developments Pty Ltd is currently progressing the planning and approval process for the rezoning, subdivision, and development of Lot 39 DP1257837, 141 Googong Road, Googong, NSW (the 'proposed development' of the 'subject land'). Capital Ecology Pty Ltd (Capital Ecology) has been commissioned to complete the necessary biodiversity surveys and prepare this Biodiversity Development Assessment Report (BDAR) to identify and assess the significance of the impacts that the proposed development will have on the biodiversity values of the subject land.

Scope

Although general biodiversity values are identified and considered, the primary purpose of this BDAR is to present the results of Capital Ecology's application of the NSW Biodiversity Assessment Method 2020 (BAM) to assess the significance of the impacts of the proposed development on biota listed as threatened under the NSW *Biodiversity Conservation Act 2016* (BC Act). This BDAR also includes assessment of the potential impacts of the proposed development on Matters of National Environmental Significance (MNES) listed pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The subject land encompasses an area of 34.48 ha. The eastern part of the subject land is zoned 'R1 – General Residential' with a minimum lot size of 'U1 – 1,000 m^2', while the western part is zoned 'C2 – Environmental Conservation' with a minimum lot size of 'AB1 = 10 ha'.

Stage 1 of the development has already been completed in the south-east corner of the subject land. The proposed development (Stage 2) will rezone and subdivide the central part of the subject land into 86 residential lots with associated roads and infrastructure.

Survey Overview

Vegetation and potential flora/fauna habitat were surveyed and mapped in accordance with the BAM. This involved the following ecological surveys undertaken by Capital Ecology between 28 September 2021 and 7 December 2021.

- Plant Community Type and Vegetation Zone assessment and mapping.
- BAM plots.
- Threatened flora surveys via random meander, surveys of rocky areas, and opportunistic observations.
- Threatened bird surveys via area searches and opportunistic observations.
- Surveys for the Pink-tailed Legless Lizard *Aprasia parapulchella* via a rock turning survey consistent with the Commonwealth guidelines.

Results

Native vegetation

The subject land supports two Plant Community Types (PCTs).

- 3375 – Monaro-Queanbeyan Rolling Hills Grassy Forest
- 3376 – Southern Tableland Grassy Box Woodland

Before European occupation, the majority of the subject land would have been characterised by a grassy woodland dominated by Yellow Box *Eucalyptus melliodora*, while the gully in the north-western part of the subject land would have supported a grassy forest dominated by by Apple Box *E. bridgesiana* and Red Box *E. polyanthemos*.

The subject land has been used for residential and agricultural purposes and has undergone substantial vegetation clearance, pasture improvement, and livestock grazing. This has led to extensive clearing of the native woody overstorey, midstorey, and shrubstorey across the central and eastern parts of the subject land. The cleared land has been cultivated, grazed by livestock, or otherwise intensely utilised for agriculture over a long period of time, and as such, is dominated by exotic pasture grass species including Wild Oats *Avena sp.,* Brome *Bromus sp.*, and Ryegrass *Lolium sp.*

In contrast, other parts of the subject land have retained patches of remnant native vegetation in varying condition. The western part of the subject land contains a gully, with largely intact grassy forest on the western slope and moderate to high diversity derived grassland on the eastern slope. Several patches of remnant grassy woodland and derived native grassland occur in the north-eastern and south-western parts of the subject land, consisting of mature Yellow Box in the upper stratum and a lower stratum supporting a moderate to high diversity of native grasses and forbs, including some uncommon and threatened species. However, these patches do not contain any regeneration of the overstorey and the midstorey and shrubstorey are absent.

Threatened ecological communities

PCT3376 is identified as potentially being the BC Act / EPBC Act critically endangered listed 'White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland' (Box-Gum Woodland) threatened ecological community (TEC). PCT3376 Zones 3, 4, and 7 meet the listing criteria for this TEC under both the EPBC Act and the BC Act. PCT3376 Zones 8 and 10 meet the listing criteria under the BC Act only. PCT3376 Zone 12 has been historically cleared and disturbed to the extent that it no longer meets the listing criteria for this TEC under either the BC Act or EPBC Act. As such, the subject land supports 3.99 ha of BC Act listed Box-Gum Woodland, and 1.99 ha of EPBC Act listed Box-Gum Woodland.

Threatened species

Targeted surveys were completed to confirm the occurrence and/or habitat potential for the EPBC Act only species and BC Act species credit species flagged by the BAM as having the potential to occur in the relevant PCTs of the subject land.

<u>Threatened flora</u>

A total of 172 flora species were recorded during field surveys, comprising 106 native species and 66 exotic species (Appendix B). This included one threatened flora species, Hoary Sunray *Leucochrysum*

albicans subsp. tricolor (EPBC Act and BC Act Endangered), with a small population of approximately 10 plants recorded outside the development footprint.

Threatened fauna

A total of 38 fauna species were recorded during field surveys, comprising 29 native and 2 exotic bird species, 6 native reptile species, and 1 native amphibian species (Appendix B). This included three threatened species, specifically Dusky Woodswallow *Artamus cyanopterus* (BC Act Vulnerable), Gang-gang Cockatoo *Callocephalon fimbriatum* (EPBC Act and BC Act Endangered), and Pink-tailed Legless Lizard *Aprasia parapulchella* (EPBC Act and BC Act Vulnerable).

The subject land was estimated to contain 3.85 ha of Pink-tailed Legless Lizard habitat. However, this area does not occur in the development footprint and so will not be impacted by the proposed development.

Impacts

Native vegetation

The proposed development will result in the following impacts to native vegetation.

- Clearance of 0.68 ha of BC Act native vegetation (PCT3375 Zones 8 and 9, PCT3376 Zones 8 and 10). This includes the clearance of 0.52 ha of low to moderate quality BC Act Box-Gum Woodland (PCT3376 Zones 8 and 10).
- Clearance of three hollow-bearing remnant trees.

The proposed development will also result in the clearance of highly disturbed exotic vegetation.

- Clearance of 10.49 ha of exotic pasture (PCT3376 Zone 12 and PCT3375 Zone 12).

PCT3376 is listed as a serious and irreversible impacts (SAII) entity ('BC Act Box-Gum Woodland'). Accordingly, the proposed development could result in a SAII on a BC Act listed entity. However, as detailed in this BDAR, following substantial avoidance, minimisation, and mitigation measures, the proposed removal of 0.52 ha of low to moderate quality BC Act Box-Gum Woodland is unlikely to constitute a SAII.

The proposed development will not result in any other direct impacts on native vegetation and is unlikely to result in biodiversity impacts that are unforeseen or uncertain.

Threatened Species Habitat

While the subject land supports habitat for a number of threatened species (see above), the development footprint has been designed to avoid all threatened species habitat. The proposed development is therefore unlikely to result in any direct impacts on threatened species habitat and is unlikely to result in biodiversity impacts that are unforeseen or uncertain.

Assessment and Approval Requirements

Commonwealth EPBC Act

The proposed development is unlikely to have a significant impact on an EPBC Act listed MNES given the development footprint does not:

- support any vegetation meeting the listing criteria of any EPBC Act listed threatened ecological communities; or
- support any EPBC Act listed flora species; or
- contain habitat of potential importance to EPBC Act listed threatened or migratory fauna species.

In light of the above, EPBC Act referral is considered unwarranted and is not recommended.

NSW BC Act – Biodiversity offset credit calculations

The proposed development will involve the clearance of vegetation which generates the following ecosystem credits (Table 1).

Table 1. Vegetation zones requiring offsetting

PCT & Vegetation Zone	Vegetation Integrity Score	Proposed Clearance Area	Credits Required
PCT3375 Zone 8	13.9	0.06 ha	0
PCT3375 Zone 9	34.3	0.10 ha	1
PCT3375 Zone 12	8.7	0.64 ha	0
	Total	**0.80 ha**	**1**
PCT3376 Zone 8	10.1	0.06 ha	0
PCT3376 Zone 10	16.1	0.46 ha	4
PCT3376 Zone 12	4.1	9.85 ha	0
	Total	**10.37 ha**	**4**

The proposed development therefore generates the following ecosystem credits:

- PCT3375 Monaro-Queanbeyan Rolling Hills Grassy Forest – 1 credit.
- PCT3376 Southern Tableland Grassy Box Woodland – 4 credits.

The proposed development avoids impacts to habitat of potential significance to any species credit species. Accordingly, the proposed development does not generate a species credit obligation.

NSW Biodiversity and Conservation SEPP 2021– Koala Habitat Protection Requirements

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (the 'Biodiversity and Conservation SEPP 2021') commenced on 1 March 2022 consolidating and replacing eleven former SEPPs, including the former *State Environmental Planning Policy (Koala Habitat Protection) 2021*.

'Chapter 4 Koala habitat protection 2021' of the *Biodiversity and Conservation SEPP 2021* –

> *aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.*

Whilst the development control provisions of Chapter 4 apply to the proposed development, the subject land does not constitute Koala habitat, and therefore Council can be satisfied that the proposed development is unlikely to have any impact on Koalas or Koala habitat and may grant consent to the development application.

1 Introduction

Binowee Developments Pty Ltd is currently progressing the planning and approval process for the rezoning, subdivision, and development of Lot 39 DP1257837, 141 Googong Road, Googong, NSW (the 'proposed development' of the 'subject land'). Capital Ecology Pty Ltd (Capital Ecology) has been commissioned to complete the necessary biodiversity surveys and prepare this Biodiversity Development Assessment Report (BDAR) to identify and assess the significance of the impacts that the proposed development will have on the biodiversity values of the subject land.

Although general biodiversity values are identified and considered, the primary purpose of this BDAR is to present the results of Capital Ecology's application of the NSW Biodiversity Assessment Method (BAM) (NSW Government 2020a[1]) to assess the significance of the impacts of the proposed development on biota listed as threatened under the NSW *Biodiversity Conservation Act 2016* (BC Act). This BDAR also includes assessment of the potential impacts of the proposed development on Matters of National Environmental Significance (MNES) listed pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.1 Subject Land

The 'subject land' for this BDAR is 34.48 ha and is located at 141 Googong Road (Lot 39 DP1257837) Googong, NSW (Figure 1). As shown in Figure 1 and Figure 2, the subject land is bordered by:

- residential development and the township of Googong to the south;
- large-lot rural residential and agricultural properties to the north and west, consisting of mixed native and exotic pasture with intact remnant vegetation and scattered trees; and
- largely intact remnant woodland and forest to the north and east, extending to the Queanbeyan River corridor.

Located in the Queanbeyan LGA, pursuant to the *Queanbeyan Local Environment Plan 2012* (Queanbeyan LEP), the eastern part of the subject land is zoned 'R1 – General Residential' with a minimum lot size of 'U1 – 1,000 m^{2}', while the western part is zoned 'C2 – Environmental Conservation' with a minimum lot size of 'AB1 = 10 ha'.

The topography across the subject land is largely flat with elevation around 730 m Australian Height Datum (AHD) across the central and eastern parts, with a steep gully in the north-west dropping to 690 m.

The subject land contains two second-order ephemeral streams which originate to the south of the subject land and flow into the Queanbeyan River 1-2 km to the north-east. Both streams have significant weed infestations and do not support native riparian vegetation. These ephemeral streams are only likely to provide habitat to the common water birds, reptiles, and amphibians which occur in the locality.

1.1.1 Proposed Development

As shown in Figure 3, the proposed development is a residential subdivision which aims to divide part of the subject land into 86 lots. The current development is Stage 2, with Stage 1 having already been completed in the south-east corner of the subject land.

[1] NSW Government (2020a). *Biodiversity Assessment Method*. NSW Department of Environment, Climate Change and Water. Published October 2020

The 11.20 ha development footprint encompasses all of the direct impacts associated with the proposed development, including all roads and infrastructure required to service lots.

The proposed development will entail rezoning of parts of the subject land from C2 to R1, as shown in Figure 3. A small area in the east of the subject land which supports remnant Box-Gum Woodland will be rezoned from R1 to C2. The proponent intends to incorporate the retained areas of C2 into a residual lot (Residual Lot 1) which will remain in private ownership. A second residual lot (Residual Lot 2) will incorporate the drainage reserve and the riparian corridor in the south-eastern part of the subject land, and is proposed to be dedicated to council.

1.2 Commonwealth and State Assessment and Approval Processes

1.2.1 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act is the key Commonwealth Government legislation for the protection and conservation of Australia's environment and biodiversity. The EPBC Act provides the legislative framework for the assessment and approval mechanism requiring that proposed 'actions' to be assessed in terms of their potential to impact upon 'Matters of National Environmental Significance' (MNES). MNES currently listed under the EPBC Act are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (listed under the Ramsar Convention);
- threatened species and ecological communities;
- migratory species (protected under international agreements);
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas development and large coal mining development.

Where a potential impact on a MNES may occur as a result of a proposed action, the significance of that impact must be assessed. Guidelines for determining whether an impact is significant are provided by the Commonwealth Department of Climate Change, Energy, the Environment and Water (Commonwealth DEECCW) (Commonwealth of Australia 2013a[2]). If it is determined that a proposed action will, or is likely to, have a significant impact on a MNES, the action must be referred to the Commonwealth Minister for the Environment. The Department will then consider the referred action and the Minister (or their Delegate) will make a determination regarding whether the action requires approval under the EPBC Act and associated conditions and controls.

The following website provides further information regarding the EPBC Act referral and approval process: http://www.environment.gov.au/epbc/index.html

[2] Commonwealth of Australia (2013a). *Matters of National Environmental Significance - Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Climate Change, Energy, the Environment, and Water.

1.2.2 NSW Biodiversity Conservation Act 2016

The NSW *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017, the purpose of which is –

> *to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development* (BC Act Part 1, Section 1.3).

The BC Act outlines the NSW framework for addressing impacts on biodiversity from development and clearing. Supported by the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation), the BC Act establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS).

1.2.2.1 NSW Biodiversity Offset Scheme

The BOS creates a transparent, consistent, and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. The BOS aims to ensure a no-net-loss outcome for biodiversity by applying a framework which requires that impacts are first avoided and minimised, and where this cannot be fully achieved, residual impacts must be offset. The BOS also establishes Biodiversity Stewardship Agreements (BSAs), which are voluntary in-perpetuity agreements entered into by landholders, to secure and manage offset sites for biodiversity conservation. The two key elements of the BOS are as follows.

1. A developer, landholder etc. who undertakes an activity (i.e. development, clearing, other impact) which generates a credit obligation must retire the necessary credits to offset their activity.

2. A landholder who establishes a biodiversity stewardship site on their land generates credits which may be sold to developers or landholders who require those credits to offset their credit obligation.

Under the BC Act, the BOS is triggered for proposed development or clearing which:

- will involve clearance of native vegetation (including trees, understorey plants, groundcover plants, and wetland plants) or a prescribed impact (as set out in clause 6.1 of the BC Regulation) on land identified on the Biodiversity Values Map; and/or

- will exceed the native vegetation clearance threshold for the smallest minimum lot size associated with the subject land; and/or

- may significantly impact one or more BC Act listed entities (i.e. threatened species or ecological communities).

1.2.2.2 NSW Biodiversity Assessment Method

The NSW Biodiversity Assessment Method (BAM) is the assessment manual that outlines how an accredited person (i.e. a BAM Assessor) assesses impacts on biodiversity at development sites or assesses the biodiversity values of stewardship sites. The BAM is a scientific document that provides:

- a consistent (standard) method for the assessment of the biodiversity values of a proposed development site, major project site, or vegetation clearing site, or stewardship site;

- guidance on how a proponent (i.e. developer, landholder) can avoid and/or minimise potential biodiversity impacts, or assessment of the management requirements at a proposed biodiversity stewardship site and the likely improvement in biodiversity values that are predicted to occur over time; and

- the number and class of biodiversity credits that need to be offset to achieve a standard of 'no net loss' of biodiversity values for a development site, or the number and class of biodiversity credits to be generated by a proposed stewardship site.

The BAM is supported by the online BAM Calculator, into which a BAM Assessor enters the data from desktop and field investigations to determine the number and class of biodiversity credits generated:

- as an obligation for development/clearance, this obligation must be addressed by the proponent to secure approval for the development/clearance; or

- by the establishment and management of a biodiversity stewardship site, these credits being a commodity that may be sold.

The BAM determines the following two types of credits on both development/clearance sites and stewardship sites.

- Ecosystem credits, these are credits generated for impacts on, or conservation of:
  - threatened ecological communities; and
  - threatened species habitat for species that can be reliably predicted to occur within a given plant community type (PCT) (referred to in the BAM as 'ecosystem credit species').

- Species credits, these are credits generated for impacts on, or conservation of, individuals and/or the habitat of threatened species which cannot be reliably predicted to occur in a given PCT (referred to in the BAM as 'species credit species').

The BAM Assessor documents the results of the biodiversity assessment in a Biodiversity Assessment Report (BAR), of which there are the following three types.

- Biodiversity Development Assessment Report (BDAR). A BDAR is developed to assess the likely biodiversity impacts of a development or vegetation clearing proposal.

- Biodiversity Certification Assessment Report (BCAR). A BCAR is developed to assess the likely biodiversity impacts of conferring biodiversity certification over a specific area of land.

- Biodiversity Stewardship Site Assessment Report (BSSAR). A BSSAR is developed to assess the likely biodiversity conservation gain of establishing a specific area of land as a biodiversity stewardship site under a formal Biodiversity Stewardship Agreement.

1.2.3 NSW *State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala habitat protection 2021*

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state-wide issues. The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (the 'Biodiversity and Conservation SEPP 2021') commenced on 1 March 2022 consolidating and replacing eleven former SEPPs, including the *State Environmental Planning Policy (Koala Habitat Protection) 2021*.

The subject land is in the Queanbeyan-Palerang Regional Council LGA and portions of the subject land are zoned 'R1 – General Residential' and 'C2 – Environmental Conservation'. As such, the Koala Habitat Protection 2021 applies to the proposed development.

'Chapter 4 Koala habitat protection 2021' of the *Biodiversity and Conservation SEPP 2021* –

> *aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.*

On land zoning and tenure located in LGAs to which Chapter 4 applies (listed in Schedule 4):

A. on land to which an approved koala plan of management applies, the council's determination of the development application must be consistent with the approved koala plan of management that applies to the land; or

B. on land to which no approved koala plan of management applies, and the land has an area of at least 1 hectare (including adjoining land within the same ownership), before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat.

As there is no approved Koala plan of management and the subject land has an area of at least 1 hectare, Scenario B of the Koala Habitat Protection 2021 applies to the proposed development

Where Scenario B applies –

> *(3) If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application.*
>
> *(4) If the council is satisfied that the development is likely to have a higher level of impact on koalas or koala habitat, the council must, in deciding whether to grant consent to the development application, take into account a koala assessment report for the development.*
>
> *(5) However, despite subsections (3) and (4), the council may grant development consent if the applicant provides to the council—*
>
> > *(a) information, prepared by a suitably qualified and experienced person, the council is satisfied demonstrates that the land subject of the development application—*
> >
> > > *(i) does not include any trees belonging to the koala use tree species listed in Schedule 3 for the relevant koala management area, or*
> > >
> > > *(ii) is not core koala habitat, or*
> >
> > *(b) information the council is satisfied demonstrates that the land subject of the development application—*
> >
> > > *(i) does not include any trees with a diameter at breast height over bark of more than 10 centimetres, or*
> > >
> > > *(ii) includes only horticultural or agricultural plantations.*

The Koala Habitat Protection 2021 applies in addition to any assessments required under the EPBC Act or the BC Act (i.e. BAM assessment).

1.3 Biodiversity Development Assessment Report

As prescribed under Part 6, Division 3, Section 6.12 of the BC Act, a BDAR is –

> *a report prepared by an accredited person in relation to proposed development or activity that would be authorised by a planning approval, or proposed clearing that would be authorised by a vegetation clearing approval, that:*
>
> *(a) assesses in accordance with the biodiversity assessment method the biodiversity values of the land subject to the proposed development, activity or clearing, and*
>
> *(b) assesses in accordance with that method the impact of proposed development, activity or clearing on the biodiversity values of that land, and*
>
> *(c) sets out the measures that the proponent of the proposed development, activity or clearing proposes to take to avoid or minimise the impact of the proposed development, activity or clearing, and*
>
> *(d) specifies in accordance with that method the number and class of biodiversity credits that are required to be retired to offset the residual impacts on biodiversity values of the actions to which the biodiversity offsets scheme applies.*

A BDAR prepared applying the BAM by an accredited BAM Assessor must accompany any development application for which the BOS is triggered. As detailed previously, the BOS is triggered for a proposed development which:

- will involve clearance of native vegetation (including trees, understorey plants, groundcover plants, and wetland plants) or a prescribed impact (as set out in clause 6.1 of the BC Regulation) on land identified on the Biodiversity Values Map; and/or
- will exceed the native vegetation clearance threshold for the smallest minimum lot size associated with the subject land; and/or
- may significantly impact one or more BC Act listed entities (i.e. threatened species or ecological communities).

With regard to the above, the minimum lot size designation for the subject land is 'U1 – 1,000m^{2}' (Queanbeyan LEP - *Lot Size Map - Sheet LSZ_001D and 001E*). Therefore, in accordance with Part 7, Clause 7.2 of the BC Regulation, if the BC Act 'native vegetation' (defined in Part 5A of the *Local Land Services Act 2013* as plant species indigenous to NSW) clearance exceeds 0.25 ha (2,500 m^{2}) in total, then the BOS is triggered.

As the proposed development will involve the clearance of 0.68 ha of BC Act 'native vegetation' (defined in Part 5A of the *Local Land Services Act 2013* as plant species indigenous to NSW), the BOS is triggered and a BDAR is required to assess the impacts of the proposed development.

The BAM provides a standard method for assessing the impacts of a development/clearance proposal. This theme should carry over to the resulting BDAR such that it is as concise as possible whilst still addressing all of the relevant elements of the BAM in order to provide a complete assessment of the proposed development.

1.3.1 Objectives and format

Developed to reflect the format of the BAM, this BDAR comprises the following two broad parts.

- Part 1 – Biodiversity Assessment (BAM Stage 1), includes assessment of the:
  - landscape context;
  - native vegetation, threatened ecological communities (TECs), vegetation integrity; and
  - habitat suitability for threatened species.
- Part 2 – Impact Assessment (BAM Stage 2), details the:
  - proposed measures to avoid, minimise and mitigate biodiversity impacts;
  - residual impacts (direct and indirect) of the proposed development; and
  - offset requirements relevant to the proposed development.

1.3.2 Technical resources and qualifications

This BDAR has been prepared by the following technical personnel.

- Robert Speirs – Director / Principal Ecologist

  BAppSc (Ecology), DipPM, MEIANZ, CEnvP-E, Accredited BAM Assessor (No: BAAS17089)
  Robert was project manager for this assessment and completed or closely supervised all field surveys, data entry, GIS mapping, and report preparation.

- Dr Sam Reid – Senior Ecologist

  BSc (Hons), PhD, MEIANZ, Accredited BAM Assessor (No: BAAS20006)
  Sam undertook field surveys and report review.

- Dr Catherine Ross – Consultant Ecologist

  BSc (Hons), PhD
  Catherine undertook field surveys, GIS mapping, and report preparation.

- Shannon Thompson – Ecologist

  BSc
  Shannon undertook field surveys.

- Belinda Wilson, Madeleine Tranter, Blaine Serafin – Casual Field Ecologists

  Belinda, Madeleine, and Blaine undertook field surveys and data entry.

All surveys for this assessment were undertaken in accordance with the following.

- Capital Ecology's (Robert Speirs – Principal Investigator) Animal Research Authority (ARA) granted under the NSW *Animal Research Act 1985* by the Animal Care and Ethics Committee of the Secretary of the Department of Regional NSW (CSB 15/2046).
- Capital Ecology's NSW Scientific Licence issued by the NSW Department of Climate Change, Energy, the Environment, and Water under Part 2 of the NSW *Biodiversity Conservation Act 2016* (SL101623).

1.3.3 Certification under clause 6.15 of the Biodiversity Conservation Act 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the NSW Biodiversity Assessment Method 2020 and clause 6.15 of the NSW *Biodiversity Conservation Act 2016*.

Name: Robert Speirs

Signature: 

Date: 30 October 2024

BAM Assessor Accreditation no: BAAS17089

1.3.4 Conflict of interest declaration

I declare that I have considered the circumstances and there is no actual, perceived, or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Name: Robert Speirs

Signature: 

Date: 30 October 2024

BAM Assessor Accreditation no: BAAS17089

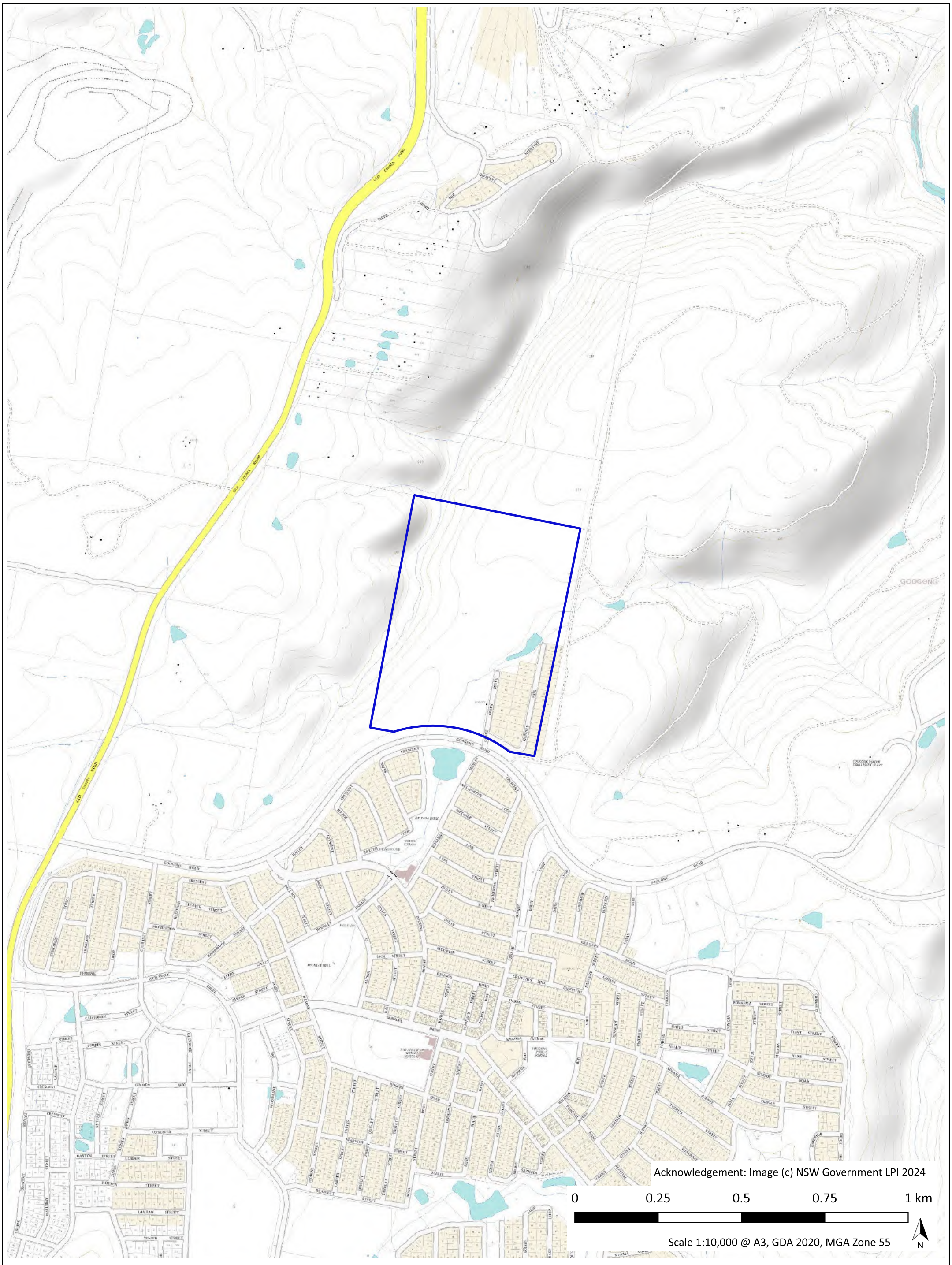


Figure 1. Locality Plan

Capital Ecology Project No: 3329
Drawn by: C. Ross
Date: 7 August 2024

Legend

Subject Land

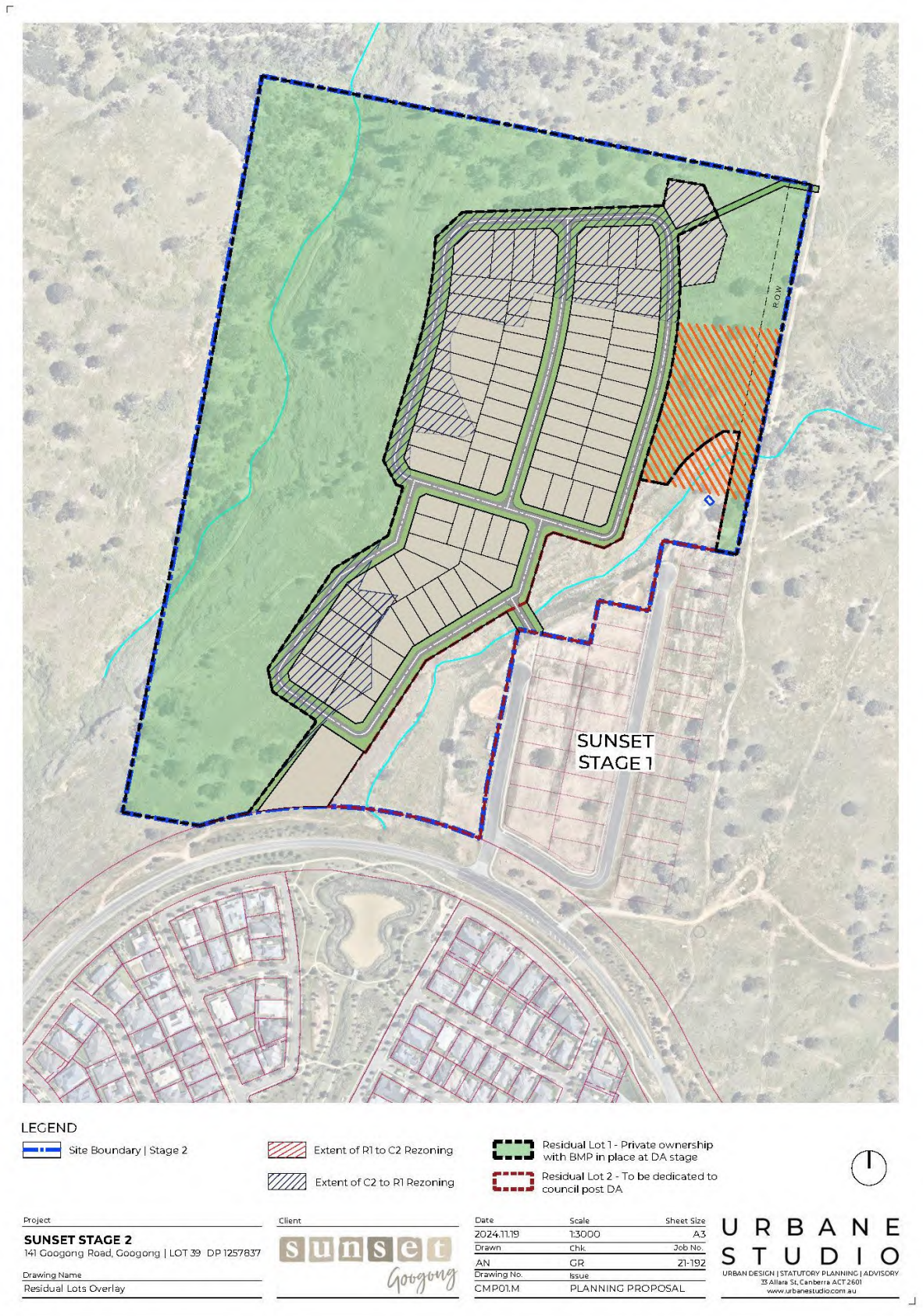
capital ecology

Figure 2. Subject Land and Proposed Development on Current Aerial Imagery

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 07/08/2024

capital ecology

Figure 3. Proposed Plan of Subdivision



2 Part 1 – Biodiversity Assessment (BAM Stage 1)

Part 1 of this BDAR provides an assessment of the biodiversity values of the subject land as set out in Stage 1 of the BAM.

2.1 Landscape Context

As detailed in the BAM, a range of landscape features must be identified where they occur in the subject land or within the assessment area surrounding the subject land. These features may contain/support biodiversity values that are important for the site context of the subject land, or for informing the likely habitat suitability of the subject land. Table 2 outlines the landscape features and overall landscape context of relevance to the subject land.

Table 2. Landscape features.

Landscape Feature	Description	Figure Reference
IBRA bioregion	The subject land occurs in the **South Eastern Highlands** IBRA bioregion.	-
IBRA subregion	The subject land occurs in the **Monaro** IBRA subregion.	-
BioNet NSW landscapes (Mitchell landscapes)	The subject land contains two Mitchell Landscapes: **Monaro Ranges** and **Canberra Plains.** The entire impact area is within the Monaro Ranges.	-
Rivers, streams and estuaries (Strahler[3] stream order)	The subject land contains two second-order ephemeral streams which originate to the south of the subject land and flow into the Queanbeyan River 1-2 km to the north-east. Both streams have significant weed infestations and do not support native riparian vegetation. These ephemeral streams are only likely to provide habitat to the common water birds, reptiles, and amphibians which occur in the locality.	Figure 2 Figure 4
Wetlands (important wetlands)	The subject land does not contain any important wetlands as listed in the Directory of Important Wetlands in Australia (DIWA) or coastal wetlands protected under *State Environmental Planning Policy No 14*.	-
Connectivity	The native woodland and grassy forest in the subject land is connected with a large area of remnant forest to the north-east, which connects to the Queanbeyan River. However, the land to the south has been extensively cleared and developed into the township of Googong. In light of the above, while the remnant vegetation in the subject land is likely to be of some habitat value to a variety of native fauna, the subject land is unlikely to constitute or comprise part of an important biodiversity corridor or other notable habitat connectivity feature.	Figure 5
Areas of geological significance and soil hazard	The subject land does not contain/support any karst, caves, crevices, cliffs, or other areas/features of geological significance. There are no hazard soil features.	-
Areas of outstanding biodiversity value	The subject land does not support or occur near any declared area of outstanding biodiversity value (AOBV).	-

[3] Strahler, AN (1952). *Hypsometric (area-altitude) analysis of erosional topology*. Geological Society of America Bulletin 63 (11): 1117–1142.

Landscape Feature	Description	Figure Reference
Percent native vegetation cover (buffer area)	A 1,500 m buffer was applied to the subject land resulting in an overall buffer area of 1,092 ha. This buffer area only contains woody PCTs (i.e. woodland, dry sclerophyll forest). Accordingly, the following two categories of native vegetation were defined to identify the total are of native vegetation in the buffer. 1. Woody vegetation – The areas which have a woody PCT and retain remnant woody vegetation or woody regrowth. 2. Non-woody vegetation – The areas which have a woody PCT from which the woody vegetation has been cleared, yet at least a substantial proportionate cover (i.e. > 35%) of native groundstorey species remains (often referred to as derived or secondary grassland). Native vegetation cover was first identified and mapped via interpretation of the available aerial imagery (ACT Government aerial imagery and NSW LPI). The presence of remnant canopy trees, cultivation patterns in paddocks, unnaturally green and/or uniform groundstorey vegetation etc., were important factors considered during aerial interpretation. Field reconnaissance was then undertaken to ground truth and refine the mapping where possible. This field reconnaissance involved driving the publicly accessible roads within the buffer area and making observations across paddocks etc. from the roadside. 1. Woody vegetation cover – 657 ha (60%) of the buffer area was determined to support native woody vegetation cover. 2. Non-woody vegetation cover – 13 ha (1%) of the buffer area was determined to support native non-woody vegetation cover. ↓ Total native vegetation cover – the total area of native vegetation cover in the buffer area is 670 ha (61%). This falls into the >30-70% cover class in the BAM Calculator.	Figure 5

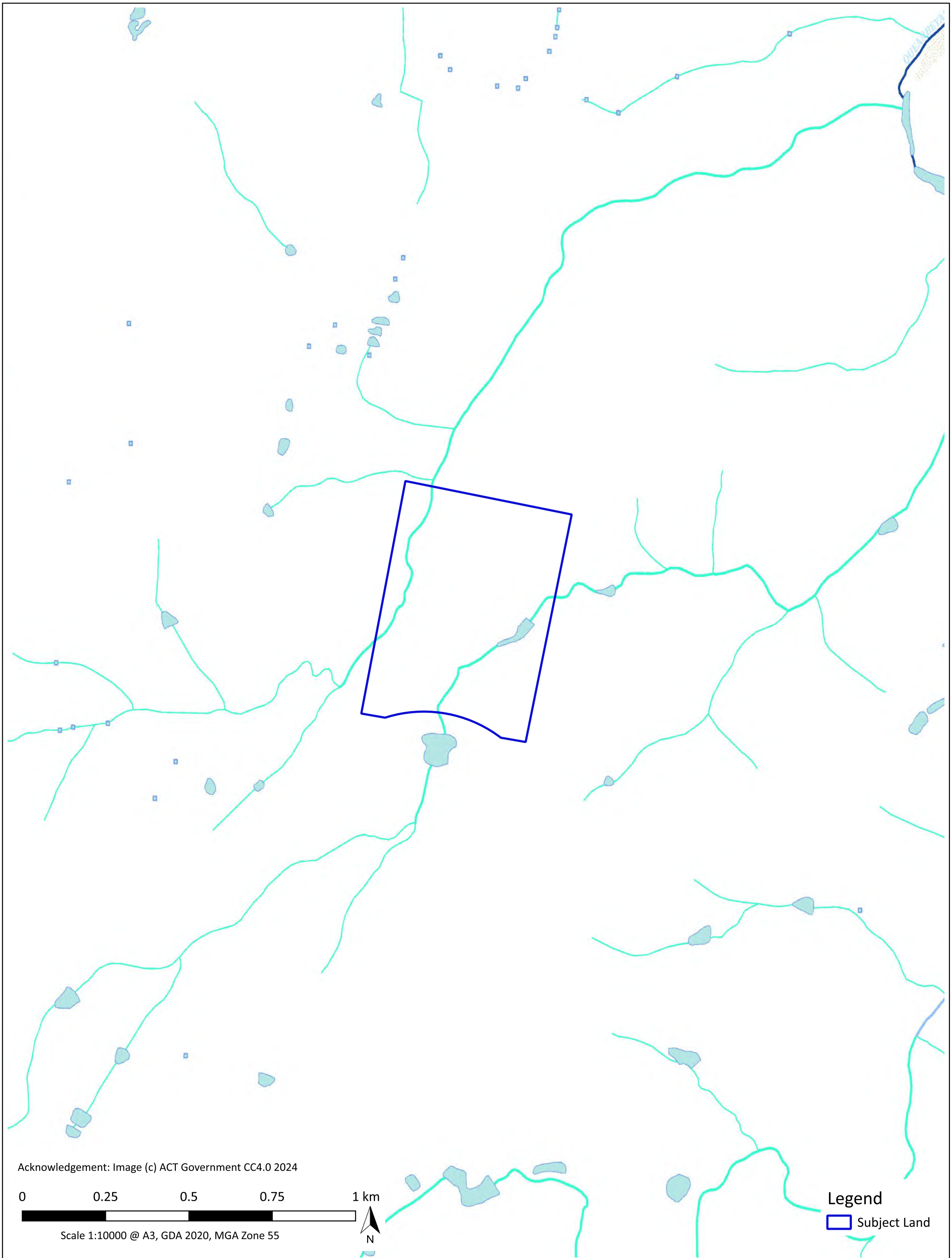


Figure 4. Hydrology

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 07/08/2024

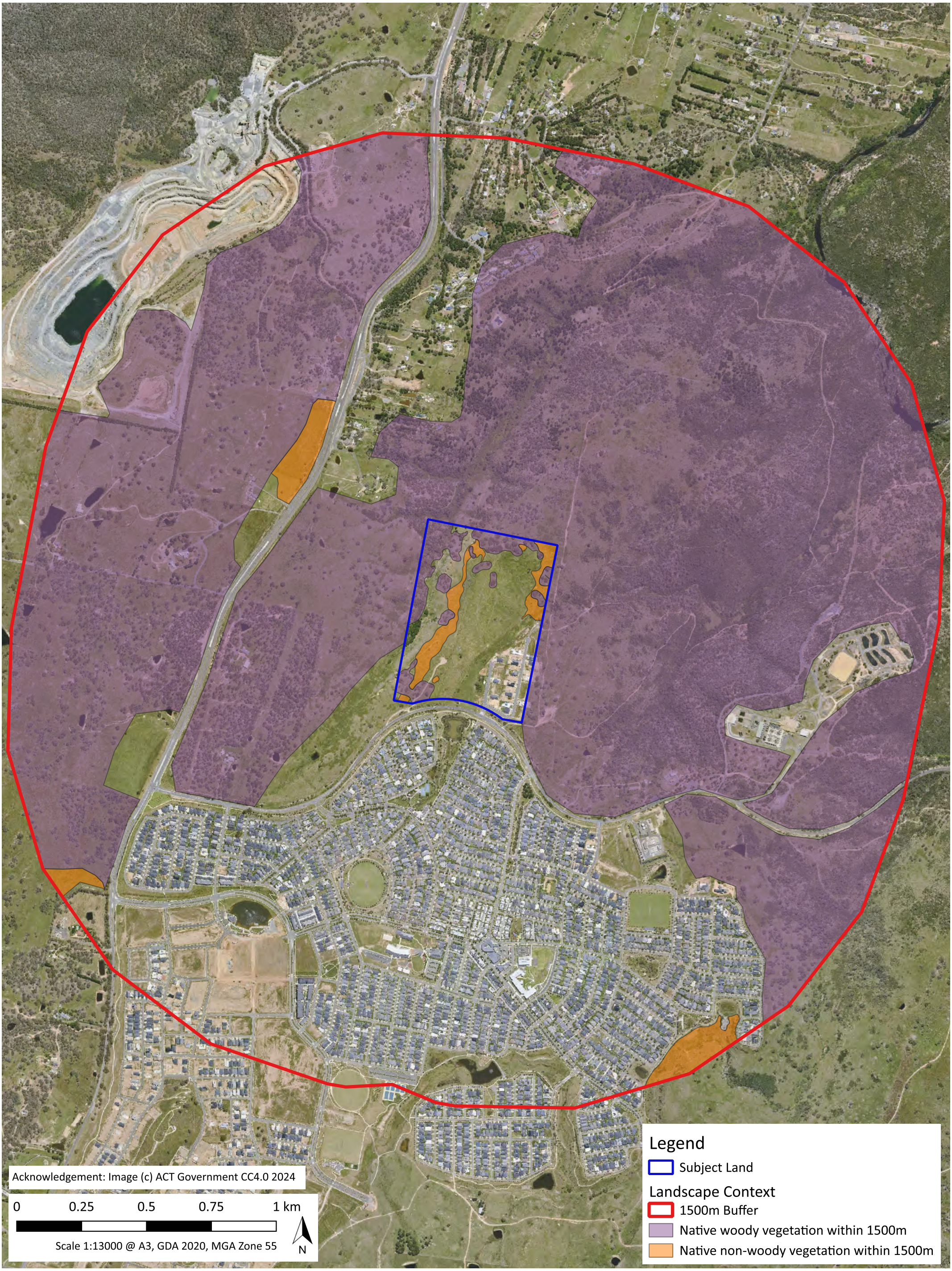


Figure 5. Site Map

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 11/09/2024

capital ecology

2.2 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity

2.2.1 Native vegetation extent

As per the BC Act, native vegetation is defined according to Part 5A of the *Local Land Services Act 2013* (LLS Act), which states –

> *(1) For the purposes of this Part, native vegetation means any of the following types of plants native to New South Wales:*
>
> *(a) trees (including any sapling or shrub or any scrub),*
>
> *(b) understorey plants,*
>
> *(c) groundcover (being any type of herbaceous vegetation),*
>
> *(d) plants occurring in a wetland.*
>
> *(2) A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible.*

As per this definition, planted vegetation which comprises plant species native to NSW, regardless of whether or not the species are indigenous to the specific region and/or PCT of the subject land, is classified as native vegetation.

The Commonwealth Government[4,5], ACT Government[6], and previous NSW Government[7] assessment guidelines for the temperate grassland and woodland PCTs of the NSW/ACT Southern Tablelands region each declare vegetation as native dominant if 50% or more of the perennial groundlayer is comprised of native species. However, no such threshold is defined by the BAM, and advice from the Department of Climate Change, Energy, the Environment, and Water (NSW DCCEEW) has been that the criteria for use in determining native vs. exotic dominance must be more stringent than the previously applied 50/50 rule. It is understood that this is due to the potential for seasonal variation and/or assessor disparity to substantially alter the BAM mapping result. For example, a patch of vegetation that is classified as 55% native in one season may be classified as 45% native in another.

With regard to the above, the following applies for the purposes of this BDAR (and the supporting BAM assessment).

1. 'Native vegetation' is defined as any plant, naturally occurring or planted, which is native to NSW.

[4] Commonwealth of Australia (2006). *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands*. Commonwealth Department of Climate Change, Energy, the Environment and Water.
[5] Commonwealth of Australia (2016). Approved conservation advice for the Natural Temperate Grassland of the South Eastern Highlands (NTG–SEH) ecological community.
[6] ACT Government (2010). *Survey guidelines for determining lowland vegetation classification and condition in the ACT*. Environment and Sustainable Development Directorate – Conservation Planning and Research.
[7] NSW Government (2014). *BioBanking Assessment Methodology 2014*. NSW Government Department of Climate Change, Energy, the Environment, and Water.

2. Exotic vegetation is defined as any plant which is not native to NSW.
3. A polygon of vegetation is 'native vegetation' if:
    a. 35% (i.e. approximately one-third) or more of the perennial groundlayer comprises species native to NSW; and/or
    b. species native to NSW are present in one or more of the other strata.

2.2.2 Vegetation survey and mapping methods

The vegetation throughout the subject land was surveyed and mapped in accordance with the BAM. Vegetation survey dates and survey effort are detailed in Table 3. The methodology involved the following.

- Mapping of the on-ground boundaries of the Plant Community Types (PCTs).
- Stratification of each PCT into vegetation zones reflecting the broad condition state of vegetation.
- The completion of a series of surveys to measure the composition, structure, and function attributes of the vegetation.

These steps are described in more detail below. The full BAM and supplementary resources are available online via the NSW DCCEEW website https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/accredited-assessors/biodiversity-assessment-method-2020.

It is important to note that the information and data collected during vegetation survey and mapping (Section 2.2.2.1 to 2.2.2.4) were also used to assess the subject land for the presence/ absence of habitat constraints and/or microhabitats for ecosystem credits species (Section 2.3.3) and species credit species (Section 2.3.4).

Table 3. Vegetation survey dates and survey effort.

Task	Method	Date	Personnel	Survey effort
PCT and Zone mapping	Random meander	28/09/2021	1 person	7 hours
Vegetation assessment	BAM plot	06/12/2021 07/12/2021	4 people 4 people	8 hours 16 hours
Remnant tree survey	Survey of mature trees	28/09/2021	1 person	5 hours

2.2.2.1 Plant Community Type (PCT) mapping

The on-ground boundaries of each of the PCTs present in the subject land were mapped by marking boundaries directly onto high resolution orthorectified aerial photograph field maps. The PCTs and their characteristics are provided in the NSW Vegetation Information System (VIS) https://www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm.

The PCTs were identified, and their boundaries defined, based on the:

- presence, species, growth form and density of remnant canopy trees and/or stags or stumps of these;
- presence and species of midstorey shrubs and trees;

- floristic composition of the groundstorey; and
- the landscape position and other geographical features (elevation, aspect, soils, apparent hydrology).

2.2.2.2 Vegetation zone definition and mapping

The mapped PCTs were further divided into vegetation zones based on the structure, floristic composition and overall condition ('condition state') of the vegetation. The vegetation zones were mapped in the field and then digitised using GIS which provided accurate calculations of the total area of each vegetation zone in the subject land.

Note that the vegetation zones in the subject land were identified and classified as per Table 4, which encompasses all of the regularly encountered woodland/forest condition states in the locality. While not all of the vegetation zones in Table 4 may be present within a given site, classifying vegetation in this manner enables accurate identification of vegetation condition and ensures consistency across all of Capital Ecology's projects within the region.

2.2.2.3 Survey plots/transects

A series of a BAM plots (i.e. vegetation assessment survey plot/transect sets) were completed to adequately sample each vegetation zone. As illustrated in Figure 9 from NSW Government (2020b[8]), each BAM Plot involved:

a. one 20 x 20 m (400 m^2) plot, used to assess the composition and structure attributes;

b. one 20 x 50 m plot (1,000 m^2) plot, used to assess the function attributes; and

c. five 1 m^2 sub-plots, used to assess average little cover (and other optional groundcover components) for the plot.

All BAM plot locations were selected randomly within the vegetation zone, by marking on a map and walking to the location. BAM plot locations were spread evenly throughout representative vegetation of the subject land (refer to Figure 6).

The number of BAM plots completed in each vegetation zone of the subject land was determined as per the minimum required plot numbers specified in Table 3 of the BAM.

As stated in Section 4.1.2 of the BAM:

> *Any part of the subject land that does not contain native vegetation does not need to be assessed under this chapter, **unless** the land is:*
>
> *a. proposed for restoration as part of a biodiversity stewardship site (see Stage 3), or*
>
> *b. assessed as habitat for threatened species according to Chapter 5.*
>
> *All parts of the subject land that do not contain native vegetation must be clearly shown on the Site Map. Justification as to why these areas do not support **any** native vegetation must be provided in the BAR.*

[8] NSW Government (2020b). *Biodiversity Assessment Method Operational Manual – Stage 1*. State of New South Wales and Department of Climate Change, Energy, the Environment, and Water.

With respect to this BDAR, all vegetation zones except PCT3375 Zone 12 and PCT3376 Zone 12 meet the definition of BC Act 'native vegetation'. However, PCT3375 Zone 12 and PCT3376 Zone 12 support a very small remnant native component (Appendix A and Appendix B). Accordingly, BAM plots were also completed in all zones. Surveying all zones ensured that the vegetation composition (including an accurate determination of BC Act native vegetation presence/absence) and potential threatened species habitat were accurately assessed across all of the vegetation condition types present in the subject land.

Table 4. Vegetation Zone classification for woodlands and forests: example shown for PCT3376 – Southern Tableland Grassy Box Woodland

PCT	Groundstorey Dominance (perennial) Native or Exotic	Mature characteristic canopy sp./spp. Present or Absent	Regeneration of characteristic canopy sp./spp. Present or Absent	Native Forb Diversity Low, Mod-High Low = < 12 sp. (disturbance tolerant spp. only) Mod-High = ≥12 sp.; incl. ≥ 1 important sp.; +/- disturbance sensitive spp.	Vegetation Zone ID
PCT3376 – *Southern Tableland Grassy Box Woodland*	Native	Present	Present	Mod-High	**3376 Zone 1**
				Low	**3376 Zone 2**
			Absent	Mod-High	**3376 Zone 3**
				Low	**3376 Zone 4**
		Absent	Present	Mod-High	**3376 Zone 5**
				Low	**3376 Zone 6**
			Absent	Mod-High	**3376 Zone 7**
				Low	**3376 Zone 8**
	Exotic	Present	Present	Low	**3376 Zone 9**
			Absent	Low	**3376 Zone 10**
		Absent	Present	Low	**3376 Zone 11**
			Absent	Low	**3376 Zone 12**

2.2.2.4 Remnant tree assessment

The subject land supports a number of mature, remnant eucalyptus trees. Several of these trees contain habitat features such as hollows, mistletoe, and stick nests, which may be of habitat value to native fauna (i.e. birds, bats, and arboreal mammals), potentially including threatened species. Particular attention was given to observations on the presence of fauna nesting in hollows or stick nests.

The remnant tree assessment surveyed all remnant trees within the subject land for their value to native fauna. Each tree containing habitat values as per above was recorded via hand-held GPS. Data collected includes:

- tree number (a unique number allocated to the tree);
- tree species;
- presence of hollows; and
- other habitat values such as stick nests, mistletoe etc.

2.2.3 BAM targeted survey methods

A number of threatened flora and fauna species were identified by the BAM as potentially occurring in the subject land (referred to as 'species credit species'). Some of these species were excluded from further consideration based on factors such as habitat constraints, degraded habitat, geographical limitations, or the absence of required microhabitat features. Survey dates and survey effort for the remaining species credit species considered to have the potential to occur in the subject land are detailed in Table 5. Weather conditions for survey dates are detailed in Table 6. In total, the survey effort for this BDAR totalled 75 person-hours.

Opportunistic observations of fauna and flora species in the subject land were taken during the field surveys completed for this BDAR. An inventory of all species identified in the subject land are presented in Appendix C. Maintaining an inventory in this manner ensures that the maximum possible diversity of species is recorded, and if present, any significant species are flagged.

Table 5. Flora and fauna survey dates and survey effort

Task	Method	Date	Personnel	Survey effort
Targeted threatened flora searches	Random meander through likely habitat	28/09/2021	3 people	15 hours
	Opportunistic observations[9]	28/09/2021 6/12/2021 7/12/2021	1-5 people	36 hours
Threatened bird survey	Area searches through likely habitat[10]	28/9/2021	1 person	5 hours
	Opportunistic observations[11]	28/09/2021 6/12/2021 7/12/2021	1-5 people	46 hours

[9] During PCT and Zone mapping, BAM plots, remnant tree surveys, and bird surveys.
[10] Concurrently with remnant tree survey
[11] During PCT and Zone mapping, BAM plots, threatened flora surveys, and Pink-tailed Legless Lizard survey.

Task	Method	Date	Personnel	Survey effort
Pink-tailed Legless Lizard survey	Rock turning survey[12]	28/9/2021	3 people	15 hours

Table 6. Survey weather conditions (Canberra Airport, ACT).

Date	Temperature Min-Max	Wind @ 9am	Rain
28/09/2021	2.1 – 20.0°C	Calm	0 mm
6/12/2021	6.8 – 19.7°C	22 km/h N	0 mm
7/12/2021	11.6 – 25.8°C	35 km/h WNW	0 mm

2.2.3.1 Threatened flora survey

Based on the location and the ecological communities present, the subject land was assessed as having the potential to support EPBC Act and/or BC Act listed threatened flora species. Some threatened flora species are identified by the BAM as a species credit species, which is a species for which presence/absence and habitat value cannot be reliably predicted by location, vegetation type, and vegetation condition. Accordingly, targeted surveys are required to determine the species credit value of the subject land for these species.

Therefore, targeted threatened flora surveys were conducted across the subject land (Figure 10). The survey involved three ecologists walking through potential habitat, targeting threatened flora species (totalling 15 hours of effective survey effort). When detected, significant species identified were recorded via a GPS waypoint.

In farmland which has been pasture improved, cultivated, and/or grazed for a prolonged period, threatened flora may only persist in those areas which are difficult to pasture improve/cultivate or which are subject to a low level of grazing pressure. Often, these areas are characterised by the presence of imbedded and/or loose surface rock. As such, the majority of the targeted threatened flora surveys were conducted concurrently with rock turning surveys for threatened reptiles (Figure 10).

2.2.3.2 Targeted bird survey

Based on the location and the ecological communities present, the subject land was assessed as having the potential to support EPBC Act and/or BC Act listed threatened bird species. Some threatened bird species are identified by the BAM as a species credit species. Accordingly, targeted surveys are required to determine the species credit value of the subject land for these species.

Therefore, targeted threatened bird surveys were conducted across the subject land. These surveys occurred concurrently with the remnant tree survey (refer to Section 2.2.2.4), as well as opportunistic observations during PCT and Zone mapping, BAM plots, threatened flora surveys, and Pink-tailed Legless Lizard survey. Particular attention was given to recording signs of fauna nesting in hollows and/or on large stick nests (e.g. individuals in hollows, scratch/chew marks, birds flying off nests, birds 'on station'). If detected, significant species identified were recorded via a GPS waypoint and notes were taken on any nesting/breeding activity.

[12] Concurrently with targeted threatened flora search.

2.2.3.3 Threatened reptile survey

A targeted survey for Pink-tailed Legless Lizard was completed on 28 September 2021 (concurrently with threatened flora searches). The weather conditions for the surveys are summarised in Table 6. These conditions were considered optimal for Pink-tailed Legless Lizard survey.

Prior to the on-ground surveys, Capital Ecology analysed aerial imagery in order to identify areas of potential habitat (i.e. areas containing surface rock) across the subject land. As shown in Figure 10, each patch of potential threatened reptile habitat in the subject land was surveyed. Approximately 15 person-hours were spent during the survey (three ecologists for approximately 5 hours) which involved the following.

- Searches for Pink-tailed Legless Lizard individuals (or sloughed skins) by carefully turning rocks over and then placing them back into position.
- Turning a minimum of 500 rocks per patch (considered adequate for confirming occurrence at large sites based on averages for detection presented in Jones 1999[13]), or until a Pink-tailed Legless Lizard was found and thus presence in the patch confirmed. Where it was not possible to turn 500 rocks because of a shortage of surface rock, all possible rocks were turned.

If discovered, each Pink-tailed Legless Lizard is classified as either an adult (≥12 cm total length), juvenile (≤12 cm total length), or sloughed skin, and the position recorded via a handheld GPS.

The above survey methodology is consistent with the Commonwealth Survey Guidelines[14].

[13] Jones, S.R. (1999). *Conservation biology of the pink-tailed worm lizard (Aprasia parapulchella)*. PhD thesis Applied Ecology research group, University of Canberra.
[14] Department of Sustainability Environment, Water, Population and Communities (2011). *Survey guidelines for Australia's threatened reptiles.* Commonwealth of Australia, Canberra.

2.2.4 Vegetation survey and mapping results

2.2.4.1 Plant Community Type (PCT) mapping

Before European occupation, the majority of the subject land would have been characterised by a grassy woodland dominated by Yellow Box *Eucalyptus melliodora*, while the gully in the north-western part of the subject land would have supported a grassy forest dominated by Apple Box *E. bridgesiana* and Red Box *E. polyanthemos*.

The PCTs in the subject land were determined via the NSW Vegetation Information System (VIS) using the following filters:

- IBRA Bioregion – contains 'South Eastern Highlands';
- IBRA Subregion – contains 'Monaro'; and
- Vegetation Formation – contains 'Grassy Woodlands' and 'Dry Sclerophyll Forests (Shrubby sub-formation)'.

This process resulted in 11 candidate PCTs.

- Grassy Forest / Dry Sclerophyll Forest. Of the potential PCTs, PCT3375 best reflected the dominant overstorey species (*E. bridgesiana* and *E. polyanthemous*), community structure, and landscape position description, and is identified on the NSW State Vegetation Type Map (STVM) as occurring in the subject land.
- Grassy Woodland. Of the potential PCTs, PCT3376 best reflected the dominant overstorey species (*E. melliodora*), community structure, landscape position description, and is identified on the STVM as occurring in the subject land.

The two PCTs occurring in the subject land are shown in Figure 6 and detailed in Table 7.

The subject land has been used for residential and agricultural purposes and has undergone substantial vegetation clearance, pasture improvement, and livestock grazing. This has led to extensive clearing of the native woody overstorey, midstorey, and shrubstorey across the central and eastern parts of the subject land. The cleared land has been cultivated, grazed by livestock, or otherwise intensely utilised for agriculture over a long period of time, and as such, is dominated by exotic pasture grass species including Wild Oats *Avena sp.,* Brome *Bromus sp.*, and Ryegrass *Lolium sp.*

In contrast, other parts of the subject land have retained patches of remnant native vegetation in varying condition. The western part of the subject land contains a gully, with largely intact grassy forest on the western slope and moderate to high diversity derived grassland on the eastern slope. Several patches of remnant grassy woodland and derived native grassland occur in the north-eastern and south-western parts of the subject land, consisting of mature Yellow Box in the upper stratum and a lower stratum supporting a moderate to high diversity of native grasses and forbs, including some uncommon and threatened species. However, these patches do not contain any regeneration of the overstorey and the midstorey and shrubstorey are absent.

Table 7. PCTs recorded in the subject land

PCT	PCT name	PCT description	Occurrence in subject land	TEC status Commonwealth / NSW	PCT % cleared
3375	Monaro-Queanbeyan Rolling Hills Grassy Forest	A tall grassy sclerophyll open forest. Composition of the tree canopy is quite variable and may include *Eucalyptus bridgesiana* and rarely *E. viminalis*, *E. dives* or *E. nortonii.* Scattered shrubs commonly include *Bursaria spinosa, Acacia dealbata, Ozothamnus conditus, Cassinia longifolia* or *Acacia mearnsii*, over a grassy ground layer.	The PCT was mapped in the western part of the subject land, as well as a small patch in the north-east corner.	Not listed	61%
3376	Southern Tablelands Grassy Box Woodland	A tall sclerophyll woodland with a dry shrub layer and a mid-dense, grassy groundcover. The canopy almost always includes *Eucalyptus melliodora* or *E. bridgesiana*, occasionally associated with *E. blakelyi* which may be locally prominent in lower parts of the landscape. The shrub layer is sparse to absent with occasional, scattered *Melichrus urceolatus, Lissanthe strigosa* or various *Acacia* species.	This PCT was mapped in the eastern two-thirds of the subject land.	Critically Endangered (Commonwealth and NSW) when occurring in a condition consistent with the listing criteria of the TEC.	93%

2.2.4.2 Vegetation zones

The two PCTs occurring in the subject land were further classified into twelve vegetation zone. A total of 18 BAM plots were surveyed across the twelve vegetation zones. The locations of the plots are shown in Figure 6, and the full results are presented in Appendix A and B. The characteristics of the vegetation zones are summarised in Table 8 to Table 19.

The characteristics of the vegetation zones are summarised as follows.

PCT 3375 – *Monaro-Queanbeyan Rolling Hills Grassy Forest*

- Zone 1 – Canopy – Regeneration – Native Dominant – Moderate/High Diversity.
- Zone 2 – Canopy – Regeneration - Native Dominant – Low Diversity.
- Zone 5 – Regeneration – Native Dominant – Moderate/High Diversity.

- Zone 8 – Native Dominant – Low Diversity.
- Zone 9 – Canopy – Regeneration – Exotic Dominant – Low Diversity.
- Zone 12 – Exotic Dominant – Low Diversity.

PCT 3376 – *Southern Tablelands Grassy Box Woodland*

- Zone 3 – Canopy – Native Dominant – Moderate/High Diversity (EPBC Box-Gum Woodland).
- Zone 4 – Canopy – Native Dominant – Low Diversity (EPBC Box-Gum Woodland).
- Zone 7 – Native Dominant – Moderate/High Diversity (EPBC Box-Gum Woodland).
- Zone 8 – Native Dominant – Low Diversity.
- Zone 10 – Canopy - Exotic Dominant – Low Diversity.
- Zone 12 – Exotic Dominant – Low Diversity.

2.2.4.3 Tree Habitat Assessment

The subject land supports a large number of mature remnant trees. Of these, 32 support at least one functional hollow or other habitat feature (Figure 8, Appendix D).

Two trees were observed to contain very large stick nests, one of which was currently occupied by a Wedge-tailed Eagle *Aquila audax* (determined by the presence of fresh foliage in the nest and fresh scat under the tree).

2.2.4.4 BC Act Native Vegetation

PCT3375 Zones 1, 2, 5, 8, and 9, and PCT3376 Zones 3, 4, 7, 8, and 10 meet the definition of BC Act 'native vegetation' (Figure 7). PCT3375 Zone 12 and PCT3376 Zone 12 do not meet the definition of BC Act 'native vegetation' as they have a groundstorey clearly dominated by exotic grasses and forbs (i.e. >65% perennial exotic) and do not contain a cover of native trees and/or shrubs. As shown in Figure 7, the subject land supports a total of 13.92 ha of BC Act native vegetation.

2.2.4.5 Threatened Ecological Communities

The areas mapped as PCT3376 would historically have supported the Box-Gum Grassy Woodland (BGW) Threatened Ecological Community (TEC) which is listed as Critically Endangered under the EPBC Act and the BC Act. However, some of these areas have been historically cleared and cultivated, and no longer meet the definition for the TEC (i.e. Zone 12).

As discussed in Section 2.2.5, PCT3376 Zones 3, 4, and 7 meet the definition of EPBC Act '*White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands'* (EPBC Act Box-Gum Woodland). In addition to PCT3376 Zones 3, 4, and 7, Zones 8 and 10 also meet the definition of BC Act '*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the South Eastern Highlands'* (BC Act Box-Gum Woodland).

The subject land therefore supports 1.99 ha of EPBC Act Box-Gum Woodland and 3.99 ha of BC Act Box-Gum Woodland (Figure 7).

Table 8. PCT3375 Zone 1 results summary

	PCT3375 Zone 1
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* This zone occurs on the slopes of the gully in the western part of the subject land, largely on the western side with small patches on the eastern slope. The midstorey has been historically thinned and the groundstorey has a moderate diversity of native forbs with a moderate to high cover of weeds, particularly Blackberry *Rubus fruiticosus.*
Area – subject land	3.82 ha (2 BAM plots assessed)
Area – impact	0 ha
Overstorey Species	Dominant: *E. bridgesiana*. Associate: *E. pauciflora*
Overstorey Cover	15-40%
Overstorey Regeneration	Yes
Perennial Groundlayer	56% - 81% native
Understorey	24-33 recorded native species, 19-25 native non-grass species
Exotic species	16-23 exotic species. Important weeds include Blackberry, Briar Rose *Rosa rubiginosa,* Patterson's Curse *Echium plantagineum,* St John's Wort *Hypericum perforatum.*
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	Yes

Table 9. PCT3375 Zone 2 results summary

	PCT3375 Zone 2
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* Zone 2 occurs in several small patches across the subject land. The midstorey has been largely cleared and the understorey supports a low diversity of native forbs with a moderate cover of weeds.
Area – subject land	0.35 ha (1 BAM plot assessed)
Area – impact	0 ha
Overstorey Species	Dominant: *E. polyanthemos*
Overstorey Cover	20%
Overstorey Regeneration	Yes
Perennial Groundlayer	71% native
Understorey	29 recorded native species, 22 native non-grass species
Exotic species	29 exotic species. Important weeds include Patterson's Curse, St John's Wort, Blackberry, Briar Rose, Serrated Tussock *Nassella trichotoma*, Scotch Thistle *Onopordum acanthium.*
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	Yes

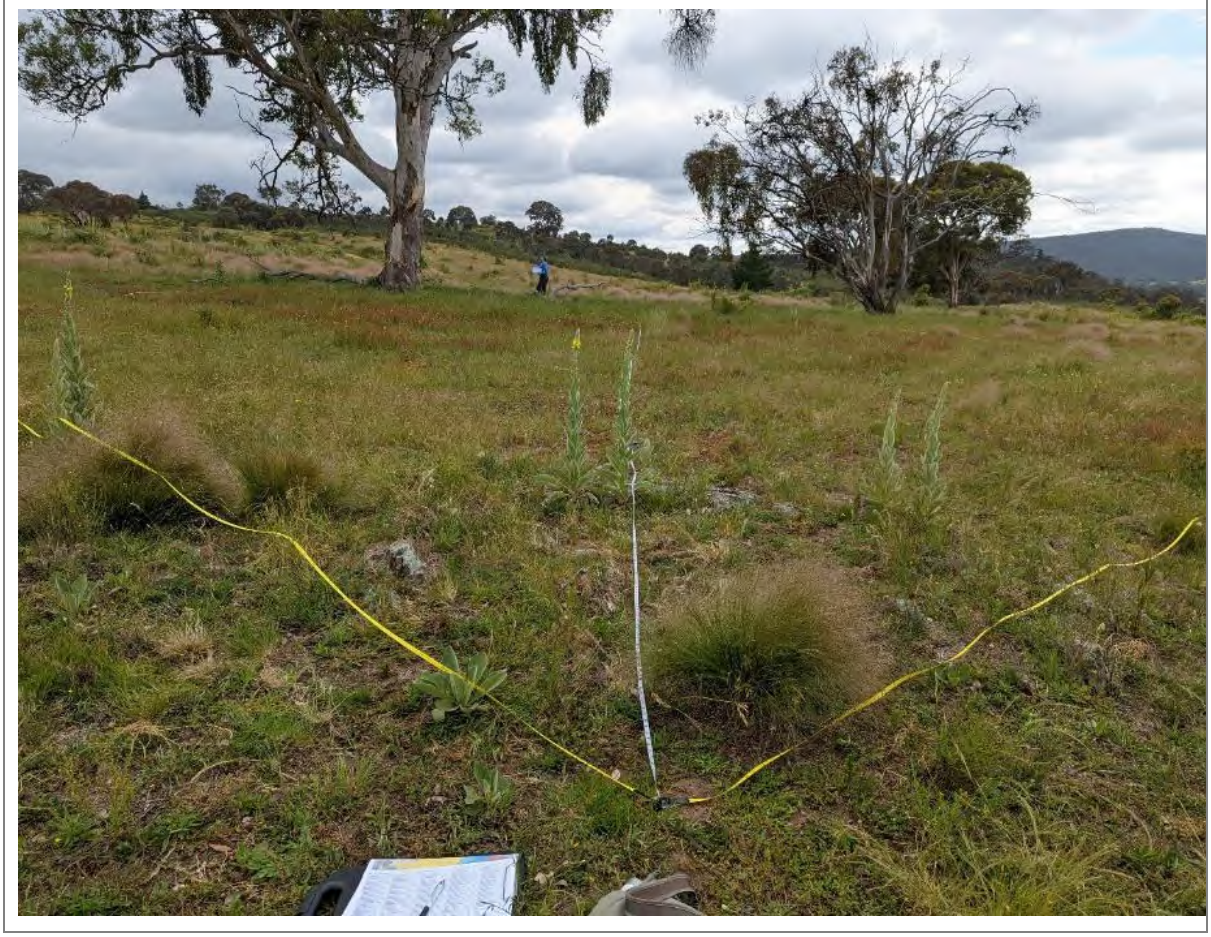


Table 10. PCT3375 Zone 5 results summary

	PCT3375 Zone 5
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* – Derived Grassland Zone 5 occurs on the steep rocky slopes on the eastern side of the gully. The native canopy has been historically cleared, but there is some scattered regeneration. The groundstorey supports a high cover and diversity of native species.
Area – subject land	2.76 ha (2 BAM plots assessed)
Area – impact	0 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	Scattered
Perennial Groundlayer	81% - 90% native
Understorey	25-27 recorded native species, 18-21 native non-grass species
Exotic species	19-21 exotic species. Important weeds include Briar Rose, Blackberry, Serrated Tussock, Patterson's Curse, St John's Wort, Saffron Thistle *Carthamus lanatus*
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	Yes

Table 11. PCT649 Zone 8 results summary

	PCT3375 Zone 8
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* – Native Pasture Zone 8 consists of low diversity derived grassland on the upper parts of the eastern gully slope, and in the north-eastern part of the subject land. This zone has a high cover of weeds such as Serrated Tussock, Briar Rose, and Blackberry.
Area – subject land	2.55 ha (2 BAM plots assessed)
Area – impact	0.06 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	No
Perennial Groundlayer	36% - 62% native
Understorey	15-24 recorded native species, 9-15 native non-grass species
Exotic species	21-23 exotic species. Important weeds include Serrated Tussock, Briar Rose, Blackberry, Patterson's Curse, Saffron Thistle
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	Yes

Table 12. PCT3375 Zone 9 results summary

	PCT3375 Zone 9
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* – Exotic Groundstorey This zone has retained the native canopy, but the groundstorey has been cultivated and has a high cover of pasture species and weeds.
Area – subject land	0.44 ha (1 BAM plot assessed)
Area – impact	0.10 ha
Overstorey Species	Dominant: *E. polyanthemos*
Overstorey Cover	40%
Overstorey Regeneration	Yes
Perennial Groundlayer	10% native
Understorey	13 recorded native species, 8 native non-grass species
Exotic species	24 exotic species. Important weeds include Patterson's Curse, St John's Wort, Scotch Thistle
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	Yes

Table 13. PCT3375 Zone 12 results summary

	PCT3375 Zone 12
Description	PCT3375 - *Monaro-Queanbeyan Rolling Hills Grassy Forest* – Exotic pasture Zone 12 occurs in the bottom of the gully and a small patch in the north-east of the subject land. This zone has been historically cleared and is dominated by exotic species such as Blackberry. Part of the gully also contains a stand of White Poplar *Populus alba.*
Area – subject land	2.22 ha (2 BAM plots assessed)
Area – impact	0.64 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	No
Perennial Groundlayer	7% - 47% native
Understorey	7-19 recorded native species, 4-13 native non-grass species
Exotic species	17-18 exotic species. Important weeds include Blackberry, Briar Rose, Patterson's Curse, Serrated Tussock, Scotch Thistle, White Poplar.
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	No

Table 14. PCT3376 Zone 3 results summary

	PCT3376 Zone 3
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* Zone 3 occurs in three small patches in the north-east of the subject land. This zone has been historically thinned but retains a moderate diversity of native species. The northern patch appears to be used as a stock camp and has a moderate cover of weeds.
Area – subject land	0.44 ha (1 BAM plot assessed)
Area – impact	0 ha
Overstorey Species	Dominant: *E. melliodora*
Overstorey Cover	50%
Overstorey Regeneration	No
Perennial Groundlayer	51% native
Understorey	25 recorded native species, 18 native non-grass species
Exotic species	30 exotic species. Important weeds include Patterson's Curse, St John's Wort, Serrated Tussock, Scotch Thistle, Blackberry, Briar Rose.
EPBC Act and/or BC Act listed TEC	Yes (EPBC Act / BC Act Box-Gum Woodland)
BC Act Native Vegetation	Yes

Table 15. PCT3376 Zone 4 results summary

	PCT3376 Zone 4
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* This zone has been historically thinned but retains a low diversity of native species. The northern patch appears to be used as a stock camp and has a high cover of weeds.
Area – subject land	0.99 ha (1 BAM plot assessed)
Area – impact	0 ha
Overstorey Species	Dominant: *E. melliodora*
Overstorey Cover	50%
Overstorey Regeneration	No
Perennial Groundlayer	34% native.
Understorey	16 recorded native species, 13 native non-grass species
Exotic species	32 exotic species. Important weeds include Saffron Thistle, St John's Wort, Patterson's Curse, Serrated Tussock, Scotch Thistle, Blackberry.
EPBC Act and/or BC Act listed TEC	Yes (EPBC Act Box-Gum / BC Act Woodland)
BC Act Native Vegetation	Yes

Table 16. PCT3376 Zone 7 results summary

	PCT3376 Zone 7
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* – Derived Grassland Zone 7 consists of a two small patches of moderate-high diversity derived grassland. There is some erosion in the drainage line and a low cover of weeds such as Serrated Tussock and Briar Rose.
Area – subject land	0.56 ha (1 BAM plot assessed)
Area – impact	0 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	No
Perennial Groundlayer	82% native
Understorey	34 recorded native species, 28 native non-grass species
Exotic species	21 exotic species. Important weeds include Patterson's Curse, St John's Wort, Briar Rose, Blackberry, Serrated Tussock.
EPBC Act and/or BC Act listed TEC	Yes (EPBC Act Box-Gum / BC Act Woodland)
BC Act Native Vegetation	Yes

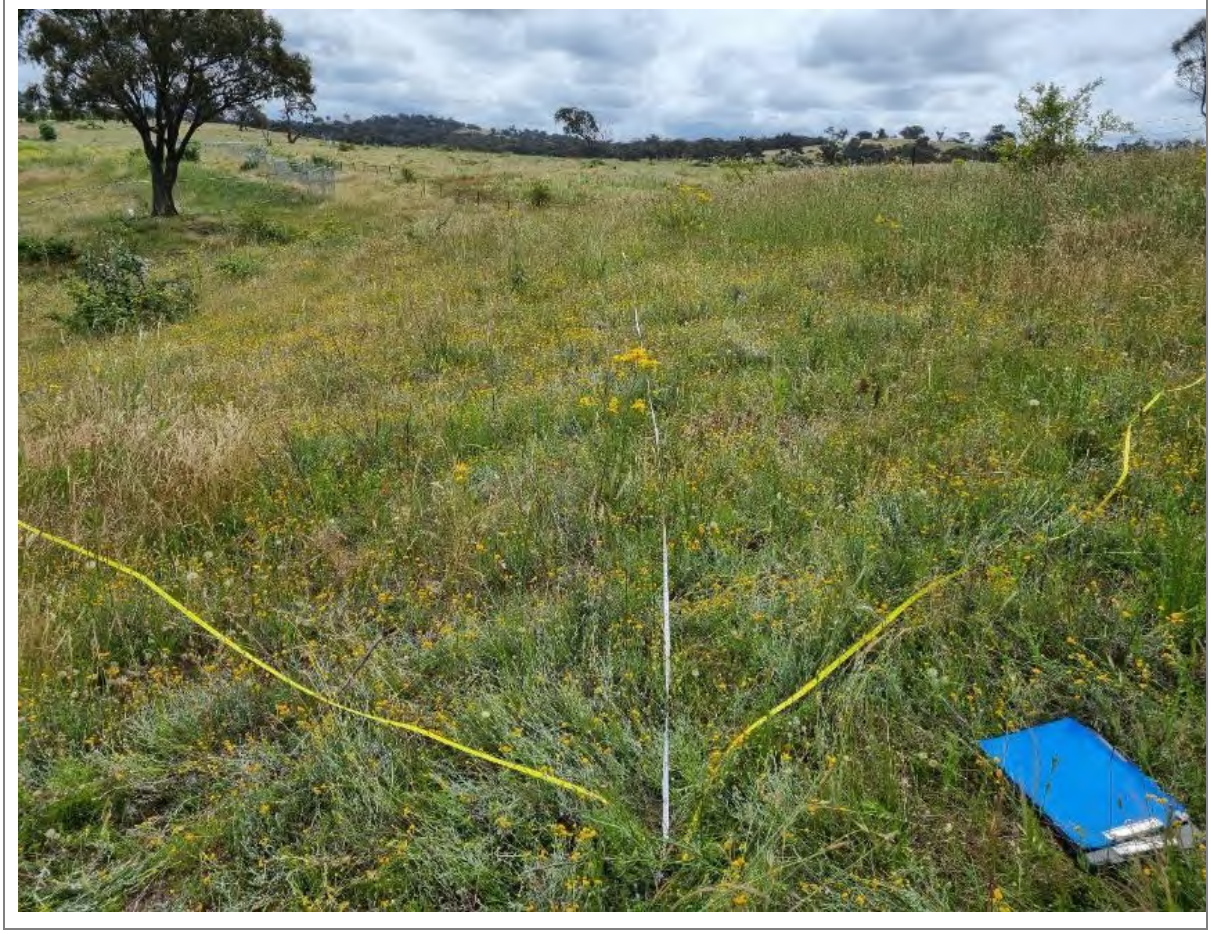


Table 17. PCT3376 Zone 8 results summary

	PCT3376 Zone 8
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* – Native Pasture Zone 8 consists of low diversity native pasture and occurs in small patches in the northeast and southwest of the subject land. These areas have not been cultivated but have a moderate cover of exotic grasses and weeds, particularly Serrated Tussock.
Area – subject land	0.95 ha (1 BAM plot assessed)
Area – impact	0.06 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	No
Perennial Groundlayer	30% native
Understorey	16 recorded native species, 9 native non-grass species
Exotic species	20 exotic species. Important weeds include Serrated Tussock, Patterson's Curse, Blackberry.
EPBC Act and/or BC Act listed TEC	Yes (BC Act Box-Gum Woodland)
BC Act Native Vegetation	Yes

Table 18. PCT3376 Zone 10 results summary

	PCT3376 Zone 10
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* – Exotic Groundstorey Zone 10 consists of small patches of mature trees surrounded by exotic pasture. The understorey has been cleared and cultivated and is dominated by a mix of exotic pasture species and weeds, particularly Rye Grass, Wild Oats, and Brome. This zone supports a very low diversity of disturbance tolerant native species.
Area – subject land	1.05 ha (1 BAM plot assessed)
Area – impact	0.46 ha
Overstorey Species	Dominant: *E. melliodora*
Overstorey Cover	5%
Overstorey Regeneration	No
Perennial Groundlayer	20% native
Understorey	12 recorded native species, 6 native non-grass species
Exotic species	15 exotic species. Important weeds include Serrated Tussock, Scotch Thistle, Blackberry, Briar Rose.
EPBC Act and/or BC Act listed TEC	Yes (BC Act Box-Gum Woodland)
BC Act Native Vegetation	Yes

Table 19. PCT3376 Zone 12 results summary

	PCT3376 Zone 12
Description	PCT3376 – *Southern Tablelands Grassy Box Woodland* – Exotic Pasture Zone 12 is found throughout the central area of the subject land and consists of cultivated paddocks dominated by pasture grasses and weeds with a low diversity of native species.
Area – subject land	12.08 ha (3 BAM plots assessed)
Area – impact	9.85 ha
Overstorey Species	N/A
Overstorey Cover	0%
Overstorey Regeneration	No
Perennial Groundlayer	7% - 27% native
Understorey	5-14 recorded native species, 3-12 native non-grass species
Exotic species	16-27 exotic species. Important weeds include Serrated Tussock, Saffron Thistle, Scotch Thistle, Patterson's Curse, St John's Wort, Blackberry, Briar Rose.
EPBC Act and/or BC Act listed TEC	No
BC Act Native Vegetation	No

2.2.4.6 Patch size

As defined in the BAM, patch size is –

> *an area of native vegetation that:*
>
> > *a) occurs on the development site or biodiversity stewardship site, and*
> >
> > *b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30m for non-woody ecosystems).*
>
> *Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.*

With respect to the above, all zones (except PCT3376 Zone 11 and PCT3376 Zone 11), meet the definition of 'native vegetation' as per the BAM (refer to Figure 7). The native vegetation in the subject land is connected with a large area of remnant woodland to the north and east of the subject land (Figure 5). When native vegetation from adjoining land is considered, the patch size for all native vegetation zones falls within the >100 ha class as defined by the BAM (Table 20 and Table 21).

2.2.4.7 Vegetation integrity scores

Zones which support any amount of 'native vegetation', regardless of how small, and which occur in the development footprint are used to determine vegetation integrity scores and the impacts associated with the proposed development (refer to Figure 7). Zones which do not support ***any*** native vegetation do not require further assessment in the BAM except where:

(a) they are proposed for restoration as part of a biodiversity stewardship site; or

(b) they are assessed as habitat for threatened species.

PCT3375 Zone 1, 2, and 5 and PCT3376 Zones 3, 4, and 7 do not occur in the development footprint and so will not be directly impacted by the proposed development. As such, these zones do not require further assessment. However, they are included in Table 20 and Table 21 (grey filled columns) as identifying the composition, structure, function, and resulting vegetation integrity score is useful when discussing avoidance measures and impacts to SAII entities.

In addition, to the above, while PCT3375 Zone 12 and PCT3376 Zone 12 do not meet the definition of BC Act 'native vegetation' (see Section 2.1.3), they do support a very small native component (Appendix A). As such, these vegetation zones have been assessed to determine a vegetation integrity score and the impact associated with the proposed development.

Table 20 and Table 21 summarise the results of the BAM plot assessments and detail the composition, structure, function, and resulting vegetation integrity score for all vegetation zones. The detailed results are presented in Appendix A.

Table 20. Vegetation integrity scores - PCT 3375

	PCT3375 Zone 1	PCT3375 Zone 2	PCT3375 Zone 5	PCT3375 Zone 8	PCT3375 Zone 9	PCT3375 Zone 12
Native Canopy	Yes	Yes	No	No	Yes	No
Groundstorey	Native	Native	Native	Native	Exotic	Exotic
Native Diversity	Mod-High	Low	Mod-High	Low	Low	Low
Patch size	>100 ha	>100 ha	>100 ha	>100 ha	>100 ha	0 ha
Area - subject land	3.82 ha	0.35 ha	2.76 ha	2.55 ha	0.44 ha	2.22 ha
Area - impact	0 ha	0 ha	0 ha	0.06 ha	0.10 ha	0.64 ha
BAM plots assessed in the subject land	2	1	2	2	1	2
Composition condition score	81.9	69.3	71.6	49.7	33.8	36.1
Structure condition score	99.6	84.3	58.3	54.5	35.4	18.2
Function condition score	52.5	34.5	0.4	0.2	33.6	0.1
Current vegetation integrity score	**75.4**	**58.6**	**12.1**	**13.9**	**34.3**	**8.7**

Table 21. Vegetation integrity scores - PCT 3376

	PCT3376 Zone 3	PCT3376 Zone 4	PCT3376 Zone 7	PCT3376 Zone 8	PCT3376 Zone 10	PCT3376 Zone 12
Native Canopy	Yes	Yes	No	No	Yes	No
Groundstorey	Native	Native	Native	Native	Exotic	Exotic
Native Diversity	Mod-High	Low	Mod-High	Low	Low	Low
Patch size	>100 ha	>100 ha	>100 ha	>100 ha	>100 ha	0 ha
Area - subject land	0.44 ha	0.99 ha	0.56 ha	0.95 ha	1.05 ha	12.08 ha
Area - impact	0 ha	0 ha	0 ha	0.06 ha	0.46 ha	9.85 ha
BAM plots assessed in the subject land	1	1	1	1	1	3
Composition condition score	69.2	45.1	84.3	29.1	27.2	26.7
Structure condition score	76.9	56.5	58.8	16.3	12.9	2.7
Function condition score	61.1	54.9	15.1	2.2	11.9	0.6
Current vegetation integrity score	**68.7**	**51.9**	**42.1**	**10.1**	**16.1**	**4.1**

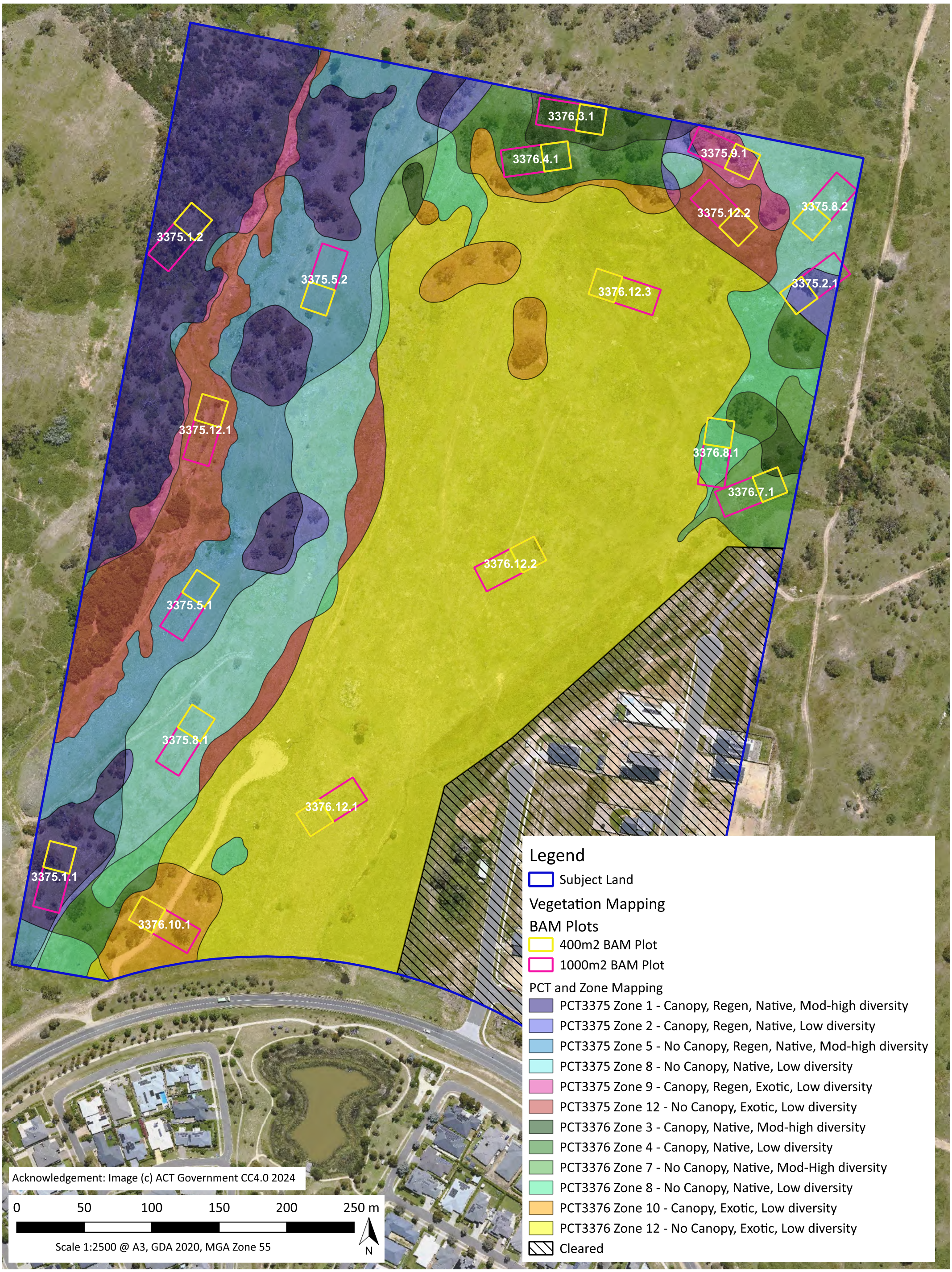


Figure 6. BAM Vegetation Mapping and Survey

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 07/08/2024

Figure 7. BC Act Native Vegetation and Threatened Ecological Communities

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 16/10/2024

Figure 8. Remnant Tree Assessment

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 07/08/2024

2.2.5 Threatened ecological communities

2.2.5.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

Two EPBC Act listed threatened communities have the potential to occur in the subject land, both listed as critically endangered under the EPBC Act: 'Natural Temperate Grassland of the South Eastern Highlands', and 'White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland' (EPBC Act Box-Gum Woodland). Based on the landscape position and species composition of the remnant trees on adjoining and nearby properties, only EPBC Act Box-Gum Woodland is considered to have the potential to occur within the subject land.

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland – listed as critically endangered pursuant to the EPBC Act

Description – The White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC is characterised by a species-rich understorey of native tussock grasses, herbs, and scattered shrubs (where shrub cover comprises less than 30% cover), and a dominance or prior dominance of White Box and/or Yellow Box and/or Blakely's Red Gum trees. This TEC occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through New South Wales and the Australian Capital Territory to Victoria.

Presence in the subject land – Confirmed – The portion of the subject land mapped as PCT3376 would have once supported the climax community of this TEC.

↓

To determine whether a patch meets the criteria for the community, the vegetation must be assessed against the criteria provided in *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands* (Commonwealth of Australia 2006[15]). Assessments of structure and floristic composition were undertaken in each of the six vegetation zones of PCT3376 present in the subject land. The results of this assessment are provided in Table 22.

It is important to note that the floristic diversity recorded in plots may be lower than expected. This is due to fact that BAM plots are 400 m^2 while the Commonwealth assessment process assumes plots of 1000 m^2. As a result, it is probable that within a specific patch of vegetation a 400 m^2 BAM plot would record fewer flora species than a 1000 m^2 plot.

As shown in Table 22 (Step 3), the factor described above may influence the assessment of whether a patch meets the criteria for EPBC Act Box-Gum Woodland. To account for this, a marginally lower than required floristic diversity is not used as a justification for excluding a given vegetation zone from consideration as EPBC Act Box-Gum Woodland.

As detailed in Table 22, Figure 6, and Figure 7, the areas mapped as PCT3376 Zone 3, Zone 4, and Zone 7 meet the criteria for the EPBC Act listed TEC. The subject land therefore supports 1.99 ha of EPBC Act Box-Gum Woodland.

[15] Commonwealth of Australia (2006). *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of Climate Change, Energy, the Environment, and Water.

Table 22. Assessment against the listing criteria for the EPBC listed TEC – White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Criterion	Assessment results					
	PCT3376 Zone 3	**PCT3376 Zone 4**	**PCT3376 Zone 7**	**PCT3376 Zone 8**	**PCT3376 Zone 10**	**PCT3376 Zone 11**
Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum?	Yes Yellow Box and/or Blakely's Red Gum are dominant throughout this zone.	Yes Yellow Box and/or Blakely's Red Gum are dominant throughout this zone.	Yes Yellow Box and/or Blakely's Red Gum are likely to have been historically dominant throughout this zone.	Yes Yellow Box and/or Blakely's Red Gum are likely to have been historically dominant throughout this zone.	Yes Yellow Box and/or Blakely's Red Gum are likely to have been historically dominant throughout this zone.	Yes Yellow Box and/or Blakely's Red Gum are likely to have been historically dominant throughout this zone.
Does the patch have a predominantly native understorey?	Yes The understorey was recorded as 51% native species cover.	Yes While the understorey was recorded as 35% native species cover from one plot, the wider vegetation zone was seen to support a greater cover of native species.	Yes The understorey was recorded as 82% native species cover.	Yes While the understorey was recorded as 30% native species cover from one plot, the wider vegetation zone was seen to support a greater cover of native species.	No The understorey was recorded as supporting 20% native species cover.	No The understorey was recorded as supporting an average of 14 % native species cover.
Is the patch 0.1 ha (1000 m^2) or greater in size with 12 or more native understorey species present (excluding grasses)? There must be at least one important species.	Yes The patch is greater than 0.1 ha in size and 18 native non-grass understorey species were recorded in the single plot.	Yes The patch is greater than 0.1 ha in size and 13 native non-grass understorey species were recorded in the single plot.	Yes The patch is greater than 0.1 ha in size and 28 native non-grass understorey species were recorded in the single plot.	No The patch is greater than 0.1 ha in size, but only 9 native non-grass understorey species were recorded in the single plot.	N/A See Criterion 2.	N/A See Criterion 2.
Or						
Is the patch 2 ha or greater in size with an average of 20 or more mature trees per hectare, or is there natural regeneration[16] of the dominant overstorey eucalypts?	No The patch is less than 2 ha and there is no natural regeneration.	No The patch is less than 2 ha and there is no natural regeneration	No The patch is less than 2 ha and there is no natural regeneration	No The patch is less than 2 ha and there is no natural regeneration	N/A See Criterion 2.	N/A See Criterion 2.
Does the patch meet the criteria for the listed TEC?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

[16] Defined in Commonwealth of Australia (2006) as '*natural regeneration of the dominant overstorey eucalypts when there are mature trees* [circumference of at least 125 cm at 130 cm above the ground] *plus regenerating trees of at least 15 cm circumference at 130 cm above the ground*.'

54

2.2.5.2 Biodiversity Conservation Act 2016 (NSW)

Based on the landscape position and recorded canopy species, only one BC Act listed ecological community has the potential to occur in the subject land: 'White Box – Yellow Box – Blakely's Red Gum Woodland' (BC Act Box-Gum Woodland).

BC Act Box-Gum Woodland

This community, listed as critically endangered in NSW, is described below, together with an assessment of its presence and condition in the subject land.

The below description is extracted from the NSW *Final Determination: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (NSW Threatened Species Scientific Committee 2020, gazetted 17 July 2020[17]).

> *4.2. White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is characterised by widely-spaced trees with canopies not touching and projected foliage cover generally less than 30% (Prober et al. 2017) ...Understorey shrubs are typically sparse or absent (Prober et al. 2017). The groundcover is dominated by perennial tussock grasses interspersed with a diverse range of forb species with the families Asteraceae and Fabaceae, and the orders Liliales and Asparagales well represented (Prober et al. 2017).*
>
> *4.3. White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is characteristically dominated by one or more of the species Eucalyptus albens (White Box), E. melliodora (Yellow Box) and E. blakelyi (Blakely's Red Gum) …A number of understorey species are typically found throughout almost the entire range of the community, with the exception of the extreme north of its distribution and areas where they have been excluded by grazing.*
>
> *4.10. The distribution of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland spans a range in elevation from approximately 170 m ASL on the western slopes of the Great Dividing Range to approximately 1200 m on the Northern Tablelands of NSW (Beadle 1981), although occurrences on the ranges are typically at lower elevations (Prober et al. 2017). The topography on which the community occurs ranges from flat in the west of its range to hilly and undulating in the east (Prober and Thiele 2004).*
>
> *4.12. …For the purpose of establishing the risk of ecosystem/community collapse due to ongoing decline in distribution, it is not possible on the basis of available data, to specify thresholds in either tree cover or species diversity which are indicative of loss of function because: i) no single threshold is appropriate for the range of circumstances and pathways leading to different states of degradation (and hence the potential for recovery); ii) the point at which an ecological community has ceased to function in its original form is inherently uncertain, and the scientific basis upon which symptoms such as loss of tree cover and diversity can be related to ecological function is not established in this case; and iii) recovery may be dependent on active remediation, therefore thresholds can not be determined in absolute terms because they depend on social (collective will) and economic (cost of remediation) factors.*
>
> *3.1.4. The condition of remnants ranges from relatively good to highly degraded, such as paddock remnants with weedy understories and only a few hardy natives left. Some remnants of*

[17] NSW Threatened Species Scientific Committee (2020a). *Final Determination: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. Gazetted 17 July 2020.

the community may consist of only an intact overstorey or an intact understorey but may still have high conservation value due to the flora and fauna they support.

The final determination does not provide specific listing criteria against which to assess a patch of vegetation. However, as described in the final determination, the definition for the BC Act Box-Gum Woodland TEC is extremely broad. In effect, any land for which the climax community is Box-Gum Woodland that has not been cleared and cultivated, become a stock camp, or otherwise been highly modified/degraded, is likely to meet the minimum definition of the BC Act listed TEC.

Presence in the subject land – Present – The areas mapped as PCT3376 would have historically supported woodland with Yellow Box as the most common species.

PCT3376 Zones 3, 4, 7, 8, and 10 have retained the remnant native overstorey and/or a native dominant groundstorey and therefore meet the criteria for the TEC. The condition of the BC Act listed TEC in the subject land varies as follows.

- PCT3376 Zones 3 (VI = 68.7), 4 (VI = 51.9), and 7 (42.1) support vegetation which meets the criteria for this TEC in high condition (i.e. EPBC Act Box-Gum Woodland).
- PCT3376 Zone 10 (VI = 16.1) supports vegetation which meets the criteria for this TEC in moderate condition (i.e. canopy over exotic groundstorey).
- PCT3376 Zone 8 (VI = 10.1) supports vegetation which meets the criteria for this TEC in low condition (i.e. cleared native pasture).

PCT3376 Zone 12 lacks a native overstorey and has a groundstorey that is highly modified and dominated by perennial exotic grasses and herbaceous weeds. As such, PCT3376 Zone 12 does not support vegetation which meets the criteria for this TEC under the BC Act.

Conclusion – the subject land supports 3.99 ha of BC Act Box-Gum Woodland in the areas defined by the extent of PCT3376 Zones 3, 4, 7, 8 and 10 (refer to Figure 6 and Figure 7).

2.2.6 High threat weeds

Table 23 lists the high threat weeds (as per the BAM High Threat Weeds list) that occur in the subject land.

Table 23. High threat weeds.

Species Name	Common Name	Status
Trees		
Pinus radiata	Radiata Pine	-
Populus alba	White Poplar	-
Shrubs		
Rubus fruiticosus	Blackberry	WoNS
Grasses		
Nassella trichotoma	Serrated Tussock	WoNS
Forbs		
Carthamus lanatus	Saffron Thistle	-
Cyperus eragrostis	Tall Flat-sedge	-
Echium plantagineum	Patterson's Curse	-

Species Name	Common Name	Status
Hypericum perforatum	St John's Wort	LM
Romulea rosea	Onion Grass	-
Rumex acetosella	Sheep Sorrel	-

Table key. Commonwealth Weed of National Significance = **WoNS**. Regional Priority Weed in the South East Regional Strategic Weed Management Plan[18] under the NSW *Biosecurity Act 2015*: **P** = Prevention; **E** = Eradication; **C** = Containment; **AP** = Asset Protection; **LM** = Species subject to Local Management programs.

2.3 Habitat Suitability for Threatened Species

2.3.1 Fauna habitat

The habitat features in the subject land were identified during the field surveys and assessed regarding their potential value to native fauna species, both threatened and common. The fauna habitat features of the subject land are described in Table 24. It is important to note that the information presented in Table 24 is also used to assess the presence/absence of habitat constraints and/or microhabitats for ecosystem credits species (Section 2.3.3) and species credit species (Section 2.3.4).

Table 24. Fauna habitat features.

Habitat Feature	Description	Relevant Native Fauna Species/Assemblages
Remnant eucalypts	The subject land contains numerous remnant mature eucalyptus, of which several were assessed as containing hollows or other habitat features (Figure 8, Appendix D).	All live remnant trees are likely to provide a foraging resource for a variety of birds and marsupials when in flower. Additionally, hollow-bearing trees may provide a nesting resource to several common generalist and threatened species of birds and marsupials. Large remnant trees have the potential to provide a nesting resource for raptors, including the Little Eagle *Hieraaetus morphnoides* and Wedge-tailed Eagle.
Other native vegetation (i.e. native shrubs, grasses and forbs)	PCT3375 Zones 1 and 2 support a largely intact grassy forest with a dense midstorey and shrubstorey. PCT3375 Zones 1, 2, 5 and 6, and PCT3376 Zones 3, 4, 7 and 8 support a native understorey with a low to high diversity of native grasses and forbs.	The midstorey and shrubstorey may provide foraging or breeding habitat for a number of common or threatened native bird and small mammal species that prefer dense vegetation. The native grasses and forbs may provide a foraging resource to a variety of native birds, reptiles, and herbivorous mammals. Open areas are likely to provide a hunting resource for raptors and other predatory birds.
Surface rocks and rocky outcrops	Loose surface rock and embedded rocky outcrops are scattered across a substantial portion of the subject land, particularly in the gully on the western side.	The loose surface rock is likely to provide refuge and foraging habitat for common herpetofauna and invertebrates. In addition, as shown in Figure 10, the rocky slopes of the gully on the western side of the subject land support habitat for the threatened Pink-tailed Legless Lizard.
Exotic pasture	PCT3375 Zone 12 and PCT3376 Zone 12 support a highly modified groundstorey	The exotic dominant pasture would provide a limited grazing resource for common birds, reptiles, and herbivorous mammals. Open areas are likely to

[18] https://www.lls.nsw.gov.au/__data/assets/pdf_file/0006/722706/South-East-Regional-Weed-Mgmt-Plan.pdf

Habitat Feature	Description	Relevant Native Fauna Species/Assemblages
	dominated by exotic pasture grasses and weeds.	provide a hunting resource for raptors and other predatory birds.
Creeks, streams, dams	The subject land contains two ephemeral 2nd order streams. Both streams are infested with weeds and do not support native riparian vegetation.	The streams may be of some value to common native water birds (e.g. Australian Wood Duck *Chenonetta jubata*), amphibians, and reptiles (e.g. Eastern Long-necked Turtle *Chelodina longicollis*).

2.3.2 Threatened biodiversity databases

2.3.2.1 Definitions of conservation significance

The conservation significance of a species, population or community is determined by its current listing pursuant to Commonwealth and/or State legislation and associated policy, more specifically:

- National – Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) pursuant to the EPBC Act; and
- State (NSW) – Listed as threatened (endangered or vulnerable) pursuant to the BC Act.

Species listed as 'migratory' under the EPBC Act are also considered where relevant.

2.3.2.2 Database and literature review

Information regarding the suitability of the habitat in the subject land for threatened species was obtained from the Threatened Biodiversity Data Collection (TBDC), BioNet (e.g. the profile of a threatened species), the BAM Calculator, listing determinations, and/or recovery plans prepared for the species by the Commonwealth Government and NSW Government. This information is used to assess the presence/absence of habitat constraints and/or microhabitats for species identified by the Commonwealth DEECCW online EPBC Act Protected Matters Search Tool (PMST) or flagged by the BAM as ecosystem credits species and species credit species (refer to Section 2.3.3 and Section 2.3.4).

In addition, a database search and literature review were completed to inform likelihood of occurrence assessments and provide useful background information for this assessment. This review included obtaining:

- a list of threatened species (flora and fauna), threatened populations and threatened ecological communities (TECs) listed pursuant to the EPBC Act with the potential to occur in the subject land obtained using the online EPBC Act Protected Matters Search Tool (PMST); and
- ecological point data from the NSW Wildlife Atlas (BioNet), downloaded on 30 April 2024, providing a list of threatened species which have previously been recorded in the broad locality of the subject land (i.e. within 10 km) (refer to Figure 9).

Literature referred to during the conduct of the surveys for this study and/or during the preparation of this BDAR is listed under References.

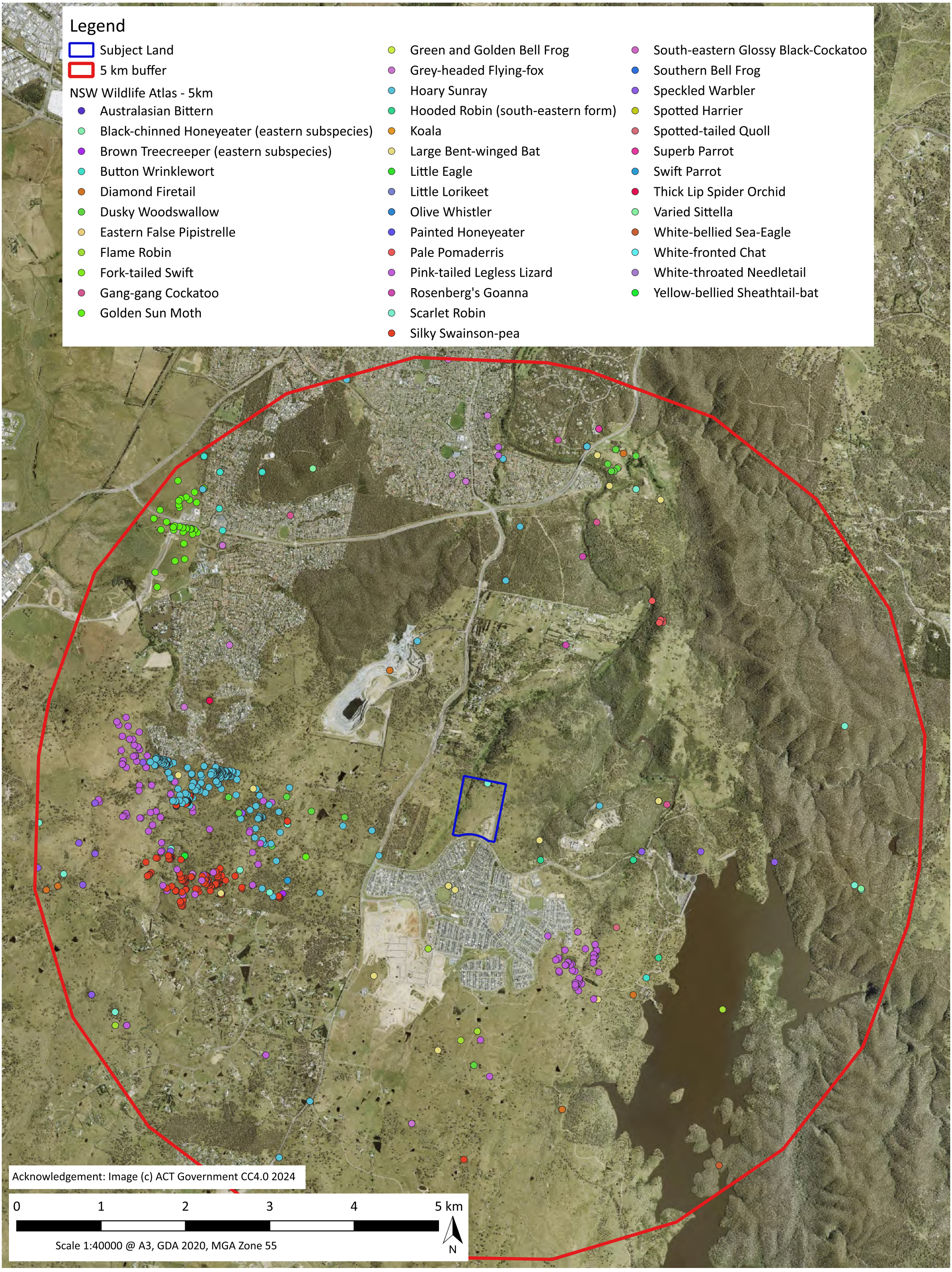


Figure 9. NSW Wildlife Atlas Threatened Species Search

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 07/08/2024

2.3.3 Habitat suitability for ecosystem credit species

Threatened species classified as ecosystem credit species and identified by the BAM as potentially occurring in the subject land are listed in Table 25. The value of the habitat in the subject land for ecosystem credit species is determined based on the type and condition (i.e. vegetation integrity) of the vegetation present together with the landscape context (refer to Section 2.1). The likelihood of these species occurring in the subject land is determined based the presence/absence of specific habitat constraints, geographic limitations, and vagrancy. Information regarding habitat constraints, geographic limitations, and vagrancy were obtained from the TBDC, BioNet (e.g. the profile of a threatened species), and through the BAM Calculator.

Table 25. Predicted ecosystem credit species identified by the BAM as potentially occurring in the subject land.

Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Presence	Justification for exclusion
Anthochaera phrygia Regent Honeyeater (Foraging)	Critically Endangered	Critically Endangered	Yes – assumed	-
Aphelocephala leucopsis Southern Whiteface	Vulnerable	Vulnerable	Yes – assumed	-
Artamus cyanopterus cyanopterus Dusky Woodswallow	Vulnerable	-	Yes – confirmed	-
Botaurus poiciloptilus Australasian Bittern	Endangered	Endangered	No – habitat constraint	No appropriate waterbodies or brackish or freshwater wetlands recorded in the subject land.
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	Endangered	Endangered	Yes – confirmed	-
Calyptorhynchus lathami South-eastern Glossy Black-Cockatoo (Foraging)	Vulnerable	Vulnerable	No – habitat constraint	No Allocasuarina or Casuarina species recorded in the subject land.
Chthonicola sagittate Speckled Warbler	Vulnerable	-	Yes – assumed	-
Circus assimilis Spotted Harrier	Vulnerable	-	Yes – assumed	-

Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Presence	Justification for exclusion
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	Vulnerable	Vulnerable	Yes – assumed	-
Daphoenositta chrysoptera Varied Sittella	Vulnerable	-	Yes – assumed	-
Dasyurus maculatus Spotted-tailed Quoll	Vulnerable	Endangered	Yes – assumed	-
Ephippiorhynchus asiaticus Black-necked Stork	Endangered	-	No – habitat constraint	No appropriate waterbodies recorded in the subject land.
Falco subniger Black Falcon	Vulnerable	-	Yes – assumed	-
Falsistrellus tasmaniensis Eastern False Pipistrelle	Vulnerable	-	Yes – assumed	-
Glossopsitta pusilla Little Lorikeet	Vulnerable	-	Yes – assumed	-
Haliaeetus leucogaster White-bellied Sea-eagle (Foraging)	Vulnerable	-	Yes – assumed	-
Hieraaetus morphnoides Little Eagle (Foraging)	Vulnerable	-	Yes – assumed	-
Hirundapus caudacutus White-throated Needletail	Vulnerable	Vulnerable	Yes – assumed	-
Lathamus discolor Swift Parrot (Foraging)	Endangered	Critically Endangered	Yes – assumed	-
Lophoictinia isura Square-tailed Kite (Foraging)	Vulnerable	-	Yes – assumed	-
Melanodryas cucullata cucullata South-eastern Hooded Robin	Endangered	Endangered	Yes – assumed	-

Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Presence	Justification for exclusion
Miniopterus orianae oceanensis Large Bent-winged Bat (Foraging)	Vulnerable	-	Yes – assumed	-
Neophema pulchella Turquoise Parrot	Vulnerable	-	Yes – assumed	-
Pachycephala olivacea Olive Whistler	Vulnerable	-	Yes – assumed	-
Petroica boodang Scarlet Robin	Vulnerable	-	Yes – assumed	-
Petroica phoenicea Flame Robin	Vulnerable	-	Yes – assumed	-
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	Vulnerable	Vulnerable	Yes – assumed	-
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	Vulnerable	-	Yes – assumed	-
Stagonopleura guttata Diamond Firetail	Vulnerable	Vulnerable	Yes – assumed	-
Suta flagellum Little Whip Snake	Vulnerable	-	Yes – assumed	-
Varanus rosenbergi Rosenberg's Goanna	Vulnerable	-	Yes – assumed	-

2.3.4 Habitat suitability for species credit species

2.3.4.1 Candidate species credit species

Threatened species classified as species credit species and identified by the BAM as potentially occurring in the subject land are listed in Table 26. The value of the habitat in the subject land for species credit species is determined based on the type and condition (i.e. vegetation integrity) of the vegetation present together with the landscape context (refer to Section 2.1). The likelihood of these species occurring in the subject land is determined based the presence/absence of specific habitat constraints, microhabitat requirements, geographic limitations, vagrancy, species records (BioNet and ecological reports), and/or the results of targeted surveys. Information regarding habitat constraints, microhabitat requirements, geographic limitations, and vagrancy were obtained from the TBDC, BioNet (e.g. the profile of a threatened species), and through the BAM Calculator. A summary of the findings from each targeted survey is given in Section 2.3.4.2.

Table 26. Candidate species credit species identified by the BAM as potentially occurring in the subject land.

Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Anthochaera phrygia Regent Honeyeater (Breeding)	Critically Endangered	Critically Endangered	This species inhabits dry open forest and woodland (particularly Box-Ironbark woodland and riparian forests of River Sheoak) that have significantly large numbers of mature trees, high canopy cover, and abundance of mistletoes. The species breeds in Box-Ironbark and other temperate woodlands, and in riparian gallery forest dominated by River Sheoak. The species usually nests in tall mature eucalypts, Sheoaks, or mistletoe haustoria. There are only three known key breeding regions: north-east Victoria (Chiltern-Albury) and NSW (Capertee Valley and the Bundarra-Barraba region). The TBDC lists *'as per important habitat map'* as a breeding habitat constraint for this species.	No – habitat constraint	The subject land is not identified on the 'BAM – Important Areas viewer' map[19]. Conclusion - the subject land lacks the breeding habitat constraints required for this species.
Aprasia parapulchella Pink-tailed Legless Lizard	Vulnerable	Vulnerable	This species inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass. Sites are typically well-drained, with rocky outcrops or scattered, partially buried rocks. The TBDC lists *'rocky areas or within 50 m of rocky areas'* as a habitat constraint for this species. Some of the main threats to this species listed in the TBDC are habitat loss through bush-rock removal and vegetation clearing for agricultural purposes (e.g. pasture improvement including slashing, ploughing, and sowing of non-native species), overgrazing by domestic stock, and invasion of habitat by weeds.	No - surveyed	As detailed in Section 2.3.4.2, targeted surveys recorded this species across the rocky slopes of the gully in the west of the subject land. However, these areas are outside the development footprint and will not be impacted by the proposed development. Conclusion - the subject land contains 3.85 ha of Pink-tailed Legless Lizard habitat, all of which is outside the development footprint.
Callocephalon fimbriatum Gang-gang Cockatoo (Breeding)	Endangered	Endangered	In spring and summer, this species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Gang-Gang Cockatoos favour old growth forest and woodland for nesting and roosting. The TBDC lists '*Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger*' as a breeding habitat constraint for this species.	No – surveyed	This species was recorded during targeted surveys in the gully on the western side of the subject land (Figure 10). While the subject land may provide foraging or nesting resources, no sign of Gang-gang Cockatoos nesting in tree hollows was detected. Finally, the areas with potential habitat for the species are outside the development footprint and will not be impacted by the proposed development. Conclusion - the species is considered unlikely to breed in the development footprint.
Calotis glandulosa Mauve Burr-daisy	Vulnerable	Vulnerable	This species is found in montane and subalpine grasslands in the Australian Alps and is found in subalpine grassland (dominated by *Poa* spp.), and montane or natural temperate grassland dominated by Kangaroo Grass and Snow Gum Woodlands on the Monaro and Shoalhaven area. It appears to be a coloniser of bare patches, which explains why it often occurs on roadsides. The species does not persist in heavily grazed pastures of the Monaro or the Shoalhaven area.	No – geographic constraint	The subject land is not located south of Michelago. Conclusion – the geographic limitation removes this species from further consideration.

[19] https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=BAM_ImportantAreas

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Calyptorhynchus lathami South-eastern Glossy Black-Cockatoo (Breeding)	Vulnerable	Vulnerable	This species inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak *Allocasuarina littoralis* and Forest Sheoak *Allocasuarina torulosa* are important foods. Inland populations feed on a wide range of Sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta* and *A. gymnathera*. Belah (*Casuarina cristata*) is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah. The species is dependent on large hollow-bearing eucalypts for nest sites and a single egg is laid between March and May. The TBDC lists '*Living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground*' as a breeding habitat constraint for this species and notes that '*the species may need larger patches and more intact landscapes for breeding.*'	No – microhabitat features, surveyed	The subject land does not contain any Sheoak trees. In addition, targeted bird surveys were conducted across the subject land, and remnant trees were assessed for the presence/absence of habitat features and for signs of fauna nesting in hollows (Figure 8). No Glossy Black-Cockatoos were recorded in the subject land and no sign of Glossy Black-Cockatoo nesting in tree hollows was detected. Conclusion - the species is considered unlikely to breed in the subject land.
Cercarterus nanus Eastern Pygmy-possum	Vulnerable	-	This species is found in a broad range of habitats, but in most areas woodlands and heath appear to be preferred. It feeds primarily on nectar and pollen collected from banksias, eucalypts, and bottlebrushes, but also feeds on insects throughout the year. The species shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum dreys, or thickets of vegetation, (e.g. grass-tree skirts). Tree hollows are favoured for breeding. The TBDC lists '*declining shrub diversity in forests and woodlands due to overgrazing by stock and rabbits*', '*predation from cats, dogs and* foxes', and '*loss of nest sites due to removal of firewood'* as some of the key threats to the species.	No – habitat degraded, microhabitat features	The species has not been recorded in the locality, and the subject land does not contain the microhabitat features necessary for the species. Additionally, the vegetation within the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion - the species is considered unlikely to occur in the development footprint.
Delma impar Striped Legless Lizard	Vulnerable	Vulnerable	Striped Legless Lizard is mainly found in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. It is also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is characterised by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda triandra*, Speargrasses *Austrostipa* spp., Poa Tussocks *Poa* spp., and occasionally Wallaby Grasses *Rytidosperma* spp.. The species can sometimes be found in modified grasslands with a significant content of exotic grasses, and in grasslands with significant amounts of surface rocks (used for shelter). Some of the main threats to this species listed in the TBDC are habitat loss through vegetation clearing for agricultural purposes (e.g. pasture improvement including slashing, ploughing, and sowing of non-native species), habitat degradation through invasion by weeds or escaped pasture species, and overgrazing by domestic stock.	No	Capital Ecology has undertaken numerous surveys in the locality (within 5 km of the subject land) and has not recorded or found evidence of this species occurring. Additionally, no recent or historical records of this species exist within 10km of the subject land and there are no mapped Natural Temperate Grassland vegetation communities in the locality. Conclusion - the species is considered unlikely to occur in the subject land.
Dillwynia glaucula Michelago Parrot-pea	Endangered	-	Occurs on exposed patches of clay or on rocky outcrops in eucalypt woodland often dominated by Scribbly Gum (*Eucalyptus rossii*), Snow Gum (*E. pauciflora*), Broad-leafed Peppermint (*E. dives*) and Red Stringybark (*E. macrorhyncha*). The understorey may be either grassy or shrubby. Grows adjacent to Natural Temperate Grassland in the Michelago area.	No – surveyed	The species was not recorded during targeted surveys. Conclusion - the species is considered unlikely to occur in the subject land
Diuris aequalis Buttercup Doubletail	Endangered	Vulnerable	This species has been recorded in forest, low open woodland with a grassy understorey, and secondary grassland on the higher parts of the Southern and Central Tablelands (especially on the Great Dividing Range). Populations tend to contain few, scattered individuals; despite extensive surveys, only about 200 plants from 20 populations are known. The species has been recorded in Kanangra-Boyd National Park, Gurnang State Forest, towards Wombeyan Caves, the Taralga - Goulburn area, and the ranges between Braidwood, Tarago and Bungendore. The type location (from the 19th Century) is Liverpool, west of Sydney. However, this and other questionable records from the Sydney metropolitan area are unlikely based on current knowledge of the species. The BAM Calculator lists '*North of Hoskintown*' as a geographic limitation for this species.	No – geographic limitation	The subject land is not north of Hoskintown. Conclusion – the geographic limitation removes this species from further consideration.
Dodonaea procumbens Creeping Hop-bush	Vulnerable	Vulnerable	Creeping Hop-bush is found in the dry areas of the Monaro, between Michelago and Dalgety. It grows in Natural Temperate Grassland or fringing eucalypt woodland of Snow Gum. It is found in open bare patches where there is little competition from other species, on sandy-clay soils, usually on or near vertically-tilted shale outcrops. The species does not persist in heavily grazed pastures of the Monaro. The BAM Calculator lists '*Cooma-Monaro Shire south of Michelago*' as a geographic limitation for this species.	No – geographic limitation	The subject land is not located south of Michelago. Conclusion – the geographic limitation removes this species from further consideration.

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Eucalyptus aggregata Black Gum	Vulnerable	Vulnerable	Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler, and higher parts of the tablelands (e.g. in the Blayney, Crookwell, Goulburn, Braidwood, and Bungendore districts). The species grows on alluvial soils in the lowest parts of the landscape (i.e. on cold and poorly drained flats and hollows adjacent to creeks and small rivers). It often grows with other cold-adapted eucalypts (e.g. Snow Gum *E. pauciflora*, Ribbon Gum *E. viminalis*, Candlebark *E. rubida*, Black Sallee *E. stellulata*, and Swamp Gum *E. ovata*). Black Gum usually occurs in an open woodland formation with few shrubs and a grassy groundlayer dominated by either River Tussock *Poa labillardierei* or Kangaroo Grass *Themeda triandra*. Black Gum can occur as isolated paddock trees in modified native or exotic pastures. The BAM Calculator lists 'East of a line that runs north to south about 5 km west of Bungendore' as a Geographic limitation for this species.	No – geographic limitation	The subject land is not east of a line that runs north to south about 5 km west of Bungendore. Conclusion – the geographic limitation removes this species from further consideration.
Eucalyptus pulverulenta Silver-leafed Gum	Vulnerable	Vulnerable	This species grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum *E. mannifera*, Red Stringybark *E. macrorhyncha*, Broad-leafed Peppermint *E. dives*, Silvertop Ash *E. sieberi* and Apple Box *E. bridgesiana*. The BAM Calculator lists '*South of Tinderry Range*' as a geographic limitation for this species.	No – geographic limitation	The subject land is not located south of the Tinderry Range. Conclusion – the geographic limitation removes this species from further consideration.
Haliaeetus leucogaster White-bellied Sea-eagle (Breeding)	Vulnerable	-	Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. The TBDC lists '*living or dead mature trees in suitable vegetation within 1km of a river, lake, large dam, creek, wetland, or coastline*' as a breeding habitat constraint.	No – habitat constraint	No significant perennial streams or waterbodies exist within 1km of the subject land. Conclusion - the species is considered unlikely to breed in the subject land.
Heleioporus australiacus Giant Burrowing Frog	Vulnerable	Vulnerable	This species appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. The species if found in heath, woodland, and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water. When breeding, frogs will call from open spaces, under vegetation or rocks or from within burrows in the creek bank. The species spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. The TBDC lists '*Habitat loss through clearing for residential, agricultural and urban infrastructure development*', '*Disease (chytrid fungus)*', and '*Reduction of water quality generally in the vicinity of urban development*' as some of the key threats to the species.	No – microhabitat features	The subject land does not contain potential habitat for the species as it lacks appropriate streams, rivers, other suitable waterbodies, and riparian habitat. In addition, the species is no longer considered likely to occur in the immediate locality, with the closest record 12 km south of the subject land being from 1995 (BioNet and NatureMapr). Conclusion – the species is considered unlikely to occur in the subject land.
Hieraaetus morphnoides Little Eagle (Breeding)	Vulnerable	-	This species occupies open eucalypts forest, woodland, or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. The species nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. The TBDC lists *'Nest trees - live (occasionally dead) large old trees within vegetation'* as a breeding habitat constraint for this species.	No – surveyed	Little Eagles have not been recorded within 5km of the subject land since 1984. Several large stick nests were observed in the subject land but were occupied by Wedge-tailed Eagles. In addition, the potential habitat for the species is outside the development footprint and will not be impacted by the proposed development. Conclusion - the species is considered unlikely to breed in the subject land.
Keyacris scurra Key's Matchstick Grasshopper	Endangered	Endangered	Key's Matchstick Grasshopper is usually found in native grasslands, but it has also been recorded in other vegetation associations containing a native grass understory (especially Kangaroo Grass *Themeda triandra*) and known food plants (particularly Asteraceae, indicator species include the daisy *Chrysocephalum apiculatum*). Although it does not appear to feed on Kangaroo Grass, it may be important for providing protection from predators. More recently, however, opportunistic sightings of Key's Matchstick Grasshopper have been reported in a wide range of vegetation types in south-east NSW including wet sclerophyll forest, montane low forest, dry woodlands, heathland and montane grasslands. In some reported locations there is an absence of Kangaroo Grass and very few or no Asteraceae. Where the understory is favourable for the species, habitat under scattered trees could be suitable. Being flightless, this species does not disperse large distances (< 10 m).	No – habitat degraded	Surveys for this project were conducted prior to this species being listed. As such, while the subject land may contain suitable habitat for the species, targeted surveys were not carried out. However, as the development footprint avoids all areas of potential habitat (i.e. zones with moderate to high diversity native groundstorey), Key's Matchstick Grasshopper will not be impacted by the proposed development. The impacted areas have been degraded to the extent that they are no longer likely to support the species. Conclusion - the species is considered unlikely to occur in the development footprint.

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Lathamus discolor Swift Parrot (Breeding)	Endangered	Critically Endangered	This species breeds in Tasmania from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus.* The species migrates between February and October to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. On the mainland, they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. In NSW, the species mostly occurs on the coast and south west slopes. The TBDC lists *'as per Important Habitat Map'* as a breeding habitat constraint for this species.	No – habitat constraint	The subject land is not identified on the 'BAM – Important Areas viewer' map[20]. Conclusion - the subject land lacks the breeding habitat constraints required for this species.
Leucochrysum albicans var. tricolor Hoary Sunray	Endangered	Endangered	This species occurs in a wide variety of grassland, woodland, and forest habitats, generally on relatively heavy soils. It can occur in modified habitats such as semi-urban areas and roadsides. It is highly dependent on the presence of bare ground for germination, and in some areas disturbance is required for successful establishment.	No – surveyed	A small population of around 10 plants was recorded in the subject land (Figure 10). However, this population is outside the development footprint and will not be impacted by the proposed development. Conclusion - the species does not occur in the development footprint.
Litoria aurea Green and Golden Bell Frog	Endangered	Vulnerable	The species inhabits marshes, dams, and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby, and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region, occur in highly disturbed areas. The TBDC lists '*Within 1km of wet areas [Semi-permanent/ephemeral wet areas]*', '*Within 1km of swamp*', and '*Within 1km of waterbody*' as habitat constraints for this species.	No – habitat constraint	The subject land does not support characteristically suitable habitat for the species. Conclusion - the species is considered unlikely to occur in the subject land.
Litoria castanea Yellow-spotted Tree Frog	Critically Endangered	Endangered	Historically, this species occurred in two separate highland ranges: on the New England Tableland, and on the southern and central tablelands from Bathurst to Bombala. Following the chytrid virus pandemic in the 1970s, this species went unrecorded for 30 years and was believed to be extinct, until it was rediscovered in 2009 on the Southern Tablelands. This population - near Yass - remains the only known extant site of the species.	No – microhabitat features.	The subject land does not support characteristically suitable habitat for the species. Conclusion - the species is considered unlikely to occur in the subject land.
Litoria raniformis Southern Bell Frog	Endangered	Vulnerable	The species is usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. During the breeding season, animals are found floating amongst aquatic vegetation (especially cumbungi or Common Reeds) within or at the edge of slow-moving streams, marshes, lagoons, lakes, farm dams, and rice crops. Tadpoles require standing water for at least 4 months for development and metamorphosis to occur but can take up to 12 months to develop. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.	No – microhabitat features	The subject land does not support permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps, or billabongs along floodplains and river valleys. In addition, the species has not been recorded within 10 km of the subject land (Figure 9). Conclusion – the species is considered unlikely to occur in the subject land.
Lophoictinia isura Square-tailed Kite (Breeding)	Vulnerable	-	This species is found in a variety of timbered habitats including dry woodlands and open forests. It shows a particular preference for timbered watercourses. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. The TBDC lists *'nest trees'* as a breeding habitat constraint. The TBDC general notes state '*it will be difficult to identify a Kite nest (there are lots of comparable sized stick nests built by other species), especially given Kites have large territories and other stick nesters will undoubtedly also be nesting where Kites might be recorded. Kites will need be in attendance to confirm breeding sites*.'	No – surveyed	Square-tailed Kite has not been recorded within 5km of the subject land, and no Square-tailed Kite or appropriate stick nests were recorded in the subject land during targeted surveys. Conclusion - the species is considered unlikely to breed in the subject land.

[20] https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=BAM_ImportantAreas

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	Vulnerable	-	Caves are the primary roosting habitat, but the species also use derelict mines, storm-water tunnels, buildings, and other man-made structures. The species forms 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. Breeding or roosting colonies can number from 100 to 150,000 individuals. The TBDC list the following breeding habitat constraint, *'Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave", observation type code "E nest-roost", with numbers of individuals >500.'*	No – habitat constraint	The subject land does not contain potential breeding habitat (caves, tunnels, mines, culverts, etc.). The subject land therefore land lacks the breeding habitat constrains required for this species. Conclusion - the species cannot utilise the subject land for breeding.
Myotis macropus Southern Myotis	Vulnerable	-	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	No – habitat constraint	The subject land does not contain suitable permanent waterbodies. The subject land therefore land lacks the breeding habitat constrains required for this species. Conclusion - the species cannot utilise the subject land for breeding.
Ninox connivens Barking Owl	Vulnerable	-	This species inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair. Nesting occurs during mid-winter and spring, being variable between pairs and among years. As a rule of thumb, laying occurs during August and fledging in November. The female incubates for 5 weeks, roosts outside the hollow when chicks are 4 weeks old, then fledging occurs 2-3 weeks later. The TBDC lists '*living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground'* as a breeding habitat constraint for this species.	No – habitat degraded	Barking Owl has not been recorded within 5 km of the subject land (Figure 9). While the subject land contains potential habitat for the species, these areas occur outside the development footprint and will not be impacted by the proposed development. The development footprint itself has been disturbed to the extent that it is considered unlikely to support the species. In addition, remnant trees were assessed for the presence/absence of habitat features and for signs of fauna nesting in hollows (Figure 8). No sign of Barking Owls nesting in tree hollows was detected. Conclusion - the species is considered unlikely to occur in the subject land.
Ninox strenua Powerful Owl	Vulnerable	-	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The species requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass them. The TBDC lists *'living or dead trees with hollow greater than 20 cm diameter that occurs higher than four metres above the ground'* as a breeding habitat constraint.	No – habitat degraded	Powerful Owl has not been recorded within 5 km of the subject land (Figure 9). While the subject land contains potential habitat for the species, these areas occur outside the development footprint and will not be impacted by the proposed development. The development footprint itself has been disturbed to the extent that it is considered unlikely to support the species. In addition, remnant trees were assessed for the presence/absence of habitat features and for signs of fauna nesting in hollows (Figure 8). No sign of Powerful Owls nesting in tree hollows was detected. Conclusion - the species is considered unlikely to occur in the subject land.

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Petauroides Volans Southern Greater Glider	Endangered	Endangered	The Southern Greater Glider occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Recorded using hollows with a minimum diameter of 8 cm.	No - microhabitat features, habitat degraded	The subject land does not support tall, montane, or moist eucalypt forest and the species. In addition, the species has not been recorded within 10 km of the subject land and is not known to occur in the immediate locality, with the closest records in the Tallangandra National Park and Tidbinbilla Nature Reserve (BioNet and NatureMapr). In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.
Petaurus norfolcensis Squirrel Glider	Vulnerable	-	West of the Great Diving Range, this species inhabits mature or old growth Box, Box-Ironbark woodlands, and River Red Gum forest. It prefers mixed species stands with a shrub or Acacia midstorey. The species requires abundant tree hollows for refuge and nest sites and generally relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely connected (i.e. no more than 50 m apart). The TBDC lists *'Loss of hollow-bearing trees'* and '*Loss of understorey food resources'* as some of the key threats to this species.	No – habitat degraded	The subject land does not support old growth Box, Box-Ironbark woodlands, or River Red Gum forest. The species has not been recorded within 10 km of the subject land and is not known to occur in the immediate locality, with the closest records near the Tallangandra State Conservation Area (BioNet and NatureMapr). In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.
Petrogale penicillata *Brush-tailed Rock-wallaby*	Endangered	Vulnerable	The species occupies rocky escarpments, outcrops, and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Brush-tailed Rock-wallaby browse on vegetation in and adjacent to rocky areas, eating grasses and forbs as well as the foliage and fruits of shrubs and trees. They are highly territorial and have strong site fidelity with an average home range size of about 15 ha; males tend to have larger home ranges than females. The home range consists of a refuge area and a foraging range linked by habitually used commuting routes. The TBDC lists *'Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines'* as a habitat constraint for this species.	No – habitat constraint	The subject land is not within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines. Conclusion – the subject land lacks the habitat constraints required for this species.
Phascogale tapoatafa Brush-tailed Phascogale	Vulnerable	-	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. This species prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. It also inhabits heath, swamps, rainforest, and wet sclerophyll forest. It is an agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. The species nests and shelters in tree hollows with entrances 2.5 – 4 cm wide and uses many different hollows over a short time span. The TBDC lists 'Loss of hollow-bearing trees' and 'Predation by foxes and cats' as some of the key threats to this species.	No – habitat degraded	The species has not been recorded within 10 km of the subject land and is not known to occur in the immediate locality, with the closest records in Namadgi Nation Park (BioNet and NatureMapr). In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.
Phascolarctos cinereus Koala	Endangered	Endangered	This species inhabits eucalypt woodlands and forests, feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species. Home range size varies with quality of habitat, ranging from less than 2 hectares to several hundred hectares in size. The TBDC lists *'Presence of koala use trees - refer to the Koala (Phascolarctos cinereus): Biodiversity Assessment Method Survey Guide for information on targeted survey requirements and mapping species polygons'* as a habitat constraint for breeding for this species.	No – microhabitat features, habitat degraded	The species has not been recorded within 5km of the subject land since 1984. In addition, despite being conspicuous when present, no Koalas or signs of Koala presence were detected during the tree habitat assessment. While the vegetation in the subject land is connected with a large area of potentially suitable habitat for the species, the lack of Koala observations indicates that the subject land could not be classified Koala habitat. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion - the species is considered unlikely to occur in the subject land.

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Pomaderris pallida Pale Pomaderris	Vulnerable	Vulnerable	This species usually grows in shrub communities surrounded by Brittle Gum (*Eucalyptus mannifera*) and Red Stringybark (E*. macrorhyncha*) or *Callitris* spp. woodland. The BAM Calculator lists '*South of Queanbeyan'* as a geographic limitation for the species.	No – surveyed	The species was not recorded during targeted surveys. Conclusion - the species is considered unlikely to occur in the subject land
Prasophyllum petilum Tarengo Leek Orchid	Endangered	Endangered	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population c.10 km west of Muswellbrook. The species also occurs at Hall in the Australian Capital Territory. The species grows in open sites within Natural Temperate Grassland or Box-Gum Woodland. It often grows in association with River Tussock *Poa labillardieri*, Black Gum *E. aggregata,* Tea-tree *Leptospermum* spp., and Kangaroo Grass *Themeda triandra*. The species is highly susceptible to grazing, being retained only at little-grazed travelling stock reserves and in cemeteries. Some of the main threats to this species listed in the TBDC are: 1) vegetation clearing for agricultural purposes; 2) overgrazing by domestic stock; 3) competition from native species; and 4) encroachment of herbaceous perennial weeds such as St John's wort and Paterson's curse competing for space and resources.	No – surveyed, habitat degraded	The species is not known to occur in the locality, and the species was not recorded during targeted surveys. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion - the species is considered unlikely to occur in the subject land
Pteropus poliocephalus Grey-headed Flying-fox (Breeding)	Vulnerable	Vulnerable	Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Site fidelity to camps is high; some camps have been used for over a century. The TBDC lists breeding camps as a habitat constraint for breeding for this species.	No – habitat constraint	While the species is likely to visit the subject land occasionally to forage, field surveys confirmed that the subject land does not support breeding camps. Conclusion – the subject land lacks the breeding habitat constraints required for this species.
Rutidosis leptorrhynchoides Button Wrinklewort	Endangered	Endangered	This species occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland, or in Natural Temperate Grassland. It often occurs in the ecotone between Box-Gum Woodland and Natural Temperate Grassland. The species grows on soils that are usually shallow, stony red-brown clay loams and tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees). It exhibits an ability to colonise disturbed areas (e.g. vehicle tracks, bulldozer scrapings and areas of soil erosion). The species is apparently susceptible to grazing, being retained in only a small number of populations on roadsides, rail reserves, and other un-grazed or very lightly grazed sites. Some of the main threats to this species listed in the TBDC are: 1) loss and degradation of habitat and/or populations by intensification of grazing regimes; 2) loss and degradation of habitat and/or populations by invasion of weeds; and 3) increased competition from other native grassland species within the habitat because of adverse increases of biomass due to absence of fire or grazing and the resultant closing up of the inter-tussock spaces that this species requires.	No – surveyed, habitat degraded	Targeted and opportunistic surveys did not record this species in the subject land. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.
Swainsona recta Small Purple-pea	Endangered	Endangered	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum *E. blakelyi*, Yellow Box *E. melliodora*, Candlebark Gum *E. rubida*, and Long-leaf Box *E. goniocalyx*. It grows in association with understorey dominants that include Kangaroo Grass *Themeda triandra*, Poa tussocks *Poa* spp. and Speargrasses *Austrostipa* spp.. Some of the main threats to this species listed in the TBDC are: 1) grazing and trampling by cattle, sheep and goats; and 2) loss, degradation and fragmentation of habitat and/or populations for residential developments, agricultural developments, and by weed invasion (including exotic grasses mostly, as well as bridal creeper and St John's wort).	No – surveyed, habitat degraded	Targeted and opportunistic surveys did not record this species in the subject land. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.
Swainsona sericea Silky Swainson-pea	Vulnerable	-	This species is found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro, and in Box-Gum Woodland in the Southern Tablelands and South West Slopes. It is sometimes found in association with Cypress-pines *Callitris* spp.. Some of the main threats to this species listed in the TBDC are loss and degradation of habitat and/or populations for: 1) residential developments; 2) invasion of weeds; 3) intensification of grazing regimes; and 4) agricultural developments.	No – surveyed, habitat degraded	Targeted and opportunistic surveys did not record this species in the subject land. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion – the species is considered unlikely to occur in the subject land.

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Species	NSW (BC Act) listing status	National (EPBC Act) listing status	Habitat requirements	Presence	Justification for exclusion
Synemon plana Golden Sun Moth	Vulnerable	Vulnerable	The species occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which the groundlayer is dominated by Wallaby grasses *Rytidosperma* spp.. Grasslands dominated by Wallaby grasses are typically low and open and the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several Wallaby grass species, which are typically associated with other grasses particularly Speargrasses *Austrostipa* spp. or Kangaroo Grass *Themeda triandra*. The TBDC lists '*Wallaby grass (Rytidosperma spp), Speargrass (Austrostipa spp) or Chilean needlegrass (Nassella neesiana)'* as a habitat constraint. Some of the main threats to this species listed in the TBDC are loss and degradation of habitat by urban, residential, infrastructure, and agricultural development, modifications to agricultural practices (e.g. fertiliser application, ploughing, and inappropriate grazing), overgrazing by domestic stock, and invasive grasses.	No - microhabitat features, habitat degraded	The nearest reliable records of the species are 4 km to the north-west at the Poplars site in Jerrabomberra. Capital Ecology has undertaken numerous surveys in the locality and has not recorded or found evidence of this species occurring. In addition, the development footprint has been disturbed to the extent that it is considered unlikely to support the species. Conclusion - the species is considered unlikely to occur in the subject land.

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2.3.4.2 BAM targeted survey results

As noted in Table 26, targeted surveys were completed to confirm the occurrence and/or habitat potential for the species credit species flagged by the BAM as having the potential to occur in the relevant PCT of the subject land.

Threatened Flora

Threatened flora surveys were conducted via targeted searches and opportunistic observations across the portions of the subject land that have the potential to support threatened flora (Figure 10). A total of 172 flora species were recorded during field surveys, comprising 106 native species and 66 exotic species (Appendix B).

One threatened flora species was recorded, Hoary Sunray *Leucochrysum albicans subsp. tricolor* (EPBC Act and BC Act Endangered). One population of approximately ten individual Hoary Sunray plants was recorded in the north of the subject land (Figure 10); this area will not be impacted by the proposed development. As this species is quite conspicuous when flowering, it is considered unlikely that other individual plants were missed.

None of the other threatened flora species credit species considered to have the potential to occur were recorded in the subject land, and given the degree of targeted survey effort, none are considered likely to occur.

Threatened Fauna

Threatened fauna surveys were conducted via targeted searches and opportunistic observations across the portions of the subject land that have the potential to support threatened fauna (Figure 10). A total of 38 fauna species were recorded during field surveys, comprising 29 native and 2 exotic bird species, 6 native reptile species, and 1 native amphibian species (Appendix B). As described below, this included three threatened species, specifically Pink-tailed Legless Lizard*,* Dusky Woodswallow *Artamus cyanopterus*, and Gang-gang Cockatoo *Callocephalon fimbriatum.*

Threatened birds

A total of 31 bird species were recorded within the subject land across all surveys, comprising 29 native species and 2 exotic species (Appendix B). Two threatened species, Dusky Woodswallow (BC Act Vulnerable) and Gang-gang Cockatoo (EPBC Act Endangered, BC Act Vulnerable), were recorded in the subject land (See Figure 10). It is likely that both species visit the subject land to forage, but no evidence of breeding/nesting was observed. No other threatened species credit species were recorded foraging or nesting/breeding in the subject land.

Pink-tailed Legless Lizard

A total of six Pink-tailed Legless Lizards were recorded in the subject land (Figure 10). Of these, one was a juvenile and two were sloughed skins (see Plate 1). Suitable habitat for Pink-tailed Legless Lizard was estimated by mapping all contiguous patches of surface rock containing Pink-tailed Legless Lizard records, excluding areas with an exotic groundstorey. The subject land was therefore estimated to contain 3.85 ha of Pink-tailed Legless Lizard habitat, none of which will be impacted by the proposed development (Figure 10).

In addition to many scorpions, spiders, centipedes and other common invertebrates, a number of non-target herpetofauna species were recorded during the survey; these are listed in Appendix C.

Plate 1. Pink-tailed Legless Lizard recorded in the subject land (left = adult, right = sloughed skin)

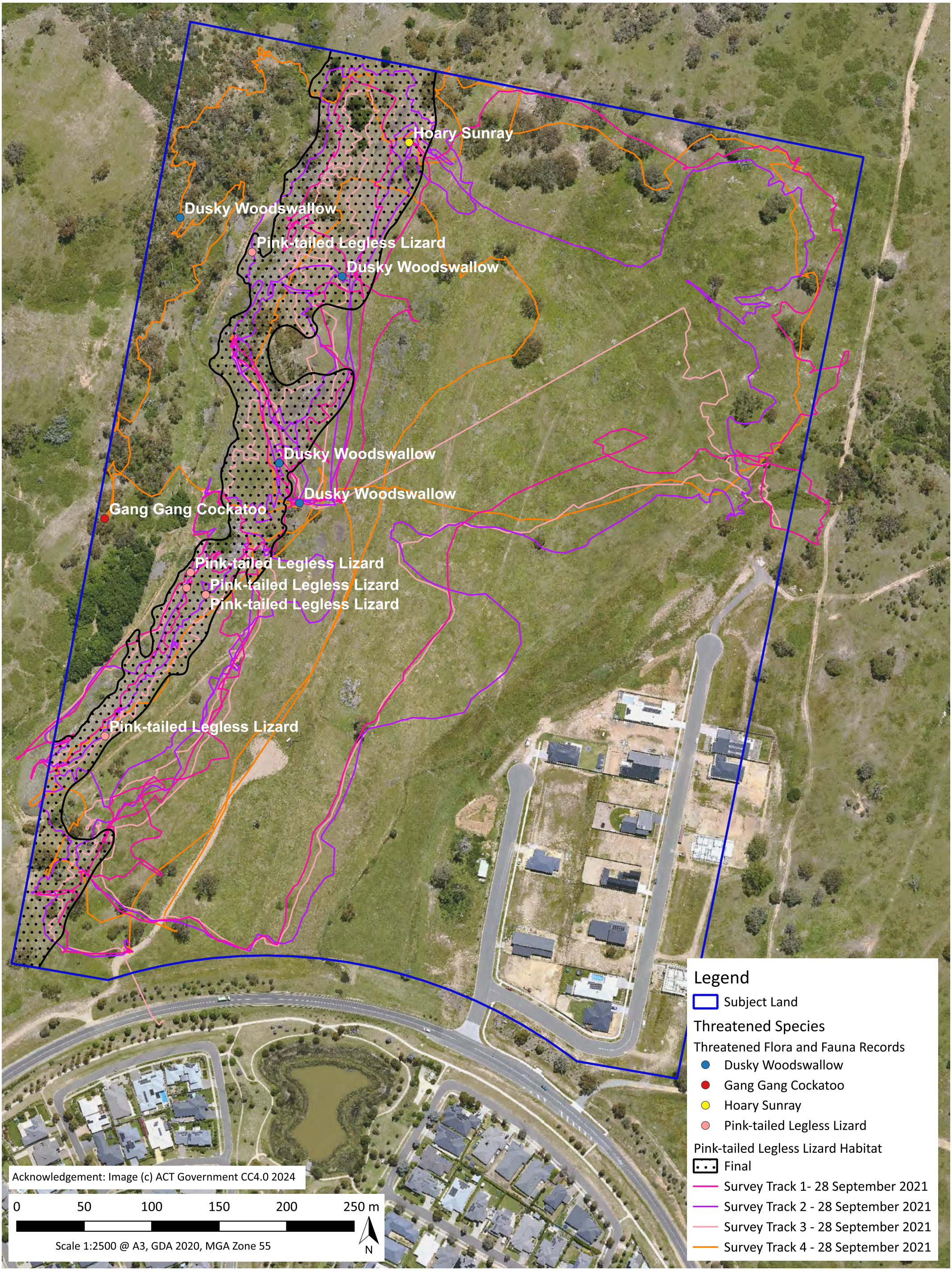

Figure 10. Threatened Flora and Fauna Surveys and Records

Capital Ecology Project No: 3329
Drawn by: Dr Catherine Ross
Date: 10/09/2024

3 Part 2 – Impact Assessment (BAM Stage 2)

Part 2 of this BDAR provides an assessment of the impacts of the proposed development as set out in Stage 2 of the BAM.

3.1 Avoidance and Minimisation of Impacts on Biodiversity Values

In accordance with the BAM, a proponent is required to demonstrate that all reasonable and practicable measures have been employed to avoid and minimise the impacts of a project on biodiversity values. Accordingly, this section outlines the avoidance and minimisation measures that have been incorporated into the project design of the proposed development.

3.1.1 Location

3.1.1.1 Locating the project where there are low or no biodiversity values

The majority of the subject land has been substantially modified by its current and past land use, which has primarily been livestock grazing and residential development. This has led to extensive clearing of the native vegetation across the central and south-eastern parts of the subject land, leaving only scattered and isolated paddock trees (see Figure 6, areas mapped as PCT3375 Zone 12 and PCT3376 Zone 12 and 'cleared'). The groundstorey across these areas is also highly disturbed as a result of historic and recent pasture improvement and grazing of livestock and supports a very low diversity of native grasses and forbs.

The proposed development has therefore been located in an area that largely lacks significant biodiversity values. This is highlighted by the fact that 94% (10.49 ha, PCT3375 / PCT3376 Zone 12) of the impact associated with the proposed development occurs in disturbed areas that do not support any notable biodiversity value (i.e. no threatened ecological community, threatened species habitat, or BC Act native vegetation).

3.1.1.2 Locating the project to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat

As discussed in Section 3.1.1.1, a large proportion of the impact associated with the proposed development occurs in highly disturbed areas that do not support any notable biodiversity value. The remainder of the subject land does contain some significant biodiversity values, including EPBC Act and BC Act listed Box-Gum Grassy Woodland in good condition, relatively intact dry sclerophyll forest, and habitat for several threatened species. The development footprint has been located to avoid impacts to these areas, and as a result does not impact any EPBC Act Box-Gum Woodland, high quality BC Act Box-Gum Woodland, or habitat for any of the identified threatened flora / fauna species credit species. This has been achieved by completing the vegetation and threatened species surveys at the outset of planning, and using the completed mapping to inform the design of the development layout.

The proposed development also includes a number of measures to minimise indirect impacts to the retained areas of high conservation value, as described in Section 3.2.2.

3.1.2 Design

3.1.2.1 Reducing the clearing footprint of the project

The design of the proposed development includes a number of measures which aim to avoid and minimise impacts to the significant ecological values of the subject land. The proposed development achieves this by avoiding the gully in the western part of the subject land, as well as the majority of the native vegetation and threatened species habitat. The proposed development also aims to retain 90% of the mature hollow-bearing trees.

The lot layout for the development has gone through multiple design options, informed by the surveys undertaken for this BDAR. This has resulted in a significant reduction in the overall impact to native vegetation, EPBC Act / BC Act Box-Gum Woodland, and remnant hollow-bearing trees.

By reducing the clearance footprint, the proposed development avoids:

- 95% (13.23 ha) of the BC Act native vegetation that occurs in the subject land;
- 90% (29) of the mature hollow-bearing remnant trees that occur in the subject land.;
- 100% of the identified threatened flora / fauna species credit species habitat (i.e. Pink-tailed Legless Lizard and Hoary Sunray);
- 87% (3.47 ha) of the BC Act Box-Gum Woodland that occurs in the subject land; and
- 100% (1.99 ha) of the EPBC Act Box-Gum Woodland that occurs in the subject land.

3.1.2.2 Locating ancillary facilities in areas: where there are no biodiversity values; where the native vegetation or threatened species habitat is in the poorest condition; and that avoid habitat for species and vegetation in high threat status categories.

Given that the proposed development is located adjacent to an existing residential area (i.e. Googong township), many of the biodiversity impacts associated with a new development will be reduced (i.e. impacts related to services, roads, bushfire protection, flood planning, etc.). In addition, all ancillary facilities associated with the construction and operation of the proposed development will be located to avoid the significant biodiversity values in the wider landscape.

3.1.2.3 Making provision for the demarcation, ecological restoration, rehabilitation, and/or ongoing maintenance of retained native vegetation and habitat.

As mentioned previously, the proposed development avoids many of the more significant ecological values that occur in the subject land by avoiding impacts to the majority of the native vegetation, threatened ecological communities, and threatened species habitat.

The avoided areas will be protected from impacts during the works by a Construction Environmental Management Plan (CEMP). In addition, the proponent intends to incorporate the retained areas of C2-zoned land into a residual lot (see Figure 3). It is proposed for the residual lot 1 to remain in private ownership. Residual lot 2, incorporating the drainage reserve and the riparian corridor is proposed to be dedicated to council.

It is anticipated that the C2-zoned portion of the residual lot 1 will have a Biodiversity Management Plan (BMP) during the Development Application process which will ensure the protection and management of the retained native vegetation and threatened species habitat. The BMP will include

measures to maintain and improve the condition and habitat value of the conservation areas, such as weed control and rehabilitation of the riparian areas.

3.2 Residual Biodiversity Impacts of the Proposed Development

3.2.1 Direct impacts on native vegetation and habitat

The proposed development has a total development footprint of 11.20 ha and will involve the subdivision of the central part of the subject land into 86 residential blocks, with associated roads and services (Figure 3).

As shown in Figure 11, the proposed development will result in the following direct impacts.

- Clearance of 0.68 ha of BC Act native vegetation (PCT3375 Zones 8 and 9, PCT3376 Zones 8 and 10). This includes the clearance of 0.52 ha of low to moderate quality BC Act Box-Gum Woodland (PCT3376 Zones 8 and 10).
- Clearance of 10.49 ha of exotic pasture (PCT3375 Zone 12 and PCT3376 Zone 12).
- Clearance of three hollow-bearing remnant trees.

The proposed development will not result in any other direct impacts on native vegetation or flora/fauna habitat.

3.2.2 Indirect impacts on native vegetation and habitat

The proposed development has the potential to indirectly impact retained or adjacent native vegetation and habitat. Potential indirect impacts are listed below.

- Increased sedimentation of receiving waterways during construction.
- Increased noise, vibration, and dust during construction.
- Weed introduction and/or spread during construction and occupation.
- Incidental damage or removal of retained native vegetation and habitat during construction and occupation.
- Increase in pest animal populations as a result of increased human activity during occupation.

The above potential indirect impacts could occur during the construction and/or occupation of the subject land and may reduce the extent and/or condition of the surrounding native vegetation and habitat. This may occur in the short-term during the construction phase of the proposed development and in the long-term during the occupation phase of the proposed development.

However, the proposed development reduces the likelihood of indirect impacts by enacting the following principles detailed in Section 3.1 to avoid and minimise impacts to native vegetation and habitat.

- Locating the project where there are low or no biodiversity values.
- Locating the project to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat
- Reducing the clearing footprint of the project.

- Locating ancillary facilities in areas: where there are no biodiversity values; where the native vegetation or threatened species habitat is in the poorest condition; and that avoid habitat for species and vegetation in high threat status categories.
- Making provision for the demarcation, ecological restoration, rehabilitation, and/or ongoing maintenance of retained native vegetation and habitat.

In addition, potential indirect impacts will be minimised and mitigated during construction by the measures outlined in Section 3.3, and during occupation by the measures outlined in Section 3.1 and Section 3.3. These measures:

- control potential sedimentation of receiving waterways during construction and operation;
- control noise, vibration, and dust spill during construction;
- control weed introduction and/or spread during construction;
- control incidental damage of retained native vegetation and habitat during construction;
- control pest animal populations as a result of increased human activity during occupation; and
- establishing a Biodiversity Management Plan (BMP) over the avoided areas to protect, manage, and restore the retained native vegetation and threatened species habitat.

In combination, the above measures are considered sufficient to reduce the risk of indirect impacts to an acceptably low level. As such, the proposed development is unlikely to result in any indirect impacts on native vegetation or habitat.

3.2.3 Prescribed biodiversity impacts

As described in the BAM, some types of projects may have impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. For many of these impacts the biodiversity values may be difficult to quantify, replace or offset, making avoiding and minimising impacts critical. Clause 6.1 of the BC Regulation identifies the following as impacts that are 'prescribed biodiversity impacts' that must be assessed using the BOS.

> *(a) impacts of development on the habitat of threatened species or ecological communities associated with:*
>
> *(i) karst, caves, crevices, cliffs and other geological features of significance;*
>
> *(ii) rocks;*
>
> *(iii) human made structures;*
>
> *(iv) non-native vegetation;*
>
> *(b) impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range;*
>
> *(c) impacts of development on movement of threatened species that maintains their life cycle;*

(d) impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining);

(e) impacts of wind turbine strikes on protected animals; and

(f) impacts of vehicle strikes on threatened species or on animals that are part of a TEC.

No potential 'prescribed biodiversity impacts' due to the proposed development were identified during the development of this BDAR.

3.3 Mitigation of Residual Impacts on Biodiversity Values

The following mitigation techniques will be implemented to address the residual impacts on biodiversity values during and after the construction phase of the proposed development. In combination, these mitigation measures are considered sufficient to reduce the risk of residual impacts to an acceptably low level.

3.3.1 Construction

A Construction Environmental Management Plan (CEMP) will be developed to guide the proposed development from before construction commences and until construction is completed. At a minimum the CEMP will include:

- clearing procedures;
- weed management procedures;
- sediment and erosion controls to prevent site run-off;
- noise, vibration, and dust control;
- flow controls;
- pollution and waste management;
- water treatment standards before release; and
- monitoring, reporting, and compliance requirements.

All retained vegetation and remnant trees will be protected in accordance with the Australian Standard[21].

Trees to be cleared will be removed in accordance with the CEMP. At a minimum this will include pre-clearance surveys, clearing outside of the breeding season of most of the locally occurring native fauna (i.e. August to December), and fauna rescue procedures.

Best practice sediment and erosion control, such as the use of sediment traps, sediment interception ponds, silt fences and haybale fences, will be implemented as required during construction to minimise the flow of water and associated material into the surrounding areas and water sources.

[21] Standards Australia (2009) *Australian Standard. Protection of trees on development sites*. https://www.tcaa.com.au/wp-content/uploads/2018/11/AS-4970-2009-Protection-of-trees-on-development-sites.pdf

3.3.1.1 Weed Management

Serrated Tussock and Blackberry are listed as Commonwealth Weeds of National Significance (WoNS). All WoNS will be removed as part of the proposed development.

The key potential risk to the biodiversity values of the subject land and adjoining areas during construction of the proposed development is the facilitated spread of the high threat weeds currently occurring in the locality and/or the introduction of new weeds. Therefore, at a minimum, the following weed management measures will be implemented during construction works and occupation of the newly created lots.

- Appropriate vehicle hygiene will be maintained. Vehicles and machinery entering the subject land will be clean of weed seed or propagules.
- Only sterile materials such as hessian/jute or rice straw will be used for soil stabilisation or similar purposes.
- High threat weeds will be prevented from establishing on newly created road verges, landscaped areas, and other open space.

3.3.2 Operation

The proponent intends to incorporate the retained areas of C2-zoned land into a residual lot (see Figure 3). It is proposed for the residual lot 1 to remain in private ownership. Residual lot 2, incorporating the drainage reserve and the riparian corridor is proposed to be dedicated to council.

It is anticipated that the C2-zoned portion of the residual lot 1 will have a Biodiversity Management Plan (BMP) during the Development Application process which will ensure the protection and management of the retained native vegetation and threatened species habitat. The BMP will include measures to maintain and improve the condition and habitat value of the conservation areas, such as weed control and rehabilitation of the riparian areas.

3.3.3 Mitigating residual prescribed biodiversity impacts

As detailed in Section 3.1.2, the proposed development is unlikely to result in any prescribed biodiversity impacts and therefore dedicated mitigation measures are not required.

Notwithstanding this, the avoidance and minimisation measures detailed in Section 3.1.1 and the mitigation measures detailed in Section 3.3.1 will reduce the impact of the proposed development.

3.3.4 Adaptive management for uncertain impacts

As per the BAM, an adaptive management strategy is required for impacts on biodiversity values that are infrequent or difficult to measure prior to commencement of the proposed development. Such impacts are referred to as uncertain impacts. If uncertain impacts are identified, the proponent must develop an adaptive management strategy.

The proposed development is unlikely to result in biodiversity impacts that are unforeseen or uncertain, especially given that:

- the subject land does not support karst, caves, crevices, cliffs and other geological features of significance;
- the proposed development does not include underground mining;

- the proposed development does not include wind turbines; and
- the proposed development is unlikely to substantively increase the incidence of vehicle strikes.

As such, an adaptive management strategy is not required for the proposed development.

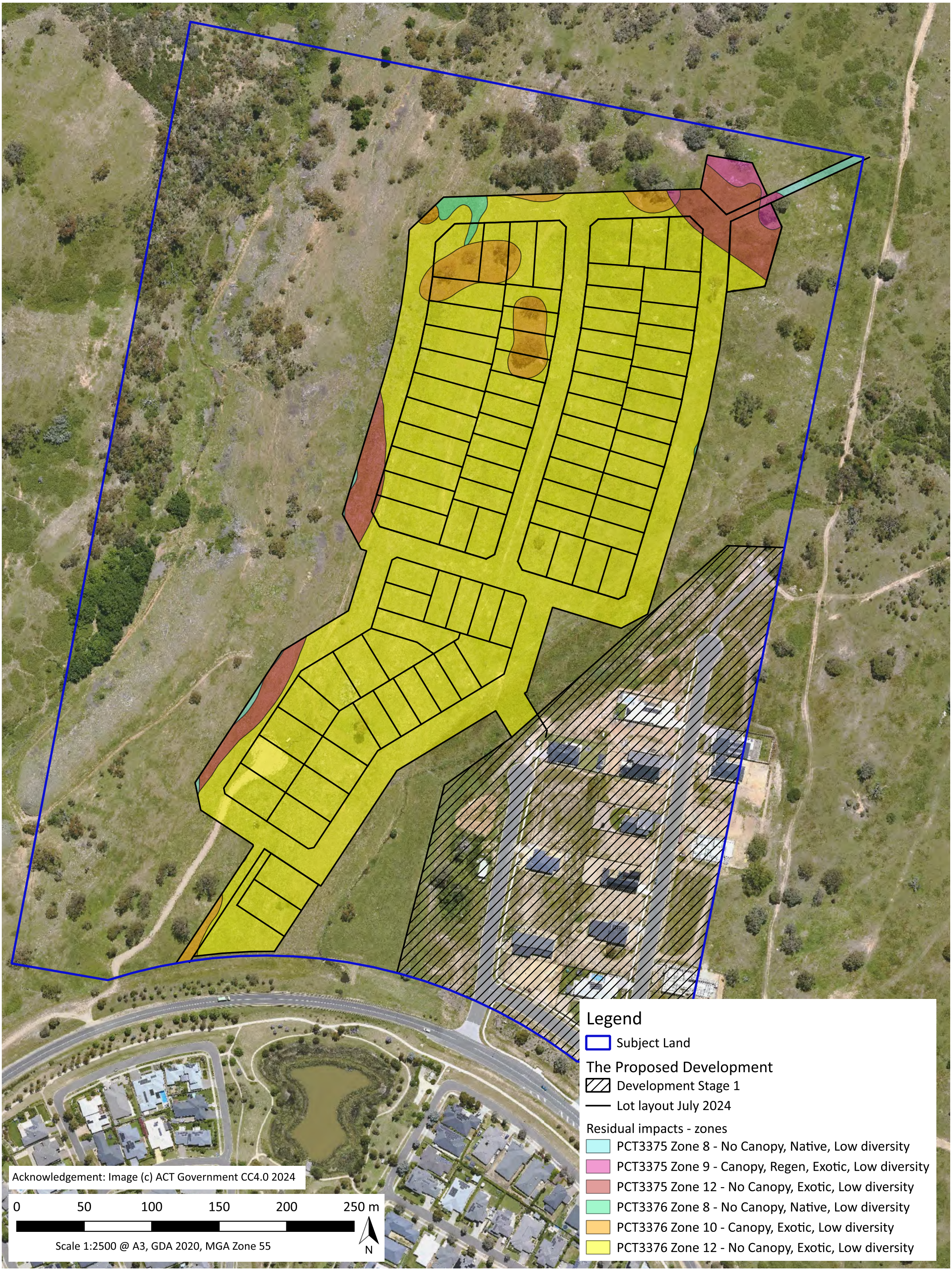

Figure 11. Residual Impacts of the Proposed Development

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Date: 07/08/2024

3.4 Serious and Irreversible Impacts

The guidance to assist a decisionmaker to determine a serious and irreversible impact (NSW Government 2019[22]) provides a list of threatened species and ecological communities which are likely to be the subject of serious and irreversible impacts (SAII). The potential for a project to impact these SAII entities must be assessed in the BDAR.

The subject land supports the following listed ecological community which is listed as an SAII entity.

- PCT3376 - '*Southern Tablelands Grassy Box Woodland*' (BC Act Box-Gum Woodland)

The proposed development will result in the removal of a total of 0.52 ha of BC Act Box-Gum Woodland, comprised of:

- 0.46 ha of moderate quality BC Act Box-Gum Woodland (i.e. PCT3376 Zone 10, VI = 16.1); and
- 0.06 ha of low quality BC Act Box-Gum Woodland (i.e. PCT3376 Zone 8, VI = 10.1).

The below additional information is provided to support the decision maker to determine if the proposed clearance of 0.52 ha of low to moderate quality BC Act Box-Gum Woodland constitutes a SAII.

3.4.1 Box-Gum Woodland

The following information is presented according to the requirements outlined in Section 10.2 of the BAM and has been informed by the following databases and documents.

- NSW Government Saving Our Species (SOS) profile[23] and project report[24].
- *Final Determination: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. Gazetted 17 July 2020 (NSW Threatened Species Scientific Committee 2020a).
- *Notice of and reason for the Final Determination (*NSW Threatened Species Scientific Committee 2020b[25]*).*
- *Conservation Assessment of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (NSW Threatened Species Scientific Committee 2020c[26]).
- NSW Government Office of Environment & Heritage White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland profile[27].

[22] NSW Government (2019). *Guidance to assist a decision-maker to determine a serious and irreversible impact*. State of New South Wales and Department of Climate Change, Energy, the Environment, and Water. https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development

[23] https://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10837

[24] https://www.environment.nsw.gov.au/savingourspeciesapp/ViewFile.aspx?ReportProjectID=988&ReportProfileID=10837

[25] NSW Threatened Species Scientific Committee (2020b), *Notice of and reason for the Final Determination.*

[26] NSW Threatened Species Scientific Committee (2020c). *Conservation Assessment of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.*

[27] https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10837

- *ACT native woodland conservation strategy and action plans* (ACT Government 2019[28]).
- *White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands listing advice and conservation advice* (NSW Government 2006[29]).
- *White box - Yellow box - Blakely's red gum grassy woodlands and derived native grasslands* (Commonwealth of Australia 2006[30]).
- *National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Commonwealth of Australia 2010[31]).

3.4.1.1 Box-Gum Woodland – SAII additional information

1. the action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAII

The proposed development enacts the principles detailed in Section 3.1 to avoid and minimise impacts to Box-Gum Woodland. Potential indirect impacts, including indirect impacts to BC Act Box-Gum Woodland, will be minimised and mitigated by the measures outlined in Section 3.3.

In total, the proposed development will impact upon:

- 0.52 ha of low to moderate quality BC Act Box-Gum Woodland (PCT3376 Zones 8 and 10, VI = 10.1 and 16.1 respectively);
- 9.85 ha of exotic pasture, not BC Act Box-Gum Woodland (PCT3376 Zone 12, VI = 3.5).

As such, 95% of the impact to PCT3376 occurs in vegetation zones that have been disturbed to the extent that they no longer meet the listing criteria for BC Act Box-Gum Woodland.

The proposed development has been designed to avoid:

- 1.99 ha (100%) of high quality EPBC Act and BC Act Box-Gum Woodland (PCT3376 Zones 3, 4, and 7, VI = 68.1, 51.9, 42.1 respectively)
- 1.48 ha (74%) of low to moderate quality BC Act Box-Gum Woodland (PCT3376 Zones 8 and 10).

Overall, the proposed development avoids 87% of the BC Act Box-Gum Woodland in the subject land, including all areas of high quality.

[28] ACT Government (2019). *ACT native woodland conservation strategy and action plans*. Environment, Planning and Sustainable Development.
[29] Commonwealth of Australia (2006). *White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands listing advice and conservation advice*. Nationally threatened species and ecological communities guidelines. EPBC Act policy statement. Department of Climate Change, Energy, the Environment, and Water.
[30] Commonwealth of Australia (2006). *White box - Yellow box - Blakely's red gum grassy woodlands and derived native grasslands.* EPBC Act Policy Statements, Nationally threatened species and ecological communities.
[31] Commonwealth of Australia (2010). *National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.* Department of Environment, Climate Change and Water NSW, Sydney

2. ***The current status of the TEC including:***

   a. ***evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW and estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal).***

   b. ***extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC regulation) indicated by:***

      i. ***change in community structure***

      ii. ***change in species composition***

      iii. ***disruption of ecological processes***

      iv. ***invasion and establishment of exotic species***

      v. ***degradation of habitat, and***

      vi. ***fragmentation of habitat***

   c. ***evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the***

      i. ***Extent of occurrence***

      ii. ***Area of occupancy, and***

      iii. ***Number of threat-defined locations***

   d. ***evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation).***

   White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is listed under the NSW BC Act as a Critically Endangered Ecological Community. It is considered to be an SAII entity based on Principles 1 and 2[32]. As stated in the Final Determination (NSW TSSC 2020[33]):

   "White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland has undergone a very large reduction in geographic distribution. The Community has been extensively cleared throughout its range and remnants typically are small, isolated, highly fragmented, occur in predominantly cleared landscapes and exhibit highly modified understoreys (TSSC 2006). Based on a compilation of available maps depicting the current extent of the community, TSSC (2006) estimated that less than 5% of the original distribution remained,

[32] https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development

[33] NSW Threatened Species Scientific Committee (2020), *Notice of and reason for the Final Determination* - White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. NSW Government.

however the extent to which remaining examples continue to support characteristic biota, their interactions and function is unknown…

…White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is subject to a number of threatening processes that have caused severe declines in biotic processes and interactions throughout its range and are likely to cause continuing decline in the future."

3. **Is the TEC 'Unknown' or 'Data deficient' for Principles 1 to 4?**

The TEC is not data deficient.

4. ***in relation to the impacts from the proposal on the TEC at risk of an SAII:***

a. ***the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:***

i. ***in hectares, and***

ii. ***as a percentage of the current geographic extent of the TEC in NSW***

The current geographic extent of the TEC in NSW varies widely between estimates. The following information was taken from the NSW TSSC Conservation Assessment of White Box-Yellow Box-Blakely's Red Gum Grass Woodland and Derived Native Grassland (Table 2a, NSW TSSC[34]):

- Former (pre-1750) extent in NSW = 3,717,366 ha.
- Current extent in NSW = 250,729 ha (93% cleared).

The proposed development will impact 0.52 ha of BC Act Box-Gum Woodland. The remaining areas (i.e. 9.85 ha of PCT3376 Zone 12) impacted by the proposed development have been disturbed to the extent that they no longer meet the listing criteria for BC Act Box-Gum Woodland.

The proposed development of the subject land will therefore have a direct impact on 0.52 ha of BC Act Box-Gum Woodland. This impact represents 0.0002% of the total extent in NSW.

b. **The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:**

i. **Estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500m of the development footprint or equivalent area for other types of proposals**

In total, the subject land was assessed as supporting 3.99 ha of BC Act Box-Gum Woodland (i.e. PCT3376 Zones 3, 4, 7, 8, and 10). The proposed development of the subject land will have a direct impact on 0.52 ha of BC Act Box-Gum Woodland.

As shown in Figure 12, a 500 m buffer around the subject land contains approximately 78.35 ha of BC Act Box-Gum woodland. The areas to be cleared within the subject land are isolated patches or small areas on the edge of larger patches extending into the surrounding area. The

[34] NSW Threatened Species Scientific Committee (2020). *Conservation Assessment of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.*

proposed development will therefore not increase the isolation of any remaining areas of the TEC.

ii. Describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:

- **Distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and**

The average minimum distance between all patches of BC Act Box-Gum Woodland within 500 m of the subject land (including vegetation within the subject land, refer to Figure 12):

- if the remnant is retained = 207 m; and
- if the remnant is removed as proposed = 183 m.

The proposed development would therefore result in an average decrease of 24 m (12%) for the minimum distance between all patches of BC Act Box-Gum Woodland within 500 m of the subject land.

The proposed impact to 0.52 ha of BC Act Box-Gum Woodland is therefore considered unlikely to further isolate retained and adjacent areas of the TEC.

- **Estimated maximum dispersal distance for native flora species characteristic of the TEC, and**

The TEC across the subject land is highly disturbed as 60% has been historically cleared in all strata (i.e. PCT3376 Zone 12) and is now entirely dominated by exotic pasture grasses with scattered paddock trees. The proposed development has been designed to avoid the remaining areas that support the TEC in moderate to high condition.

Consideration of the above information indicates that the proposed development is largely located in an area that supports low-quality vegetation and flora habitat. In addition, the proposed development will not significantly reduce the size or result in an increase in isolation of the remaining patches of the TEC. As a result, the proposed development is considered unlikely to impact the dispersal of any flora species characteristic of the TEC.

- **Other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development**

The average area to perimeter ratio for all patches of BC Act Box-Gum Woodland within 500 m of the subject land (including vegetation within the subject land, refer to Figure 12):

- if the remnant is retained = 41.4; and
- if the remnant is removed as proposed = 49.1.

The proposed development would therefore result in an average increase of 7.7 (19%) for the average area to perimeter ratio for all patches of the TEC within 500 m of the subject land.

iii. Describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zones(s). Include the relevant composition, structure and function condition scores for each vegetation zone.

The proposed development will directly impact (i.e. remove) of a total of 0.52 ha of BC Act listed Box-Gum Woodland, comprised of the following vegetation condition zones.

- PCT3376 Zone 8. Vegetation Integrity Score of 10.1 (composition 29.1, structure 16.3, and function 2.2). As described in Table 17, this zone *"consists of low diversity native pasture and occurs in small patches in the northeast and southwest of the subject land. These areas have not been cultivated but have a moderate cover of exotic grasses and weeds, particularly Serrated Tussock."*

- PCT3376 Zone 10. Vegetation Integrity Score of 16.1 (composition 27.2, structure 12.9, and function 11.9). As described in Table 18, this zone *"consists of small patches of mature trees surrounded by exotic pasture. The understorey has been cleared and cultivated and is dominated by a mix of exotic pasture species and weeds, particularly Rye Grass, Wild Oats and Brome. This zone supports a very low diversity of disturbance tolerant native species."*

As described above, PCT3376 Zone 8 and 10 have been degraded by historic and current agricultural activities and only meet the definition of BC Act Box-Gum Woodland in low to moderate condition.

Figure 12. SAII - Box-Gum Woodland within 500m of the subject land

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3.5 Legislative Requirements

3.5.1 Commonwealth EPBC Act – Referral

The proposed development is unlikely to have a significant impact on an EPBC Act listed MNES given the development footprint does not:

- support any EPBC Act listed ecological communities;
- support any EPBC Act listed flora species; or
- contain habitat of potential importance to EPBC Act listed threatened or migratory fauna species.

In light of the above, EPBC Act referral is unwarranted and is not recommended.

3.5.2 NSW BC Act – Biodiversity Offset Requirements

The BAM Calculator is the tool for quantifying the offset requirements for a project, the output being expressed as ecosystem credits and species credits. The results of the BAM credit calculations completed for the proposed development are provided below and detailed in Appendix F.

3.5.2.1 Biodiversity risk weighting

The biodiversity risk weighting is a tool used in the BOS to mitigate the risk in offsetting the loss of vegetation, threatened entities and/or their habitat. The biodiversity risk weighting does this by increasing the quantum of credits required at an impact site. The biodiversity risk weighting is derived from two components:

- sensitivity to loss – based on threat status under legislation or evidence-based information that suggests the entity is at an increased risk of loss; and
- sensitivity to potential gain – based on life history characteristics and ecological information for a species.

The biodiversity risk rating associated with the PCT within the subject land is shown below.

- PCT3365 – Biodiversity risk rating of 1.25 - 1.75.
- PCT3376 – Biodiversity risk rating of 2 - 2.50.

3.5.2.2 Ecosystem credit requirements

The results of the BAM credit calculations completed for the proposed development are provided in Table 27. As shown in Table 27, only PCT3375 Zone 9 and PCT3376 Zone 10 have a vegetation integrity score sufficient for the clearance to result in generation of ecosystem credits, as outlined in Section 9.2.1 of the BAM, these being vegetation zones that have a vegetation integrity score of:

a) *≥15, where the PCT is representative of an EEC or a CEEC*

b) *≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community*

c) *≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.*

Table 27. Ecosystem credit requirements.

PCT & Vegetation Zone	Vegetation Integrity Score	Proposed Clearance Area	Credits Required
PCT3375 Zone 8	13.9	0.06 ha	0
PCT3375 Zone 9	34.3	0.10 ha	1
PCT3375 Zone 12	8.7	0.64 ha	0
	Total	**0.80** ha	**1**
PCT3376 Zone 8	10.1	0.06 ha	0
PCT3376 Zone 10	16.1	0.46 ha	4
PCT3376 Zone 12	4.1	9.85 ha	0
	Total	**10.37 ha**	**4**

3.5.2.3 Species credit requirements

The development footprint does not support habitat of potential significance to any species credit species. Accordingly, the proposed development does not generate a species credit obligation.

3.5.3 NSW Biodiversity and Conservation SEPP 2021– Koala Habitat Protection Requirements

Regarding the application of 'Chapter 4 Koala habitat protection 2021' of the *Biodiversity and Conservation SEPP 2021* for the proposed development of the subject land, the following points are noted.

- The subject land is located within the Queanbeyan LGA, which is an LGA to which Chapter 4 applies as listed in Schedule 2.
- The subject land is zoned R1 - General Residential and C2 – Environmental Conservation.
- There is no approved koala plan of management applying to the subject land.
- The subject land has an area of greater than 1 hectare.

Based on the above assessment, the development control provisions of Chapter 4 apply to the proposed development. Therefore –

> *Before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat.*
>
> *If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application.*

With regard to the above, the following points are noted.

- The vegetation on the subject land does include trees belonging to the koala use tree species listed in Schedule 2 for the relevant koala management area (being the 'Southern Tablelands koala management area').
- In the past 40 years, there are no Koala records within 5 km of the subject land. The closest record in the past 40 years is from 2016 and is located approximately 5.5 km to the northeast of the subject land (ref BioNet)

- Approximately 80% of the canopy has been historically cleared across the subject land, and the majority of the areas that retain a canopy have been heavily thinned.
- The subject land is therefore not 'core koala habitat' which is defined in Chapter 4 as:

  (a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or

  (b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

In light of the above, and with respect to Chapter 4 of the *Biodiversity and Conservation SEPP 2021*, the subject land does not constitute koala habitat. Therefore, Council can be satisfied that the proposed development is unlikely to have any impact on koalas or koala habitat and may grant consent to the development application.

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Appendices

Appendix A. BAM Plot/Transect Scores

Composition Score

PCT code	Veg. Zone	Plot No.	Composition (species richness)					
			Tree	Shrub	Grass & grass like	Forb	Fern	Other
3375	1	1	4	10	14	1	3	1
		2	3	3	16	0	0	2
	2	1	1	10	17	0	1	1
	5	0	1	9	12	1	2	0
		0	2	8	14	1	2	0
	8	0	0	12	11	0	1	0
		0	1	8	5	1	0	0
	9	1	0	6	5	0	1	1
	12	0	0	3	4	0	0	0
		0	0	11	8	0	0	0
3376	3	1	1	8	13	0	2	1
	4	1	1	4	9	0	1	1
	7	0	4	11	15	1	3	0
	8	0	0	12	4	0	0	0
	10	1	0	8	3	0	0	1
	12	0	0	4	1	0	0	0
		1	0	6	6	0	0	1
		0	0	8	6	0	0	0

Structure Score

PCT code	Veg. Zone	Plot No.	Structure (% cover)					
			Tree	Shrub	Grass & grass like	Forb	Fern	Other
3375	1	15	1.3	49.3	9.3	0.2	0.3	15
		40	20.2	15.6	13.5	0	0	40
	2	20	0.1	38.3	3.8	0	0.2	20
	5	0	0.2	61.3	1.3	0.1	0.2	0
		0	0.2	47.8	14.1	0.1	0.3	0
	8	0	0	39.2	8.9	0	0.5	0
		0	0.1	22.7	1.5	0.1	0	0
	9	40	0	3.4	0.5	0	5	40
	12	0	0	2.2	2.3	0	0	0
		0	0	24.3	1.8	0	0	0
3376	3	50	0.1	18.6	11.3	0	0.2	50
	4	50	0.1	11.1	6.1	0	1	50
	7	0	0.5	39.1	24.9	0.1	0.5	0
	8	0	0	12.9	1.3	0	0	0
	10	5	0	10.4	0.7	0	0	5
	12	0	0	1.8	0.1	0	0	0
		1	0	4.3	1.5	0	0	1
		0	0	8.7	3.6	0	0	0

Function Score

PCT code	Veg. Zone	Plot No.	Function									
			Stem classes					No. of large trees	Hollow bearing trees	% Litter cover	Coarse woody debris (m)	% High threat weed cover
			Regen.	5-9	10-19	20-29	30-49					
3375	1	1	Present	Present	Present	Present	0	1	1	0.8	8	41.1
		2	Present	Present	Present	Present	Present	2	3	12.6	11	26.3
	2	1	Present	0	0	0	Present	1	1	5.4	19	6.5
	5	1	0	0	0	0	0	0	0	1.8	0	3.1
		2	0	0	Present	0	0	0	0	0.8	0	1.8
	8	1	0	0	0	0	0	0	0	4.6	0	13.2
		2	0	0	0	0	0	0	0	4.4	0	10.5
	9	1	0	0	0	0	Present	2	1	4.4	10	7.1
	12	1	0	0	0	0	0	0	0	0.2	0	77
		2	0	0	0	0	0	0	0	1	5	7.4
3376	3	1	0	0	0	0	Present	3	0	18	36	1.8
	4	1	0	0	0	0	Present	2	0	14	44	6.7
	7	1	Present	0	0	0	0	0	0	2.8	0	3.3
	8	1	0	0	Present	0	0	0	0	1.2	0	13.2
	10	1	0	0	0	0	Present	1	0	0.8	1	1.8
	12	1	0	0	0	0	0	0	0	11	0	6.4
		2	0	0	0	0	0	0	0	6.2	0	7.2
		3	0	0	0	0	0	0	0	2.6	0	7.3

Appendix B. Flora Species Recorded by Plot and Percent Cover

Species Name	Common Name	3375.1.1	3375.1.2	3375.2.1	3375.5.1	3375.5.2	3375.8.1	3375.8.2	3375.9.1	3375.12.1	3375.12.2	3376.3.1	3376.4.1	3376.7.1	3376.8.1	3376.10.1	3376.12.1	3376.12.2	3376.12.3
Exotic																			
Aira sp.	Hair-grass		0.1	0.1	0.1			0.2	0.1					5	1			0.1	
Avena sp.	Wild Oats	1			0.1		1								0.5	5	40	1	
Bromus sp.	Brome Grass	1	2	1	2	1	2	15	10	5	5	5	5	5	20	15	15	30	15
Capsella bursa-pastoris	Shepherd's Purse							0.1	0.1	0.1		1	1						
Carduus pycnocephalus	Slender Thistle	0.1																	
Carthamus lanatus	Saffron Thistle				0.1		0.1						0.1				1	0.5	0.1
Centaurea calcitrapa	Star Thistle			0.1								0.1							
Centaurium sp.	Common Centaury		1	1	0.1					0.2				2					
Cerastium sp.	Mouse-ears										0.1	1	1						
Chondrilla juncea	Rush Skeleton-weed			0.1		0.1								0.2				0.1	
Cirsium vulgare	Spear Thistle		0.2					0.1							0.1				
Conyza sp.	Fleabane	0.2	1	0.2	0.1	0.1	0.1			0.5		0.1	0.2	0.1	0.1			0.5	0.1
Cynodon dactylon	Couch Grass						0.1												
Cynosurus echinatus	Dog's-tail Grass												1	0.1				0.5	
Cyperus eragrostis	Tall Flat-sedge						0.1				1	0.1	0.2		1			3	5
Echium plantagineum	Paterson's Curse	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1			0.5	0.2
Erodium botrys	Long Storksbill												1						
Erodium sp.	Stork's-bill			0.1				0.1					1						
Galium aparine	Goosegrass									10									
Gnaphalium americanum	Purple Cudweed			0.1				0.1	0.1		0.2				1			0.2	1
Hirschfeldia incana	Buchan Weed	0.1			0.1		0.1	0.1	0.5	0.1		0.2	1				0.1		
Holcus lanatus	Yorkshire Fog													0.1	0.5			0.1	0.1
Hordeum sp.	Barley Grass			1				0.2	5			1	2			0.1			
Hypericum perforatum	St John's Wort	3	0.1	0.1	1	0.2	1		0.1		0.2	0.2	0.2	1			0.2	0.2	
Hypochaeris glabra	Smooth Cats-ear			0.2	0.1	0.1													0.2
Hypochaeris radicata	Flatweed	1	12	1		1	1	0.1	0.1	5	1		1	0.2	0.2			10	5
Juncus bufonius	Toad Rush			0.1					0.5		5				0.5			5	5
Lactuca serriola	Prickly Lettuce	0.1	0.1																
Lepidium africanum	Common Peppercress			0.1								0.1	1						
Linaria pelisserana	Pelisser's Toadflax	0.1			0.1														
Lolium perenne	Perennial Ryegrass		0.1	1					50		2	10	10		2	40	10	15	
Lysimachia arvensis	Scarlet Pimpernel	0.1			0.1														0.1
Malva sp.	Mallow / Marshmallow Weed							0.1	0.1										
Marrubium vulgare	White Horehound			0.1	0.1			0.1	5	0.1		1	1			1	1		
Modiola caroliniana	Red-flowered Mallow	0.1					0.1	0.2			1	1	1		0.1		1	1	2
Nassella trichotoma	Serrated Tussock			1		0.1	10	5	1	10	5	1	0.2	0.3	10	0.2	5	1	
Onopordum acanthium	Scotch Thistle			0.2					2	0.1		0.2	0.2			0.1	0.5	0.5	0.2
Orobanche minor	Lesser Broomrape									0.1		0.1	0.1			0.1			
Paronychia brasiliana	Brazilian Whitlow	0.1		0.1		0.1	0.2	10	0.5		2	1	0.5	0.2	0.5		0.5	2	0.5
Petrorhagia nanteuilii	Proliferous Pink	0.1			0.1	0.1	0.1	0.1				0.1							
Phalaris aquatica	Phalaris															1			0.2
Plantago lanceolata	Plantain / Lamb's Tongue	5	5	0.2	2	2	1	0.2	0.1	10	0.5	1	0.5	6		1	1	10	2
Polygonum aviculare	Wireweed								0.1		0.1	3	5					2	1

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Species Name	Common Name	3375.1.1	3375.1.2	3375.2.1	3375.5.1	3375.5.2	3375.8.1	3375.8.2	3375.9.1	3375.12.1	3375.12.2	3376.3.1	3376.4.1	3376.7.1	3376.8.1	3376.10.1	3376.12.1	3376.12.2	3376.12.3
Romulea rosea	Onion Grass				1														
Rosa rubiginosa	Briar Rose	3	1	0.2	1	1	2	2.5		2		0.2		0.5		0.1			1
Rubus fruticosus	Blackberry	35	25	0.2		0.2		2.5	1	65	0.2	0.2	5	0.5	0.2	1		0.5	0.2
Rumex acetosella	Sheep's Sorrel	0.1	0.2	5		0.3		0.5	5		1	0.1	1	1	2	0.5	0.2	2	1
Salvia verbenaca	Wild Sage	0.5			0.2	0.1	1			0.1		0.1	0.1	0.3					
Solanum nigrum	Black Nightshade			0.1					0.1										
Sonchus sp.	Milk/Sow Thistle											0.1	0.1		0.1			0.1	0.1
Spergularia rubra	Red Sandspurry								0.1										0.1
Taraxacum officinale	Common Dandelion	0.1				0.1													
Tolpis barbata	Yellow Hawkweed			1		0.2	0.1												0.2
Tragopogon dubius	Yellow Salsify													0.1					
Trifolium sp.	Clover	2	2	5	2	10	15	25	10	23	10	5	5	2	15		5	10	10
Verbascum thapsus	Common Mullein	1	1	0.1	0.1	0.2	0.1	0.5	1			2	2	0.1		0.2	0.2	0.2	
Verbascum virgatum	Twiggy Mullein											0.1	0.1						
Verbena incompta	Purpletop																		0.1
Vulpia sp.	Rat's Tail Fescue	1		5	0.2		3	1			20	10	5	5	15	3	15	10	20
Native																			
Acaena novae-zelandiae	Bidgee-widgee		0.1																
Acaena ovina	Sheep's Burr	0.2	0.1	0.1	0.1	1	0.1			0.1		0.1		0.1					
Ajuga australis	Austral bugle		0.1																
Amyema sp.	Box Mistletoe			0.2					5				1						
Anthosachne scaber	Common Wheat Grass		0.1	5					0.2		2	1		3	2				1
Asperula conferta	Common Woodruff	0.1	0.1		0.1	0.1						0.1		2					
Austrostipa bigeniculata	Tall Speargrass			1				0.5						5	0.5		1	1	
Austrostipa scabra	Rough Spear-grass	15		1	5	0.1	20	5			2	5	5	10	0.2		0.5		
Bossiaea buxifolia	Matted Bossiaea													0.1					
Bothriochloa macra	Red-leg Grass	1					5									2			
Brachyscome rigidula	Cut-leaf Daisy													0.1					
Bulbine bulbosa	Bulbine Lily			0.1															
Bursaria lasiophylla	Native Blackthorn	0.1	20																
Carex appressa	Tall Sedge										0.2								0.1
Carex inversa	Knob Sedge	0.1		0.1			0.1	5	2		0.1	0.5	1	0.2	0.2	1	0.2	1	0.5
Cassinia longifolia	Long-leaf Cassinia		0.1	0.1															
Cheilanthes austrotenuifolia	Southern Rock-fern							0.1											
Cheilanthes sieberi	Rock Fern	0.2			0.1	0.1								0.1					
Chloris truncata	Windmill Grass				0.1	0.5	0.1				1								
Chrysocephalum apiculatum	Common Everlasting	3			0.1	2	3							10					
Convolvulus erubescens	Australian Bindweed				0.1							0.1		0.2					
Cotula australis	Australian Water Buttons								0.1		0.1	0.1	0.2						
Crassula sieberiana	Austral Stonecrop	0.1		0.1	0.1		0.1				0.1	0.1							
Cymbonotus lawsonianus	Bear's Ears			0.1		0.1			0.1			0.1	0.1	0.1				0.5	1
Cynoglossum australe	Australian Hound's-tongue												0.1						
Daucus glochidiatus	Native Carrot	0.1	0.1		0.2	0.1	0.1												
Desmodium varians	Slender Tick-trefoil	0.1				0.2						0.1		0.2					
Dianella revoluta	Blue Flax-Lily	0.1																	
Dichelachne crinita	Long-hair Plume Grass						0.1												

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Species Name	Common Name	3375.1.1	3375.1.2	3375.2.1	3375.5.1	3375.5.2	3375.8.1	3375.8.2	3375.9.1	3375.12.1	3375.12.2	3376.3.1	3376.4.1	3376.7.1	3376.8.1	3376.10.1	3376.12.1	3376.12.2	3376.12.3
Enneapogon nigricans	Nineawn grass						0.1												
Epilobium billardierianum	Glabrous Willow Herb		0.1		0.1						0.1			0.1					
Eryngium ovinum	Blue Devil			0.1										0.5	0.1			0.1	
Eucalyptus bridgesiana	Apple Box	15	35																
Eucalyptus melliodora	Yellow Box											50	50			5		1	
Eucalyptus pauciflora	Snow Gum		5																
Eucalyptus polyanthemos	Red Box			20					40										
Euchiton sp.	Cudweed			0.2	0.1	0.1	0.1	0.1					0.1		0.5				
Euphorbia drummondii	Caustic Spurge			0.1		0.1													
Galium gaudichaudii	Rough Bedstraw		0.1																
Geranium solanderi	Native Geranium	5	10	0.1		0.1		0.1	0.1		0.1	0.2	0.2	1		0.5			0.5
Glycine clandestina	Twining Glycine	0.1												0.1					
Glycine tabacina	Variable Glycine	0.1			0.1	0.1	0.5												
Gonocarpus tetragynus	Common Raspwort		0.1																
Hibbertia obtusifolia	Hoary Guinea Flower					0.1													
Hydrocotyle laxiflora	Stinking Pennywort	0.1	2									5	5						
Juncus australis	Austral Rush								0.1		5	0.1			0.3			1	5
Juncus filicaulis	Pinrush										1		0.1		1			0.2	0.5
Leptorhynchos squamatus	Scaly Buttons													0.5					
Lomandra filiformis subsp. filiformis	Wattle Mat-rush													0.1					
Lomandra filiformis subsp. coriacea	Wattle Mat-rush	0.1		0.1	0.1	0.1	0.1	0.1						0.1	0.3	0.1	0.1	0.1	0.1
Lomandra longifolia	Spiny-head Mat-rush													0.1					
Lomandra multiflora	Many-flowered Mat-rush	0.1			0.1	0.1	0.2									0.1			
Lythrum hyssopifolia	Hyssop Loosestrife										0.1							0.5	0.5
Melichrus urceolatus	Urn Heath													0.1					
Microlaena stipoides	Weeping Grass	1		5				10	0.5	1	10	5	5			5			
Oxalis perennans	Woody-Root Oxalis	0.1	0.1	0.1		0.1	0.1	1		0.1	1	0.1	0.1	0.2	0.5	0.1	0.1	0.2	1
Panicum effusum	Hairy Panic	5		5	5	1	0.5	1	0.1		1	1			0.2	0.2			
Pimelea curviflora	Curved Rice-flower	0.1	0.1			0.1								0.2					
Pimelea linifolia	Slender Rice Flower	0.1			0.2														
Plantago varia	Variable Plantain													0.1					
Poa sieberiana	Snowgrass	2	15	1	5		1	0.1		0.2		1		0.5	2	1		1	0.5
Rubus parvifolius	Native Raspberry	1												0.1					
Rumex brownii	Swamp Dock	0.1	0.1	0.1		0.1	0.1		0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1			0.5
Rytidosperma caespitosum	Ringed Wallaby Grass					1													
Rytidosperma carphoides	Short Wallaby Grass					5													
Rytidosperma sp.	Wallaby Grass	5	0.5	20	1		2	1	0.5	1	1	5		5	5	1			
Schoenus apogon	Common Bog-sedge			0.1							1			0.1	0.2				1
Senecio quadridentatus	Cotton Fireweed	0.1	0.2		0.1							0.1	0.1						
Solanum cinereum	Narrawa Burr							0.1				0.1	0.1						
Solenogyne dominii	Smooth Solengyne			0.2															
Sorghum leiocladum	wild sorghum				5														
Stackhousia monogyna	Creamy Candles				0.1		0.1												
Stellaria pungens	Prickly Starwort		0.1																
Themeda triandra	Kangaroo Grass	20			40	40	10							15	1				
Triptilodiscus pygmaeus	Common Sunray			0.1		0.1	0.1												

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Species Name	Common Name	3375.1.1	3375.1.2	3375.2.1	3375.5.1	3375.5.2	3375.8.1	3375.8.2	3375.9.1	3375.12.1	3375.12.2	3376.3.1	3376.4.1	3376.7.1	3376.8.1	3376.10.1	3376.12.1	3376.12.2	3376.12.3
Vittadinia cuneata	Fuzzweed	0.1		1	0.1	0.1		0.1	0.1	2				5				0.1	
Vittadinia muelleri	Narrow-leaved New Holland Daisy	0.1		1	0.1	10	5	0.2				0.1		5					
Vittadinia gracilis	New Holland Daisy			0.1															
Wahlenbergia communis	Native Bluebell	0.1	0.1	0.2	0.1	0.1	0.1				0.1	0.1		0.1					
Wahlenbergia gracilis	Sprawling / Common Bluebell																	0.1	0.1
Xerochrysum viscosum	Sticky Everlasting		0.1	0.1								5							
	Number of Species	56	40	59	46	46	45	38	37	24	37	55	48	55	36	27	21	40	40
	Number of Native Species	33	24	30	25	27	24	15	13	7	19	25	16	34	16	12	5	13	14
	Number of Exotic Species	23	16	29	21	19	21	23	24	17	18	30	32	21	20	15	16	27	26
	Total No. non-grass native understorey species	25	19	22	18	21	15	9	8	4	13	18	13	28	9	6	3	10	12
	% Native Perennial Ground Cover	81.1	56.1	71.3	89.6	80.8	61.7	36.4	10.4	7.0	47.1	51.1	34.4	82.4	30.0	20.1	6.9	8.3	26.5

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Appendix C. Flora and Fauna Species Inventory

Flora Species Inventory

Scientific Name	Common Name	Status	WoNS	High Treat Weeds
Exotic				
Aira sp.	Hair-grass	-	-	-
Avena sp.	Wild Oats	-	-	-
Bromus sp.	Brome Grass	-	-	-
Capsella bursa-pastoris	Shepherd's Purse	-	-	-
Carduus pycnocephalus	Slender Thistle	-	-	-
Carthamus lanatus	Saffron Thistle	-	-	*Carthamus lanatus*
Centaurea calcitrapa	Star Thistle	-	-	-
Centaurium sp.	Common Centaury	-	-	-
Cerastium sp.	Mouse-ears	-	-	-
Chondrilla juncea	Rush Skeleton-weed	-	-	-
Cirsium vulgare	Spear Thistle	-	-	-
Conyza sp.	Fleabane	-	-	-
Cotoneaster glaucophyllus	Cotoneaster	-	-	-
Cynodon dactylon	Couch Grass	-	-	-
Cynosurus echinatus	Dog's-tail Grass	-	-	-
Cyperus eragrostis	Tall Flat-sedge	-	-	*Cyperus eragrostis*
Echium plantagineum	Paterson's Curse	-	-	-
Erodium botrys	Long Stocksbill	-	-	-
Erodium sp.	Stork's-bill	-	-	-
Galium aparine	Goosegrass	-	-	-
Gnaphalium americanum	Purple Cudweed	-	-	-
Hirschfeldia incana	Buchan Weed	-	-	-
Holcus lanatus	Yorkshire Fog	-	-	-
Hordeum sp.	Barley Grass	-	-	-
Hypericum perforatum	St John's Wort	-	-	*Hypericum perforatum*
Hypochaeris glabra	Smooth Cats-ear	-	-	-
Hypochaeris radicata	Flatweed	-	-	-
Juncus bufonius	Toad Rush	-	-	-
Lactuca serriola	Prickly Lettuce	-	-	-
Lepidium africanum	Common Peppercress	-	-	-
Linaria arvensis	Corn Toadflax	-	-	-
Linaria pelisserana	Pelisser's Toadflax	-	-	-
Lolium perenne	Perennial Ryegrass	-	-	-
Lysimachia arvensis	Scarlet Pimpernel	-	-	-
Malva sp.	Mallow/Marshmallow Weed	-	-	-
Marrubium vulgare	White Horehound	-	-	-
Modiola caroliniana	Red-flowered Mallow	-	-	-
Nassella trichotoma	Serrated Tussock	-	WoNS	*Nassella trichotoma*
Onopordum acanthium	Scotch Thistle	-	-	-
Orobanche minor	Lesser Broomrape	-	-	-
Parentucellia latifolia	Red Bartsia	-	-	-
Paronychia brasiliana	Brazilian Whitlow	-	-	-
Petrorhagia nanteuilii	Proliferous Pink	-	-	-
Phalaris aquatica	Phalaris	-	-	-
Pinus radiata	Radiata Pine	-	-	*Pinus radiata*
Plantago lanceolata	Plantain/Lamb's Tongue	-	-	-
Polygonum aviculare	Wireweed	-	-	-
Populus alba	White Poplar	-	-	*Populus alba*
Romulea rosea	Onion Grass	-	-	*Romulea rosea*
Rosa rubiginosa	Briar Rose	-	-	*Rosa rubiginosa*
Rubus fruticosus	Blackberry	-	WoNS	*Rubus fruticosus*
Rumex acetosella	Sheep's Sorrel	-	-	*Rumex acetosella*
Salvia verbenaca	Wild Sage	-	-	-
Silene gallica	French Catchfly	-	-	-
Solanum nigrum	Black Nightshade	-	-	-
Sonchus sp.	Milk/Sow Thistle	-	-	-

Scientific Name	Common Name	Status	WoNS	High Treat Weeds
Spergularia rubra	Red Sandspurry	-	-	-
Taraxacum officinale	Common Dandelion	-	-	-
Tolpis barbata	Yellow Hawkweed	-	-	-
Tragopogon dubius	Yellow Salsify	-	-	-
Trifolium sp.	Clover	-	-	-
Urtica dioica	Stinging Nettle	-	-	-
Verbascum thapsus	Common Mullein	-	-	-
Verbascum virgatum	Twiggy Mullein	-	-	-
Verbena incompta	Purpletop	-	-	-
Vulpia sp.	Rat's Tail Fescue	-	-	-
Native				
Acacia dealbata	Silver Wattle	-	-	-
Acacia rubida	Red-stemmed Wattle	-	-	-
Acaena novae-zelandiae	Bidgee-widgee	-	-	-
Acaena ovina	Sheep's Burr	-	-	-
Ajuga australis	Austral bugle	-	-	-
Amyema sp.	Box Mistletoe	-	-	-
Anthosachne scaber	Common Wheat Grass	-	-	-
Asperula conferta	Common Woodruff	-	-	-
Austrostipa bigeniculata	Tall Speargrass	-	-	-
Austrostipa scabra	Rough Spear-grass	-	-	-
Bossiaea buxifolia	Matted Bossiaea	-	-	-
Bothriochloa macra	Red-leg Grass	-	-	-
Brachychiton populneus	Kurrajong	-	-	-
Brachyscome rigidula	Cut-leaf Daisy	-	-	-
Bulbine bulbosa	Bulbine Lily	-	-	-
Bulbine glauca	Rock Lily	-	-	-
Bursaria lasiophylla	Native Blackthorn	-	-	-
Carex appressa	Tall Sedge	-	-	-
Carex inversa	Knob Sedge	-	-	-
Cassinia longifolia	Long-leaf Cassinia	-	-	-
Cheilanthes austrotenuifolia	Southern Rock-fern	-	-	-
Cheilanthes sieberi	Rock Fern	-	-	-
Chloris truncata	Windmill Grass	-	-	-
Chrysocephalum apiculatum	Common Everlasting	-	-	-
Clematis leptophylla	Old Man's Beard	-	-	-
Convolvulus erubescens	Australian Bindweed	-	-	-
Cotula australis	Australian Waterbuttons	-	-	-
Crassula sieberiana	Austral Stonecrop	-	-	-
Cryptandra amara	Bitter Cryptandra	-	-	-
Cymbonotus lawsonianus	Bear's Ears	-	-	-
Cymbopogon refractus	Barbed Wire Grass	-	-	-
Cynoglossum australe	Australian Hound's-tongue	-	-	-
Daucus glochidiatus	Native Carrot	-	-	-
Desmodium varians	Slender Tick-trefoil	-	-	-
Dianella revoluta	Blue Flax-Lily	-	-	-
Dichelachne crinita	Long-hair Plume Grass	-	-	-
Dichondra repens	Kidney Weed	-	-	-
Discaria nitida	Leafy Anchor Plant	-	-	-
Dodonaea viscosa	Hopbush	-	-	-
Einadia hastata	Berry Saltbush	-	-	-
Einadia nutans	Climbing Saltbush	-	-	-
Enneapogon nigricans	Nineawn grass	-	-	-
Epilobium billardierianum	Glabrous Willow Herb	-	-	-
Eryngium ovinum	Blue Devil	-	-	-
Eucalyptus bridgesiana	Apple Box	-	-	-
Eucalyptus dives	Broad-Leaved Peppermint	-	-	-
Eucalyptus melliodora	Yellow Box	-	-	-
Eucalyptus pauciflora	Snow Gum	-	-	-
Eucalyptus polyanthemos	Red Box	-	-	-
Eucalyptus rossii	Scribbly Gum	-	-	-
Euchiton sp.	Cudweed	-	-	-

Scientific Name	Common Name	Status	WoNS	High Treat Weeds
Euphorbia drummondii	Caustic Spurge	-	-	-
Exocarpos cupressiformis	Native Cherry	-	-	-
Galium gaudichaudii	Rough Bedstraw	-	-	-
Geranium solanderi	Native Geranium	-	-	-
Glycine clandestina	Twining Glycine	-	-	-
Glycine tabacina	Variable Glycine	-	-	-
Gonocarpus tetragynus	Common Raspwort	-	-	-
Hibbertia obtusifolia	Hoary Guinea Flower	-	-	-
Hydrocotyle laxiflora	Stinking Pennywort	-	-	-
Indigofera australis	Austral Indigo	-	-	-
Isoetopsis graminifolia	Grass Cushion Daisy	-	-	-
Juncus australis	Austral Rush	-	-	-
Juncus filicaulis	Pinrush	-	-	-
Kunzea ericoides	Burgan	-	-	-
Leptorhynchos squamatus	Scaly Buttons	-	-	-
Leucochrysum albicans var. tricolor	**Hoary Sunray**	**EPBC Act Endangered**	**-**	**-**
Linum marginale	Native Flax	-	-	-
Lissanthe strigosa	Peach Heath	-	-	-
Lomandra filiformis	Wattle Mat-rush	-	-	-
Lomandra coriacea	Wattle Mat-rush	-	-	-
Lomandra longifolia	Spiny-head Mat-rush	-	-	-
Lomandra multiflora	Many-flowered Mat-rush	-	-	-
Lythrum hyssopifolia	Hyssop Loosestrife	-	-	-
Melichrus urceolatus	Urn Heath	-	-	-
Microlaena stipoides	Weeping Grass	-	-	-
Oxalis perennans	Woody-Root Oxalis	-	-	-
Panicum effusum	Hairy Panic	-	-	-
Pimelea curviflora	Curved Rice-flower	-	-	-
Pimelea glauca	Smooth Rice-flower	-	-	-
Pimelea linifolia	Slender Rice-Flower	-	-	-
Plantago varia	Variable Plantain	-	-	-
Poa sieberiana	Snowgrass	-	-	-
Pomaderris eriocephala	Woolly-headed Pomaderris	-	-	-
Rubus parvifolius	Native Raspberry	-	-	-
Rumex brownii	Swamp Dock	-	-	-
Rytidosperma caespitosum	Ringed Wallaby-Grass	-	-	-
Rytidosperma carphoides	Short Wallaby-Grass	-	-	-
Rytidosperma sp.	Wallaby Grass	-	-	-
Schoenus apogon	Common Bog-sedge	-	-	-
Scleranthus diander	Tufted Knawel	-	-	-
Senecio quadridentatus	Cotton Fireweed	-	-	-
Solanum cinereum	Narrawa Burr	-	-	-
Solenogyne dominii	Smooth Solenogyne	-	-	-
Sorghum leiocladum	Wild Sorghum	-	-	-
Stackhousia monogyna	Creamy Candles	-	-	-
Stellaria pungens	Prickly Starwort	-	-	-
Themeda triandra	Kangaroo Grass	-	-	-
Triptilodiscus pygmaeus	Common Sunray	-	-	-
Vittadinia cuneata	Fuzzweed	-	-	-
Vittadinia muelleri	Narrow-leaved New Holland Daisy	-	-	-
Vittadinia gracilis	New Holland Daisy	-	-	-
Wahlenbergia communis	Native Bluebell	-	-	-
Wahlenbergia gracilis	Sprawling / Common Bluebell	-	-	-
Wurmbea dioica	Early Nancy	-	-	-
Xerochrysum viscosa	Sticky Everlasting	-	-	-

Fauna Species Inventory

Class	*Scientific Name*	Common Name	Native/Exotic	Status
Amphibia	*Crinia signifera*	Common Eastern Froglet	Native	Protected
Aves	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	Native	Protected
Aves	*Anthus novaeseelandiae*	Australian (Richard's) Pipit	Native	Protected
Aves	*Aquila audax*	Wedge-tail Eagle	Native	Protected
Aves	***Artamus cyanopterus***	**Dusky Woodswallow**	**Native**	**BC Act V1**
Aves	*Cacatua galerita*	Sulphur-crested Cockatoo	Native	Protected
Aves	*Cacomantis flabelliformis*	Fan-tailed Cuckoo	Native	Protected
Aves	*Caligavis chrysops*	Yellow-faced Honeyeater	Native	Protected
Aves	***Callocephalon fimbriatum***	**Gang-gang Cockatoo**	**Native**	**EPBC Act E, BC Act V1**
Aves	*Calyptorhynchus funereus*	Yellow-tailed Black-cockatoo	Native	Protected
Aves	*Carduelis carduelis*	European Goldfinch	Exotic	-
Aves	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	Native	Protected
Aves	*Cormobates leucophaea*	White-throated Treecreeper	Native	Protected
Aves	*Corvus coronoides*	Australian Raven	Native	Protected
Aves	*Eolophus roseicapilla*	Galah	Native	Protected
Aves	*Falco cenchroides*	Nankeen Kestrel	Native	Protected
Aves	*Gerygone albogularis*	White-throated Gerygone	Native	Protected
Aves	*Gymnorhina tibicen*	Australian Magpie	Native	Protected
Aves	*Malurus cyaneus*	Superb Fairy-wren	Native	Protected
Aves	*Myiagra rubecula*	Leaden Flycatcher	Native	Protected
Aves	*Neochmia temporalis*	Red-browed Finch	Native	Protected
Aves	*Pachycephala rufiventris*	Rufous Whistler	Native	Protected
Aves	*Pardalotus punctatus*	Spotted Pardalote	Native	Protected
Aves	*Pardalotus striatus*	Striated Pardalote	Native	Protected
Aves	*Petrochelidon nigricans*	Tree Martin	Native	Protected
Aves	*Phaps chalcoptera*	Common Bronzewing	Native	Protected
Aves	*Philemon corniculatus*	Noisy Friarbird	Native	Protected
Aves	*Platycercus elegans*	Crimson Rosella	Native	Protected
Aves	*Rhipidura albiscapa*	Grey Fantail	Native	Protected
Aves	*Rhipidura leucophrys*	Willy Wagtail	Native	Protected
Aves	*Strepera graculina*	Pied Currawong	Native	Protected
Aves	*Sturnus vulgaris*	Common Starling	Exotic	-
Reptilia	***Aprasia parapulchella***	**Pink-tailed Worm-Lizard**	**Native**	**EPBC Act V, BC Act V1**
Reptilia	*Ctenotus orientalis*	Eastern Ctenotus	Native	Protected
Reptilia	*Ctenotus robustus*	Eastern Striped Skink	Native	Protected
Reptilia	*Ctenotus taeniolatus*	Copper-tailed Skink	Native	Protected
Reptilia	*Diplodactylus vittatus*	Eastern Stone Gecko	Native	Protected
Reptilia	*Lampropholis delicata*	Delicate Skink	Native	Protected

Appendix D. Remnant Tree Assessment

*Trees highlighted in orange were mapped previously by Umwelt, details in Umwelt (2018)[35]. Missing tree numbers were excluded as they were outside the subject land.

Tree ID	Species Name	Common Name	Remnant/ Planted	DBH (cm)	Height (m)	Crown diameter (m)	Hollows			Alive/ Dead	Notes
							S	M	L		
4	*Eucalyptus bridgesiana*	Apple Box	Remnant	50-79			2	1		A	
5	*Eucalyptus bridgesiana*	Apple Box	Remnant	80+			2			A	
6	*Eucalyptus bridgesiana*	Apple Box	Remnant	80+						A	No hollows, large stick nest of WTE
7	*Eucalyptus bridgesiana*	Apple Box	Remnant	50-79				1		D	
8	*Eucalyptus bridgesiana*	Apple Box	Remnant	80+			1			A	
9	*Eucalyptus bridgesiana*	Apple Box	Remnant	80+			2			A	
10	*Eucalyptus bridgesiana*	Apple Box	Remnant	80	10	7				A	WTE Nest - fresh leaves and poo but no WTE seen
11	*Eucalyptus bridgesiana*	Apple Box	Remnant	130	12	10				A	WTE nest - old, not occupied, falling apart
12	*Eucalyptus bridgesiana*	Apple Box	Remnant	110	13	11	1	1		A	
13	*Eucalyptus bridgesiana*	Apple Box	Remnant	85	8	10	1			A	
14	*Eucalyptus bridgesiana*	Apple Box	Remnant	160	9	10			2	A	Bees
15	*Eucalyptus bridgesiana*	Apple Box	Remnant	65, 55, 45	10	15	1	3	1	A	Mistletoe. Bees in hollow
16	*Eucalyptus bridgesiana*	Apple Box	Remnant	90	12	14			1	A	Mistletoe
17	*Eucalyptus bridgesiana*	Apple Box	Remnant	80	11	8	2			A	
18	*Eucalyptus bridgesiana*	Apple Box	Remnant	90	12	13		1	1	A	Mistletoe

[35] Umwelt (2018). *Flora and Fauna Assessment, Sunset Residential Development, Googong, NSW*. Report no. 4167/R01, prepared by K. Connolly.

19	*Eucalyptus bridgesiana*	Apple Box	Remnant	55, 45, 40	9	14	1	1		A	Bees
20	*Eucalyptus bridgesiana*	Apple Box	Remnant	90	10	11	1			A	
21	*Eucalyptus bridgesiana*	Apple Box	Remnant	70	11	8		1	1	A	
22	*Eucalyptus polyanthemos*	Red Box	Remnant	85	10	10	2			A	Mistletoe
49	*Eucalyptus mannifera*	Brittle Gum	Remnant	50-79			7	14		A	
50	*Eucalyptus melliodora*	Yellow Box	Remnant	80+				1		A	
51	*Eucalyptus melliodora*	Yellow Box	Remnant	80+			5	3	1	A	
52	*Eucalyptus melliodora*	Yellow Box	Remnant	30-49			1			A	
53	*Eucalyptus melliodora*	Yellow Box	Remnant	50-79					1	A	
54	*Eucalyptus mannifera*	Brittle Gum	Remnant	50-79			1			A	
55	N/A	Stag	Remnant	20-29			1			D	
56	N/A	Stag	Remnant	20-29			1			D	Stick nest
57	*Eucalyptus melliodora*	Yellow Box	Remnant	50-79			1			A	
58	*Eucalyptus melliodora*	Yellow Box	Remnant	50-79			1			A	
59	*Eucalyptus rossii*	Inland Scribbly Gum	Remnant	80+			3			A	
60	*Eucalyptus melliodora*	Yellow Box	Remnant	50-79			2	1		A	
62	N/A	Stag	Remnant	30-49			2			D	

Appendix E. BAM Credit Summary Report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050327/BAAS17089/24/00050328	3329 - Cooke Sunset Googong - BAM Stage 2	28/10/2024
Assessor Name	Report Created	BAM Data version *
Robert Speirs	30/10/2024	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS17089	Open	To be finalised
Assessment Revision	BOS entry trigger	Assessment Type
1	BOS Threshold: Area clearing threshold	Part 4 Developments (General)

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Monaro-Queanbeyan Rolling Hills Grassy Forest												
1	3375_8	Not a TEC	13.9	13.9	0.06	PCT Cleared - 61%	Low Sensitivity to Gain			1.25		0

2	3375_9	Not a TEC	34.3	34.3	0.1	PCT Cleared - 61%	Low Sensitivity to Gain			1.25		1
3	3375_12	Not a TEC	8.7	8.7	0.64	PCT Cleared - 61%	High Sensitivity to Gain			1.75		0
											Subtotal	**1**
Southern Tableland Grassy Box Woodland												
4	3376_8	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	10.1	10.1	0.06	Population size	Low Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.00	True	0

5	3376_10	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	16.1	16.1	0.46	Population size	Low Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.00	True	4

6	3376_12	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	4.1	4.1	9.8	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**4**
											Total	**5**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits