Appendix A Land category assessment

Land Category Assessment

Winterbourne Wind Farm

April 2022

Project Number: 21-570





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Acronyms and abbreviations

BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
DPIE	Department of Planning, Industry and Environment (NSW)
FPC	Foliage Projective Cover
ha	hectares
km	kilometres
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013*
LLS Regulation	*Local Land Services Regulation 2014*
m	metres
NVR Map	Native Vegetation Regulatory Map
OEH	(Former) Office of Environment and Heritage (NSW) (now EES)
DCS SS	Spatial Services, a business unit of the NSW Department of Customer Service (NSW)

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1. Introduction

NGH were engaged by ERM on behalf of WinterbourneWind Pty Ltd to prepare this Land Category Assessment (LCA) for the proposed Winterbourne Wind Farm.

The development of Winterbourne Wind Farm requires assessment under the Biodiversity Assessment Method (BAM) and the preparation of a Biodiversity Development Assessment Report (BDAR). Section 6.8(3) of the *Biodiversity Conservation Act 2016* (BC Act) determines that the BAM is to exclude the assessment of the impacts of clearing of native vegetation within areas categorised as Category 1 (exempt land). The purpose of this Land Category Assessment (LCA) is to determine which areas of the Development Site, if any, constitute Category 1 (exempt land).

1.1 Development Site

The Winterbourne Wind Farm Development Site is located in the Northern Tablelands of New South Wales 6 km northeast from the town of Walcha. The project boundary falls into both the Walcha and Uralla Local Government Areas (LGA). To the east of the site lies Oxley Wild Rivers National Park, Carrai National Park and Willi Willi National Park. The site location is shown in Appendix B.

1.2 Overview of land categorisation

Rural land zoned RU1-4 and RU6 in NSW is categorised under the *Local Land Services Act 2013* (LLS Act) into three main categories:

- Category 1 (exempt land)
- Category 2 (regulated land, vulnerable regulated land, or sensitive regulated land), and
- Excluded land.

The main purpose of land categorisation under the LLS Act is to govern clearing of vegetation associated with agricultural activities in rural areas. Clearing of vegetation within Category 1 (exempt land) does not require assessment or offsetting under the BAM. In practice, this means that native vegetation within Category 1 is not included in any area clearing calculations when determining whether the Biodiversity Offset Scheme (BOS) applies to a proposal. Further details of the relevant legislation are provided in Section 1.3 below.

A Native Vegetation Regulatory (NVR) Map of existing land categorisations is maintained by the Department of Planning, Industry and Environment (DPIE). The NVR Map is currently in a transitional stage, and only Category 2 (vulnerable regulated land), Category 2 (sensitive regulated land) and excluded land are publicly viewable (State of NSW and Department of Planning Industry and Environment, 2021).

During the transitional period, BAM accredited assessors may establish the categorisation of land for the Environment Agency Head to consider, following the method outlined in the *Native vegetation regulatory map: method statement* (State of NSW and NSW Office of Environment and Heritage, 2017).This methodology is used in Section 2 of this Assessment to establish areas of Category 1 and Category 2 land.

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1.3 Legislative framework

1.3.1 Biodiversity Conservation Act 2016

Section 6.8(3) of the BC Act determines that the BAM is to exclude the assessment of the impacts of clearing of native vegetation on Category 1 - Exempt Land (within the meaning of Part 5A of the LLS Act).

- **BC Act s6.8(3):** The biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1 (exempt land) (within the meaning of Part 5A of the LLS Act), other than any impacts prescribed by the regulations under section 6.3;
- **BAM 2020, s1.5** The BAM does not assess biodiversity values for:

  d. native vegetation and loss of habitat on Category 1 (exempt land) (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts under clause 6.1 of the BC Regulation (referred to as prescribed impacts in the BAM).

1.3.2 Section 60J of the *Local Land Services Act 2013*

Under section 60J of the *Local Land Services Act 2013* (LLS Act), matters relating to the determination of mapped Category 1 (exempt land) or Category 2 (regulated land) include:

60J (2) Native vegetation that comprises grasslands or other non-woody vegetation is taken to have been cleared if the native vegetation was significantly disturbed or modified. The regulations may make provision for the purposes of determining whether native vegetation has been significantly disturbed or modified for the purposes of this Division.

The clearing of native vegetation after 1990 must have been done legally, and the vegetation must have been cleared as of 1st January 1990 or between 1st January 1990 and 25th August 2017. Satellite imagery may be used to determine the native vegetation clearing.

1.3.3 Section 114 of the *Local Land Services Regulation*

Section 114 of the *Local Land Services Regulation 2014* (LLS Regulation) outlines how to determine whether non-woody native vegetation has been significantly disturbed or modified.

(1) Native vegetation that comprises grasslands or other non-woody vegetation is taken to have been significantly disturbed or modified (and therefore cleared) only if—

> *(a) there has been a detectable variation (from information obtained from aerial or satellite imagery) in the structure or composition, or both, of non-woody vegetation, and*
>
> *(b) that variation is consistent with management of pasture or crops for agricultural purposes, and*
>
> *(c) that variation has been sustained for at least 12 months on more than one occasion before the commencement of Part 5A of the Act, and*
>
> *(d) that variation has* ***not been caused only by grazing*** *on the land, and*
>
> *(e) that variation occurred (from information obtained from aerial or satellite imagery) between 1 January 1990 and the date of commencement of Part 5A of the Act.*

1.3.4 Land Management Framework

The Land Management Framework includes the several components which work together to regulate native vegetation management on private rural land, including the LLS Act, BC Act, the *Land Management (Native Vegetation) Code 2018*, NVR Map, and NSW SEPP.

The Land Management Framework allows landholders to assess the conservation value of groundcover on Category 2 – regulated land. Native groundcover is low conservation value if:

1. less than 50 % of the vegetation cover is comprised of native species, and
2. at least 10% of the area is covered with vegetation (whether dead or alive).

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2. Methodology

2.1 Existing NVR Map methodology

The process for developing and assembling the existing NVR map involved combining multiple spatial data layers and products. This was not a linear process, as some layers take precedence over others to develop the final map product for publication. The method has been developed based on the following key components:

a) Rural areas where the map categorisation applies are identified by compiling layers representative of land to which the LLS Act does not apply – i.e., Excluded Land. No further analysis or mapping is undertaken in these areas.

b) Existing and historical agricultural land use patterns are identified and mapped, based on updated mapping products. Mapping of existing and historical land use focuses on identifying patterns or evidence of agricultural land uses according to high resolution aerial or satellite imagery. Land is then categorised as per the Australian Land Use and Management (ALUM) classification system (ABARES, 2016). Each of these ALUM classes is preliminarily identified as Category 1 or Category 2 land.

c) The mapping of agricultural land use is then supplemented by applying a time series analysis of satellite imagery and identifies non-woody vegetation that has been significantly disturbed or modified for agricultural use since 1 January 1990. This evidence is used to supplement and refine the land use mapping layer above.

d) Woody vegetation that has been cleared since 1 January 1990 is identified and mapped, based on satellite images and circa 1990 aerial photographs.

e) Any additional prescribed area criteria listed in the LLS Act that allocates land to either category 1 or 2 is applied, including confirmation that any identified clearing has been conducted lawfully

f) The layers are then integrated and analysed to create the final map product

2.2 Land categorisation criteria

The following Table 2-1 outlines the various criteria that allow for the categorisation of areas of land according to the LLS Act.

Table 2-1 Land categories and criteria that applies to each category.

Land category	Criteria
Category 1 **Exempt Land**	• Land cleared of native vegetation as at 1 January 1990 • Land **lawfully** cleared of native vegetation between 1 January 1990 and 25 August 2017 • Low conservation value grasslands - grasslands or groundcover that are composed of less than 50% native vegetation, and don't occur under the drip line of woody vegetation (factsheets are available on the Local Land Services website describe grasslands and groundcover and explain how these areas can be assessed) • Land containing only low conservation groundcover (not being

Land category	Criteria
	grasslands) • Native vegetation identified as regrowth in a Property Vegetation Plan (PVP) under the repealed *Native Vegetation Act 2003,* only where the PVP specifies a regrowth date. • Land bio-certified under the *Biodiversity Conservation Act 2016*
Category 2 **Regulated Land**	• Land not cleared as at 1 January 1990 or • Land **unlawfully** cleared of native vegetation between 1 January 1990 and 25 August 2017 • Native vegetation grown with the assistance of public funds (clearing under the *Land Management (Native Vegetation) Code 2018* is not permitted on such land while the agreement providing the funds is in force) • Land that was subject to a Private Native Forestry property vegetation plan (PVP) that is no longer in force • Grasslands that are neither low nor high conservation grasslands • Travelling Stock Reserves, apart from Travelling Stock Reserves in the Western Division
Category 2 **Vulnerable Regulated Land**	• Steep or highly erodible land • Protected riparian areas • Land susceptible to erosion, or land that is otherwise environmentally sensitive
Category 2 **Sensitive Regulated Land**	• Land subject to a private land conservation agreement as set aside under the *Land Management (Native Vegetation) Code 2018* • Land subject to a biocertification conservation measure • Land comprising an offset under a Property Vegetation Plan or set aside under a code under the *Native Vegetation Act 2003* • Coastal wetlands and littoral rainforests (*Coastal Management Act 2016*) • High conservation grasslands • Core Koala habitat identified in a plan of management (Koala Habitat Protection State Environmental Planning Policy) • Critically endangered plants and critically endangered ecological communities • Ramsar wetlands listed under the *Environment Protection and Biodiversity Conservation Act 1999* • Land subject to remedial action or conservation measures under the *Biodiversity Conservation Act 2016* • Land subject to a property, trust or conservation agreement • Land recommended for listing as an Area of Outstanding Biodiversity

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Land category	Criteria
	Value • Land subject to a Private Native Forestry Plan or Private Native Forestry PVP that is in force • Conservation Areas under the Southern Mallee Land Use Agreement • Native vegetation that must be retained under the *Plantation and Reafforestation Act 1999* • Land subject to a condition of development consent requiring the land to be set aside for conservation purposes under the *Environmental Planning and Assessment Act 1979* • Rainforest and old-growth forest
Excluded land	• Land that is not subject to the LLS Act, such as National Parks, State Forests and urban areas (subject to the Vegetation SEPP).

2.3 NGH assessment methodology

2.3.1 Desktop assessment

NGH undertook a desktop mapping analysis of the Development Site, using historic and current aerial imagery and several spatial datasets, outlined in Table 2-2 below, also presented in the Appendices.

NGH predominantly used the existing Transitional NVR Map, historical imagery, NSW Landuse 2017, and information obtained during our site visits to inform this analysis. NSW Woody Vegetation Extent & FPC 2011 data was used to supplement past and recent aerial imagery of woody vegetation.

Table 2-2 Datasets used in desktop analysis

Dataset	Purpose
Historic aerial imagery (State of NSW and Spatial Services, 2021). **Predominantly 1991, some 1993 and 1989. These dates were the closets to 1990 available.**	Appendix E, Appendix F Used to show historic evidence of land use, cropping, disturbance, vegetation clearing
Transitional NVR Map v3.0 (State of NSW and Department of Planning Industry and Environment, 2021)	Appendix B The transitional Native Vegetation Regulatory (NVR) Map is a tool that landholders can use to display the most critical land categories at a property scale during the transitional period. As this map is updated on a monthly basis, published

Dataset	Purpose
	spatial layers used in this assessment were cross checked against the online web portal map to ensure the NVR mapping was the most up to date available for the site.
NSW Landuse 2017 v1.2 (State of NSW and Department of Planning, Industry and Environment, 2020)	Appendix D This dataset captures how the landscape in NSW is being used (as at 2017, updated for some regions in 2020) for food production, forestry, nature conservation, infrastructure and urban development. It can be used to monitor changes in the landscape and identify impacts on biodiversity values and individual ecosystems. The 2017 Landuse data is based on Aerial imagery and Satellite imagery available for NSW, and classified according to the Australian Land Use and Management (ALUM) Classification system.
NSW Environmental Planning Instrument - Land Zoning (State of NSW and Department of Planning, Industry and Environment, 2021)	Appendix H This spatial dataset identifies land use zones and the type of land uses that are permitted (with or without consent) or prohibited in each zone on any given land as designated by the relevant NSW environmental planning instrument (EPI) under the Environmental Planning and Assessment Act 1979.
NSW Woody Vegetation Extent & FPC 2011 (State of NSW and Department of Planning, Industry and Environment, 2015)	Appendix G This dataset shows the location, extent, and foliage cover for stands of woody vegetation in NSW for the year 2011.
NGH PCT and vegetation mapping	Appendix C PCT and vegetation mapping undertaken during site assessments.

2.3.2 Field assessment

Field data can be used to support land categorisation. The purpose of these visits relevant to this LCA was to broadly survey the site in order to stratify vegetation, and to conduct vegetation integrity surveys to assess native vegetation and assign Plant Community Types (PCTs) where appropriate. Fieldwork was undertaken both before and after the desktop assessment, and for this assessment, the field data generally overrides the results of the desktop analysis, where results (i.e., evidence to support proposed land categorisation) conflict.

Several field assessments of the site were undertaken by BAM accredited ecologists in August, September and November 2020, and March, April and October 2021. Some initial vegetation

mapping following site visits was undertaken by ERM in February 2020. NGH completed subsequent mapping following site visits.

Under the Land Management Framework, which allows landholders or ecologists to assess the conservation value of their land (section 1.3.4), native groundcover is low conservation value if:

- less than 50 % of the vegetation cover is comprised of native species, and

at least 10% of the area is covered with vegetation (whether dead or alive).Full vegetation integrity surveys (BAM plots), rapid vegetation assessments and step point method assessments (LLS, n.d.) were undertaken. Vegetation integrity surveys included collection of full floristic data within a 20 x 20 plot, and litter data within 5 1 x 1 m sub-plots. Rapid vegetation assessments included assessment of the dominant species within each vegetation stratum. The step point method involves walking 100 steps in a transect across a selected patch of vegetation and recording the groundcover vegetation at the tip of your shoe at each step – native, non-native, or other (e.g., bare ground, leaf litter), and then calculating whether the total native groundcover percentage is greater or less than 50%.

Step point method assessments were primarily targeted towards areas where it was suspected the vegetation would qualify as low conservation groundcover, but that historic imagery and other spatial layers did not support Category 1 classification. BAM plots were targeted towards areas that were likely of higher conservation value and requiring full assessment and offset under the BAM.

Across the entire Development Site, 140 BAM plots, and 144 step point/rapid vegetation assessments have been undertaken (see Appendix C).

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3. Results

3.1 Field assessment

Large areas of the Development Site were assigned a PCT following survey, therefore qualifying as Category 2 (regulated land) and requiring assessment under the BAM. Areas of grassland where BAM plot, rapid vegetation or step-point assessment data demonstrated high exotic coverage were mapped as Category 1 (exempt land) (Appendix C). 173 scattered trees were identified during field assessments, also categorised as Category 2 (regulated land).

3.2 Desktop analysis

3.2.1 Transitional NVR Map

The existing NVR mapping shows areas already classed as Category 2 (vulnerable regulated land) and Category 2 (sensitive regulated land) (Appendix B). The pre-existing classification of these areas cannot be changed, and thus our analysis and classification relates to all remaining areas of land.

There are no areas of Excluded land within the Development Site, as the entire Site is zoned RU1 Primary Production, and thus falls under the jurisdiction of the LLS Act.

3.2.2 NSW Landuse 2017

The NSW Landuse 2017 dataset classifies the majority of the site as either ‘Grazing native vegetation’ or ‘Grazing modified pastures’, with smaller areas of ‘Cropping’, ‘Residential Farm Infrastructure’, and ‘River’ (Appendix D).

All areas mapped as ‘Grazing native vegetation’, ‘River’, or ‘Residential Farm Infrastructure’ were classed as Category 2 (regulated land), as per LCA protocol, unless field data demonstrated otherwise

Taking a conservative approach, areas mapped as ‘Grazing modified pastures’ should only be mapped as Category 1 (excluded land) where there is clear evidence that significant groundcover modification has occurred post 1990. Section 114 of the LLS Reg outlines how to determine whether non-woody native vegetation has been significantly disturbed or modified – see Section 1.3.3 of this LCA for detail. Critically, there must be evidence of more than just grazing, i.e., aerial imagery should show evidence of pasture management or cropping. This may be evidenced by crop lines, or by paddocks significantly differently coloured than the surrounding areas

All areas mapped as ‘Grazing modified pastures’ were reviewed with reference to aerial imagery and either classed as Category 2, or Category 1 if evidence of significant groundcover modification was available, either as historic aerial imagery, or field data.

For the most part, all areas mapped as ‘Cropping’ appeared consistent with historic imagery, and were classed as Category 1 (exempt land), unless field data demonstrated otherwise.

3.2.3 Aerial imagery

No historic aerial imagery was available for 1990; we therefore used imagery from the closest years, 1991, 1989, and 1993. The majority of the images are from 1991. The most recent aerial

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imagery available from NSW Spatial Services dates from 2012, and is used as the base layer for NGH's non-historic maps.

Comparing recent aerial imagery and historic imagery, there did not appear to be any significant differences in areas of woody vegetation between 1991 and 2012.

The historic imagery was predominantly used to determine whether areas of 'Grazing modified pastures' were disturbed enough to constitute Category 1 land. For most areas there was not enough evidence of disturbance (e.g. cropping, clearing) for these areas to be classified as Category 2 (regulated land). Examples of areas where there was clear evidence of significant groundcover modification, predominantly cropping, are provided in Appendix F.

3.2.4 NSW Woody Vegetation Extent & FPC 2011

Most 'woody' areas shown on the NSW Woody Vegetation Extent & FPC 2011 dataset (Appendix G) fall within areas classified as 'Grazing native vegetation' or 'Grazing modified pastures' and thus are for the most part already classified as Category 2 (regulated land).

NGH identified 173 scattered/paddock trees within Category 1 (exempt land); these are categorised as Category 2 (regulated land). Individual scattered/paddocks trees were mapped using aerial imagery and supported by field data, as the Woody Vegetation Extent layer was only moderately accurate, and individual mapping was more appropriate.

3.3 Proposed Land Categorisation

NGH's field and desktop analyses identified the following within the Development Site (disregarding areas already mapped on the Transitional NVR Map). Our proposed land category mapping is shown in Appendix I. Approximate areas for each of the existing and proposed land categories is shown in Table 3-1.

Table 3-1 Approximate areas for each of the existing and proposed land categories within the Development Site.

Land category	Area (ha)	Approx. % of site
Category 1 (exempt land)	1204	27.2%
Category 2 (regulated land)	3124	70.6%
Category 2 (sensitive regulated land)	11	0.2%
Category 2 (vulnerable regulated land)	88	2.0%
Total	4426	100%

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3.3.1 Category 2

Approximately 73% of the Development Site has been mapped as Category 2 (regulated land, sensitive regulated land and vulnerable regulated land), based on the NVR map, historic aerial imagery, NSW Landuse 2017 mapping, and field assessments undertaken by NGH.

The 173 scattered trees identified in the desktop analysis of aerial imagery and field assessments, also visible in the NSW Woody Vegetation Extent & FPC 2011 dataset; have been mapped as Category 2 (regulated land).

3.3.2 Proposed Category 1

NGH have mapped approximately 27% of the Development Site as proposed Category 1 (exempt land). The proposed categorisation is supported by field data, evidence of historic cropping, nearby vegetation integrity assessment, or aerial evidence of more recent cropping in areas already classed as 'Cropping' or 'Grazing modified pastures' in the NSW Landuse 2017 dataset.

3.4 Conclusion

NGH have assessed the Development Site using spatial and field-based data, and have determined the following:

- There are no areas of Excluded land within the Development Site.
- There are existing areas of Category 2 (vulnerable regulated land) and Category 2 (sensitive regulated land) within the Development Site which remain unchanged.
- Approximately 73% of the Development site has been mapped as Category 2 (regulated land, sensitive regulated land and vulnerable regulated land).This includes areas of paddock trees within Category 1 (excluded land) areas.
- There are some areas NGH proposes to categorise as Category 1 (exempt land), based on available historic and current imagery, NSW Landuse 2017 dataset and field data collected by NGH ecologists.

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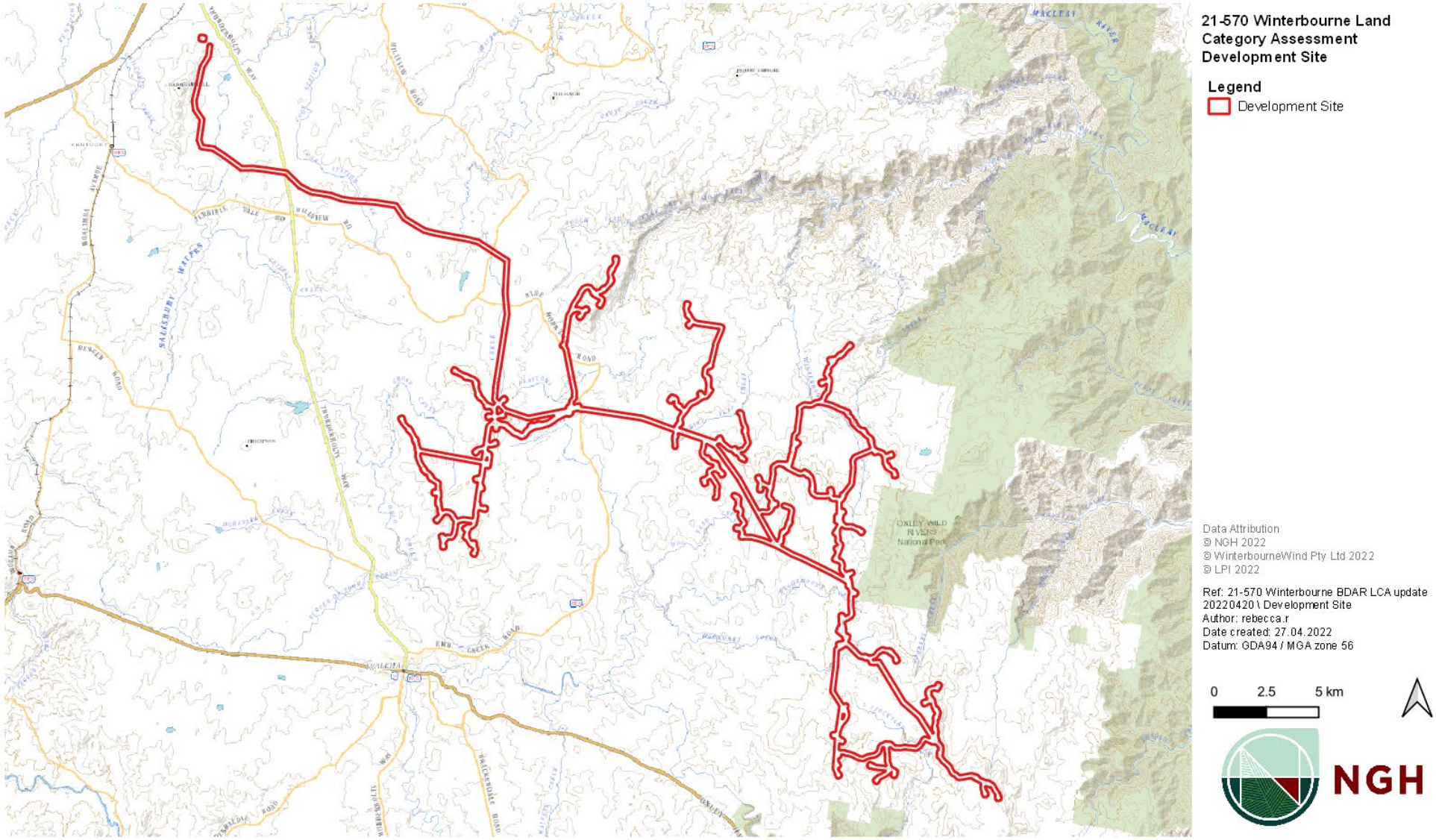
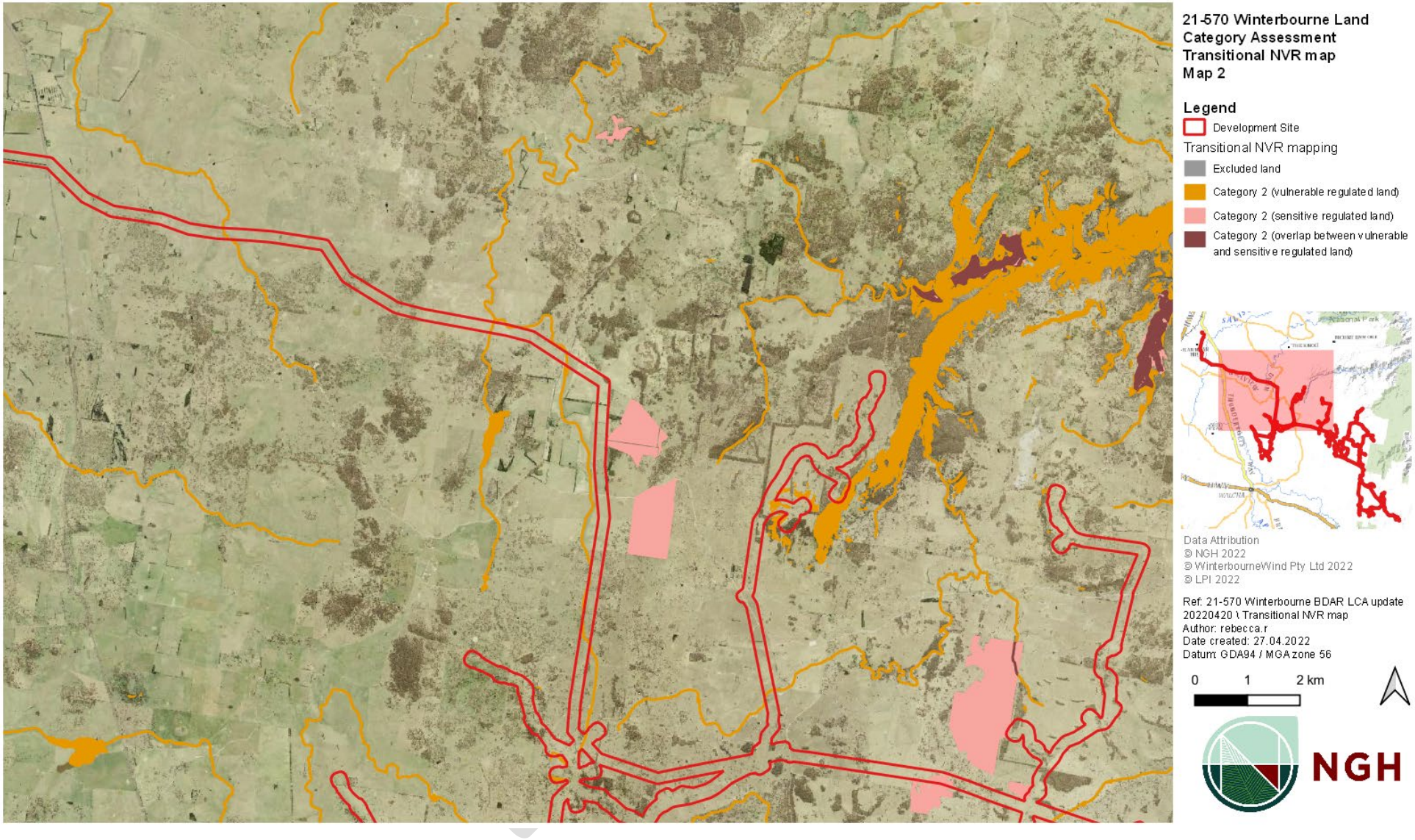
Appendix A Development Site



Appendix B Native Vegetation Regulatory Map




21-570 Winterbourne Land Category Assessment
Transitional NVR map
Map 2
Legend
Development Site
Transitional NVR mapping
Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
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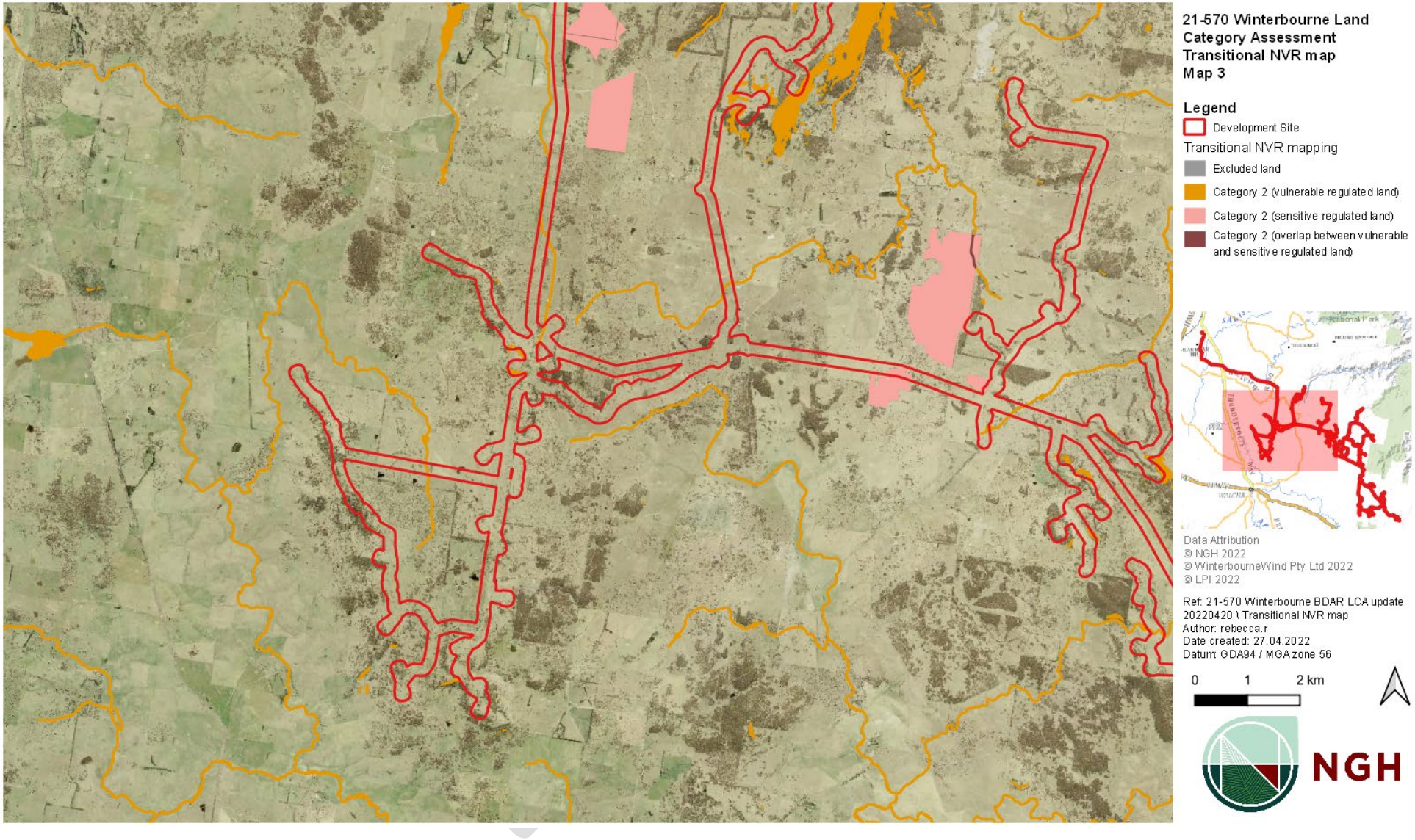
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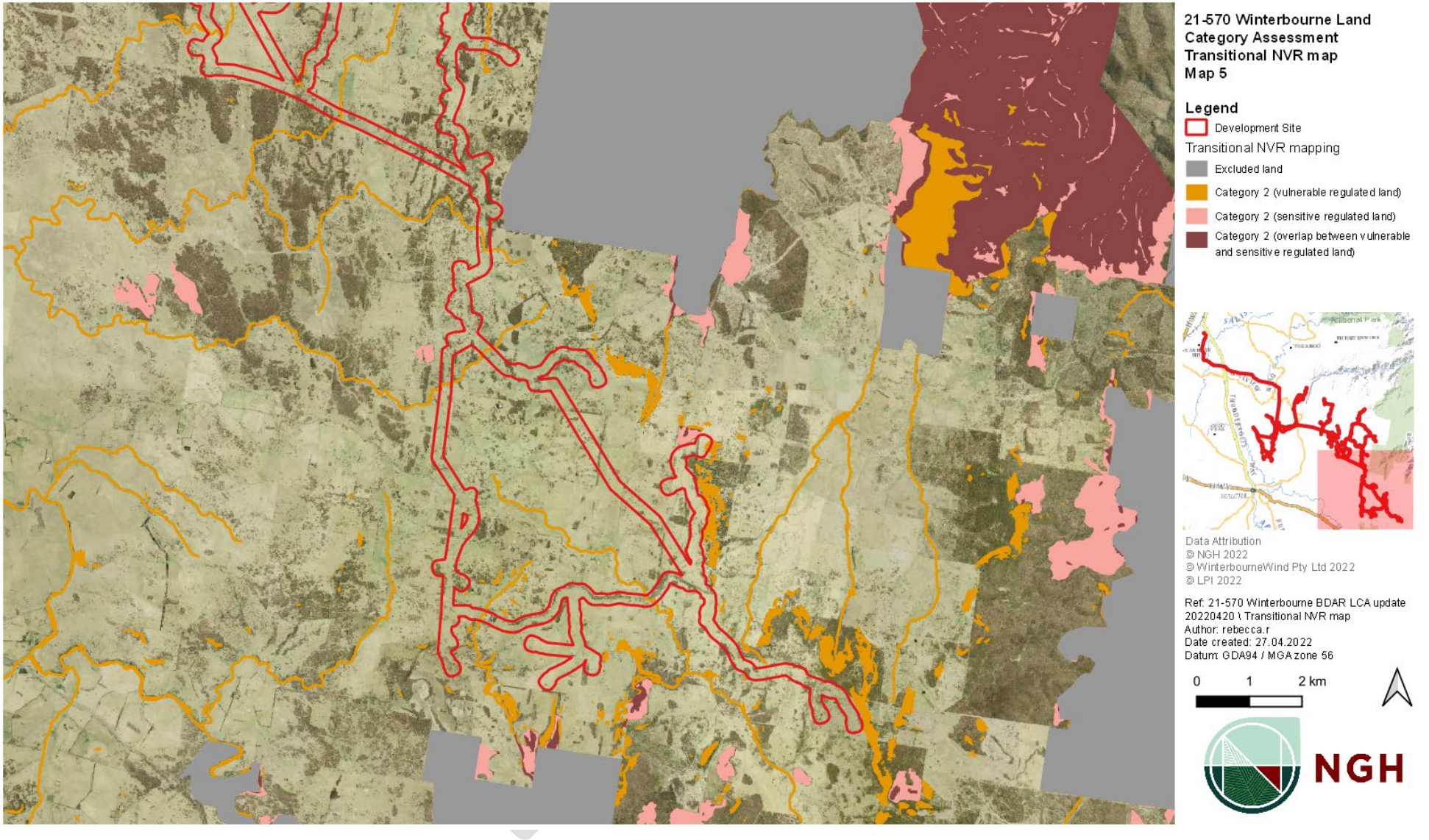
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Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
Data Attribution
© NGH 2022
© WinterbourneWind Pty Ltd 2022
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Transitional NVR map
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
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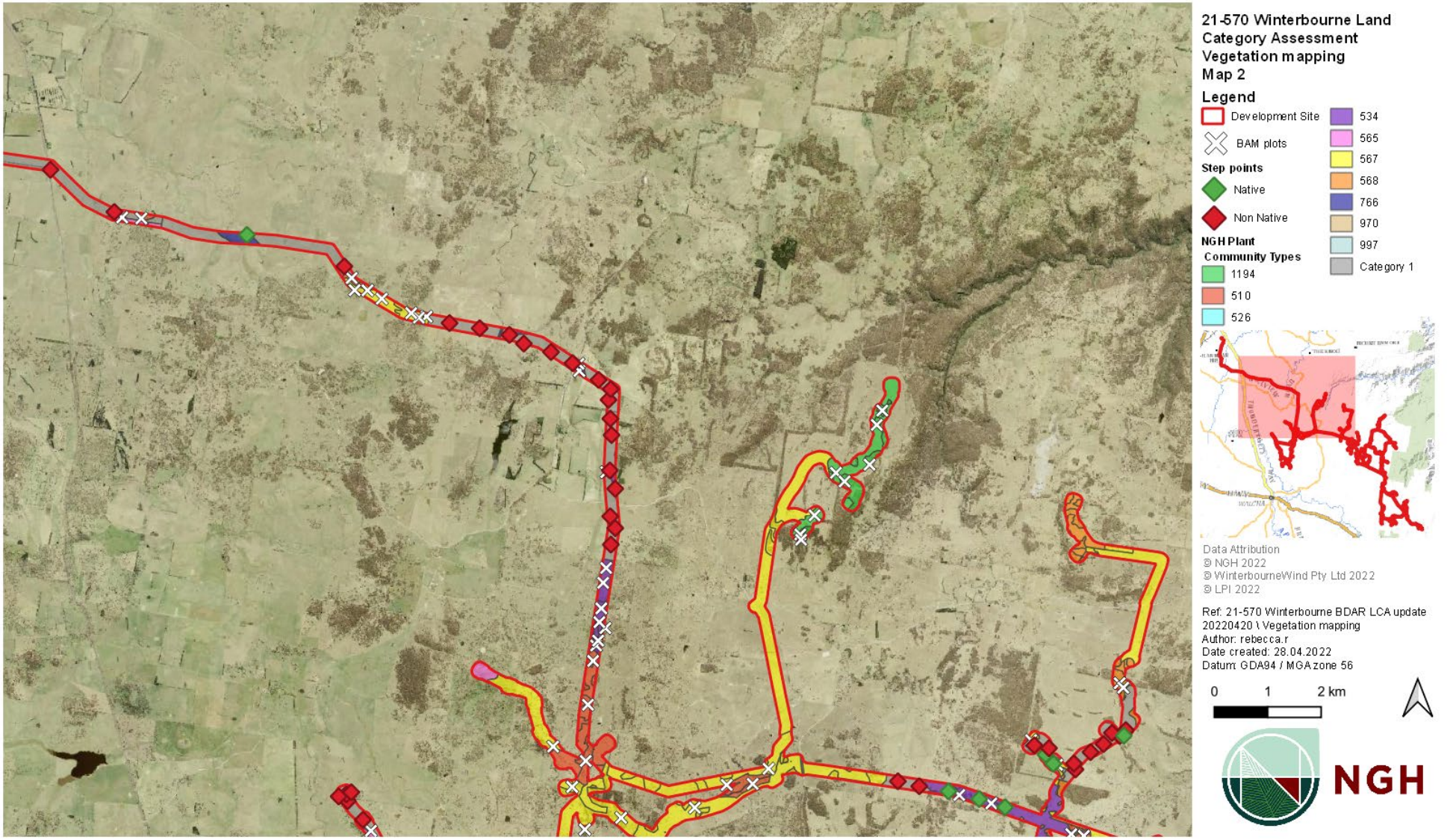
1
2 km
NGH

Appendix C NGH vegetation and PCT mapping

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Vegetation mapping
Map 2
Legend
Development Site
BAM plots
Step points
Native
Non Native
NGH Plant Community Types
1194
510
526
534
565
567
568
766
970
997
Category 1
Data Attribution
© NGH 2022
© WinterbourneWind Pty Ltd 2022
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Vegetation mapping
Author: rebecca.r
Date created: 28.04.2022
Datum: GDA94 / MGA zone 56
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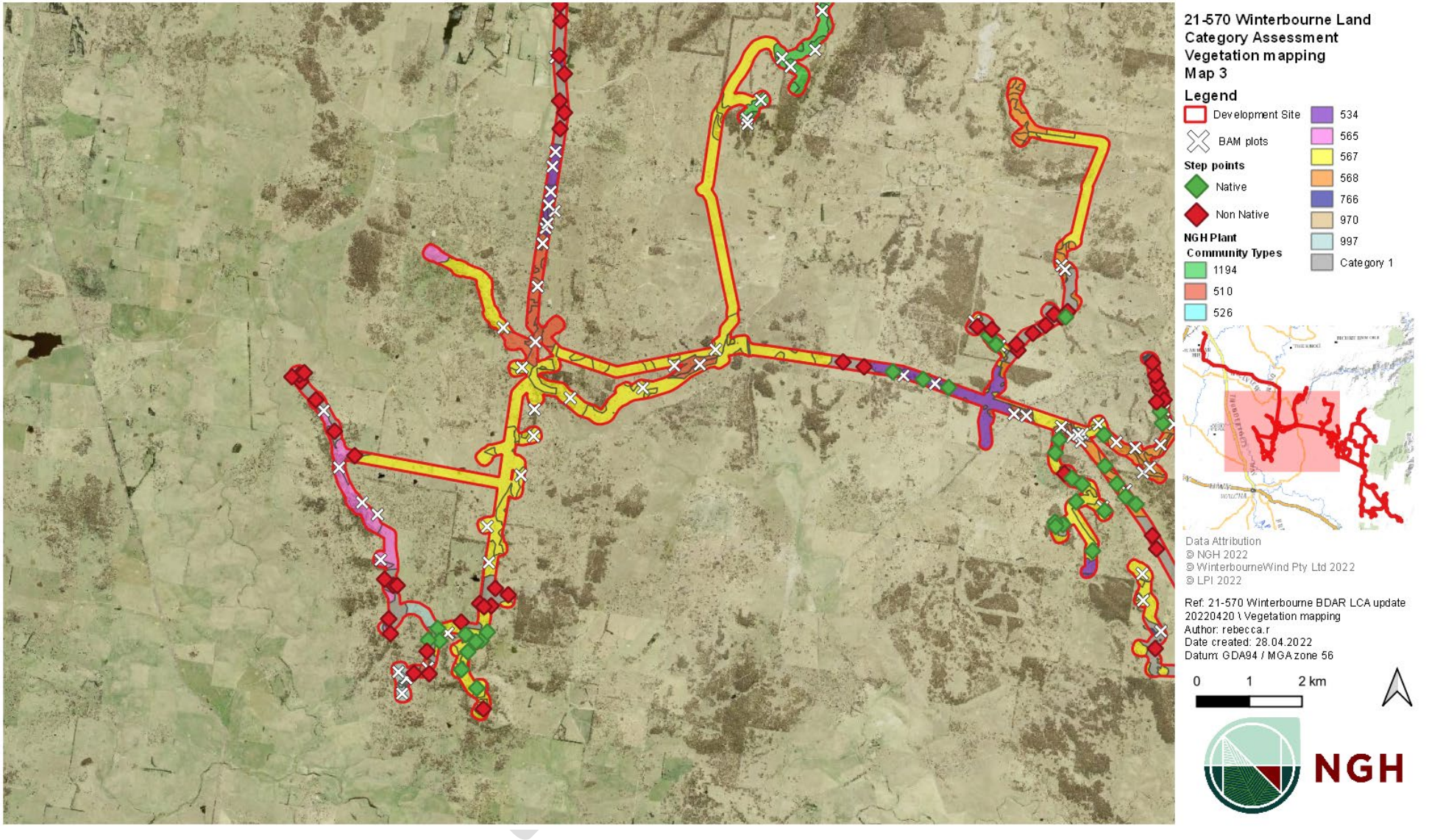
2 km
NGH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Map 3
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Development Site
BAM plots
Step points
Native
Non Native
NGH Plant Community Types
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526
534
565
567
568
766
970
997
Category 1
Data Attribution
© NGH 2022
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© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Vegetation mapping
Author: rebecca.r
Date created: 28.04.2022
Datum: GDA94 / MGA zone 56
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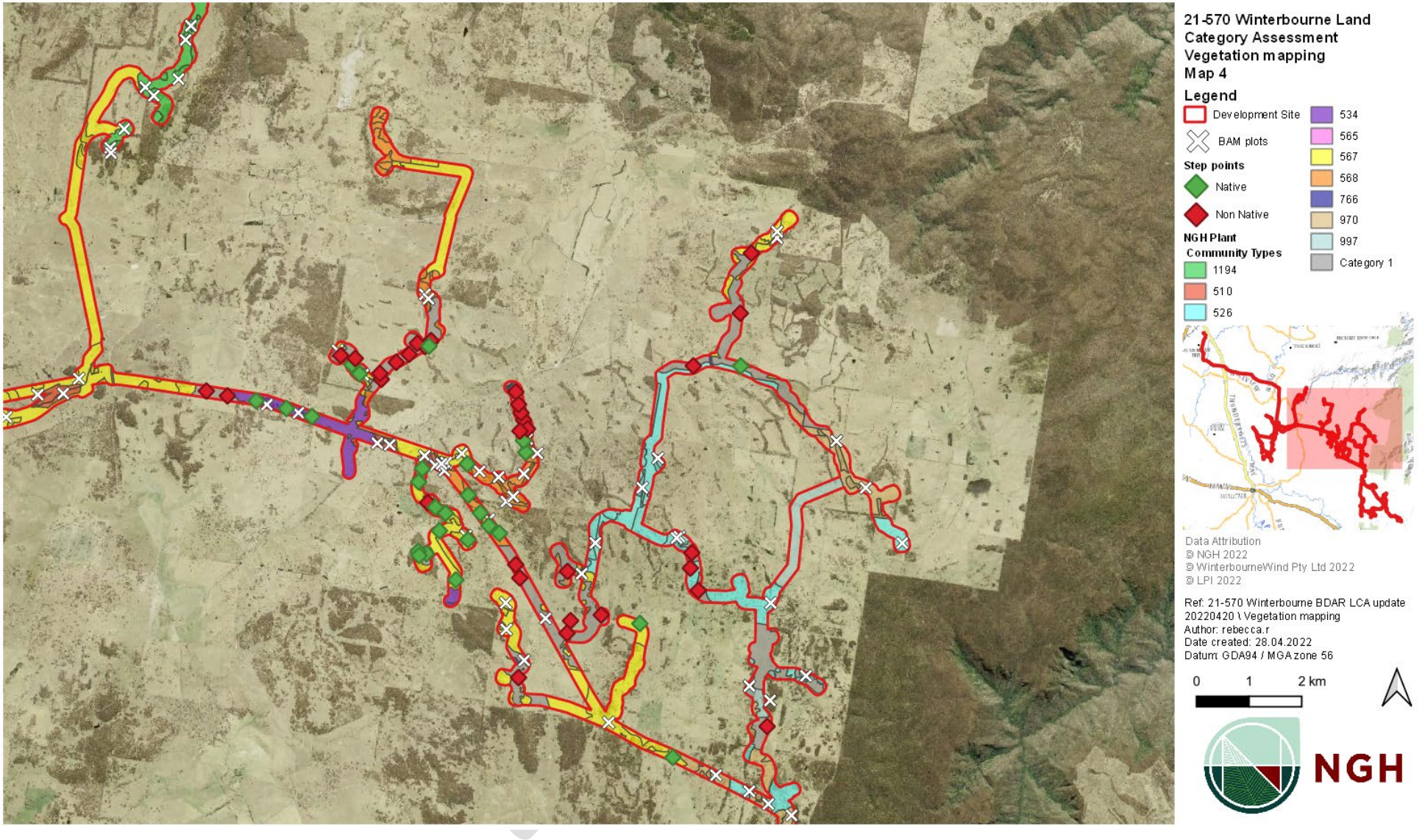
2 km
NGH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Vegetation mapping
Map 4
Legend
Development Site
BAM plots
Step points
Native
Non Native
NGH Plant Community Types
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510
526
534
565
567
568
766
970
997
Category 1
Data Attribution
© NGH 2022
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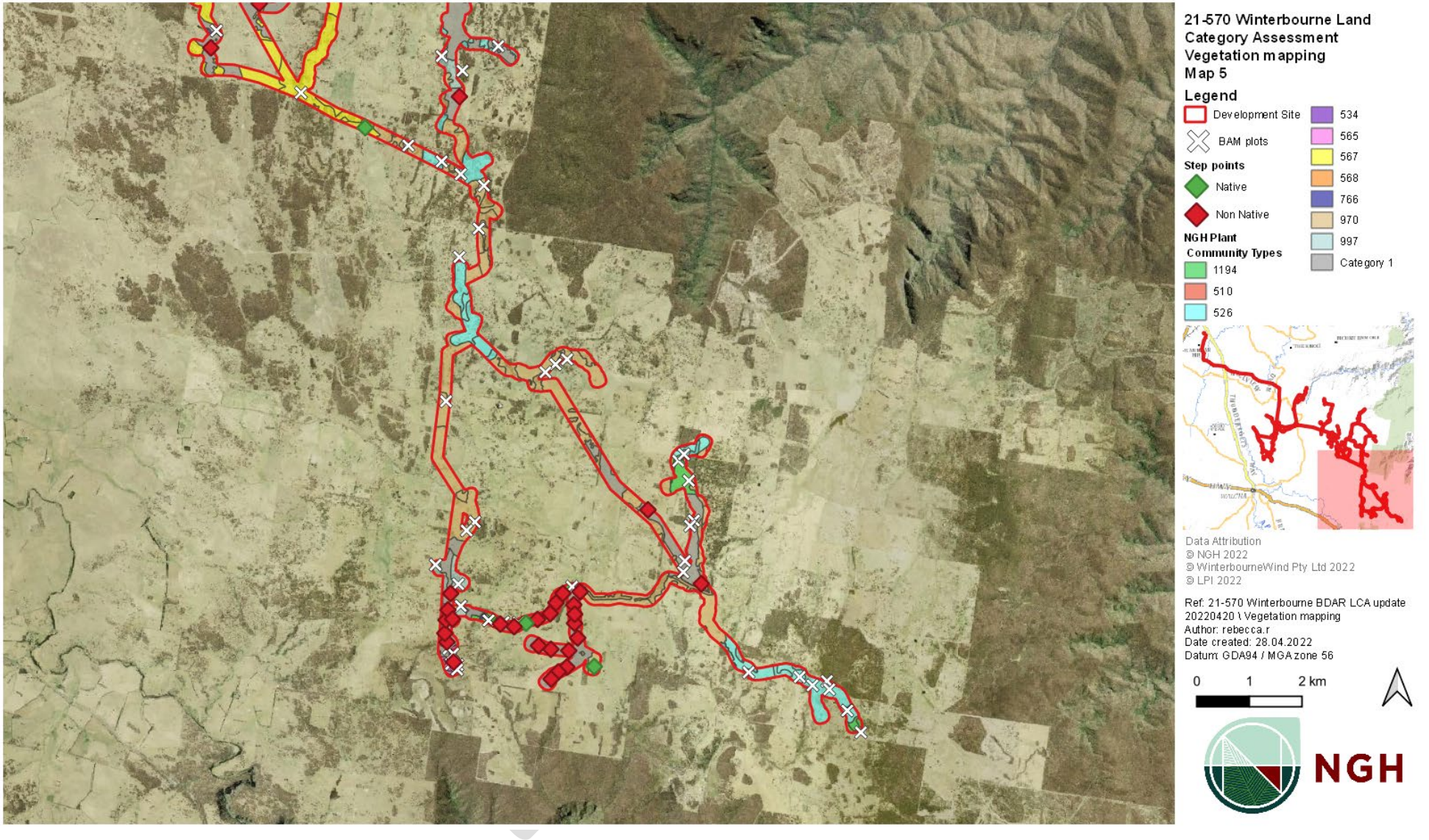
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Vegetation mapping
Author: rebecca.r
Date created: 28.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH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Vegetation mapping
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BAM plots
Step points
Native
Non Native
NGH Plant Community Types
1194
510
526
534
565
567
568
766
970
997
Category 1
Data Attribution
© NGH 2022
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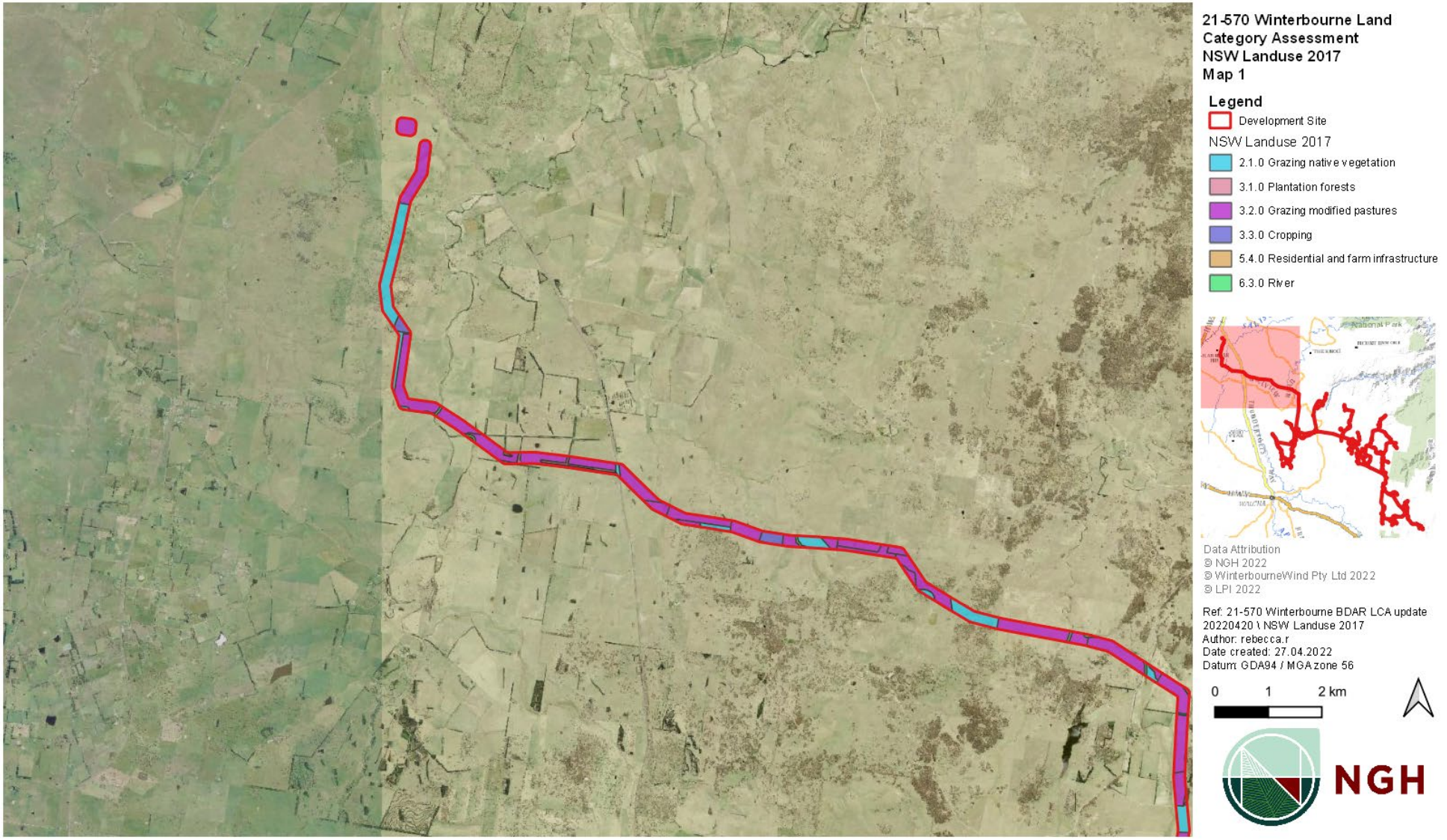
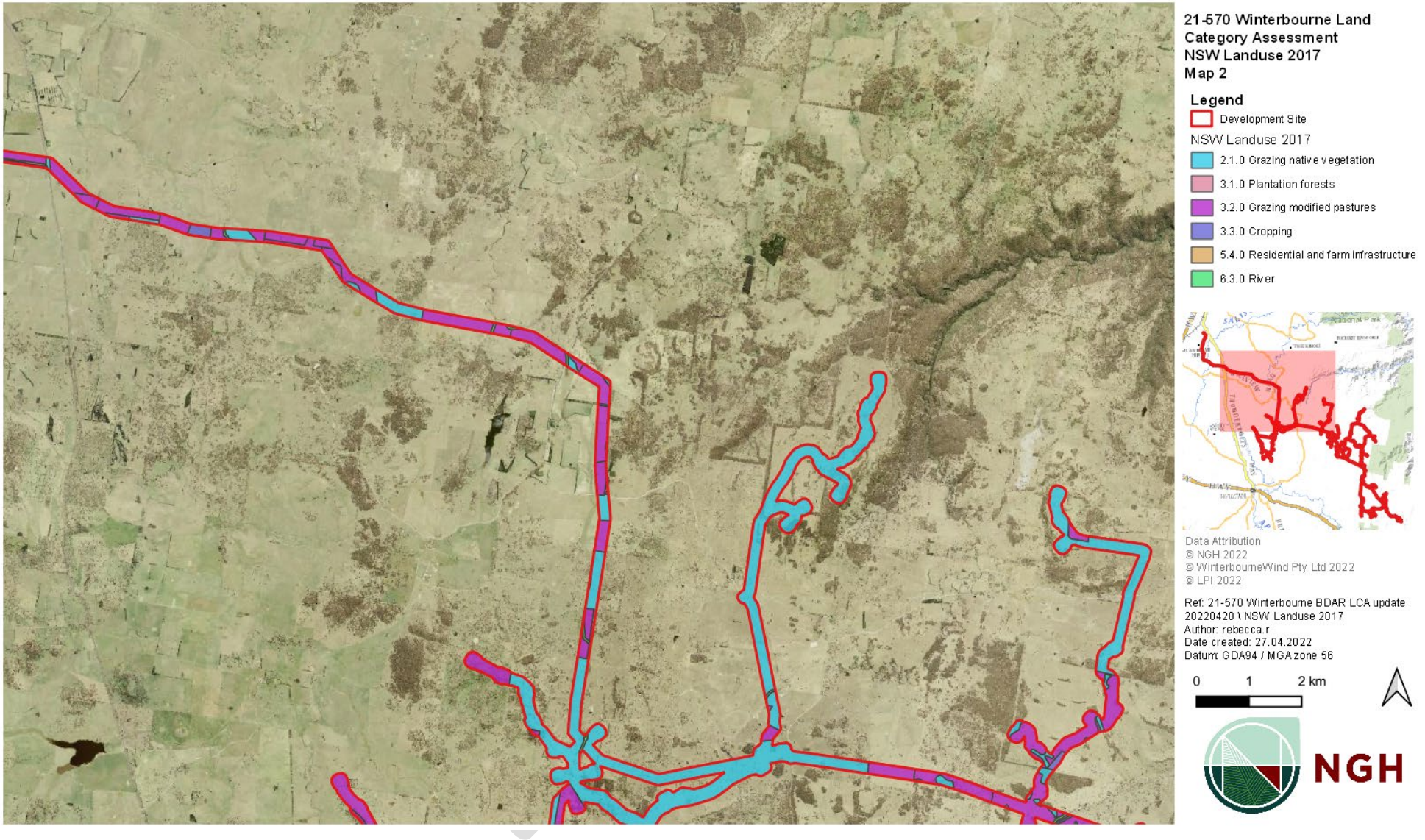
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Vegetation mapping
Author: rebecca.r
Date created: 28.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH

Appendix D NSW Landuse 2017 mapping

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Map 2
Legend
Development Site
NSW Landuse 2017
2.1.0 Grazing native vegetation
3.1.0 Plantation forests
3.2.0 Grazing modified pastures
3.3.0 Cropping
5.4.0 Residential and farm infrastructure
6.3.0 River
Data Attribution
© NGH 2022
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© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ NSW Landuse 2017
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
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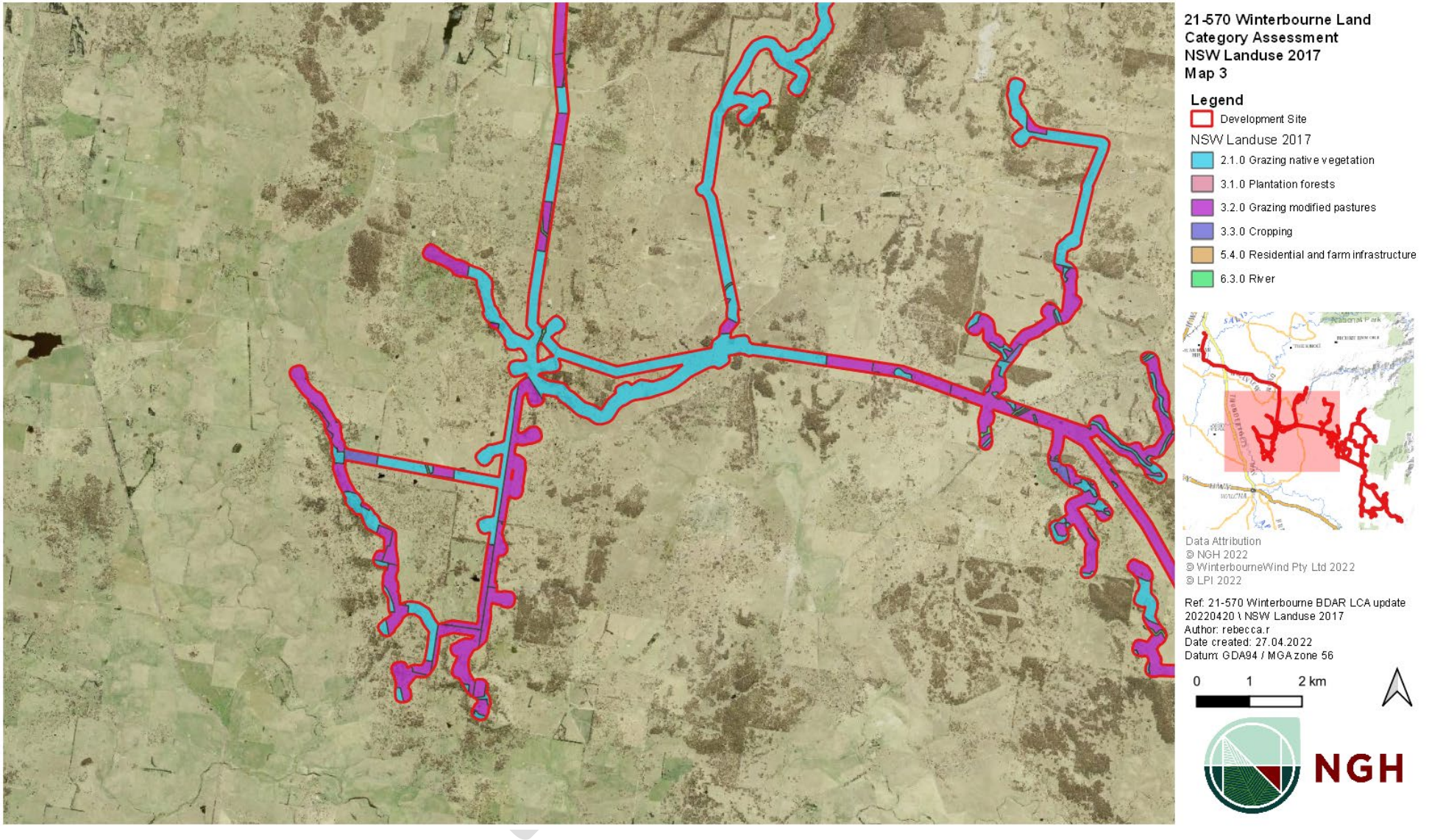
2 km
NGH


21-570 Winterbourne Land Category Assessment
NSW Landuse 2017
Map 3
Legend
Development Site
NSW Landuse 2017
2.1.0 Grazing native vegetation
3.1.0 Plantation forests
3.2.0 Grazing modified pastures
3.3.0 Cropping
5.4.0 Residential and farm infrastructure
6.3.0 River
Data Attribution
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Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ NSW Landuse 2017
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
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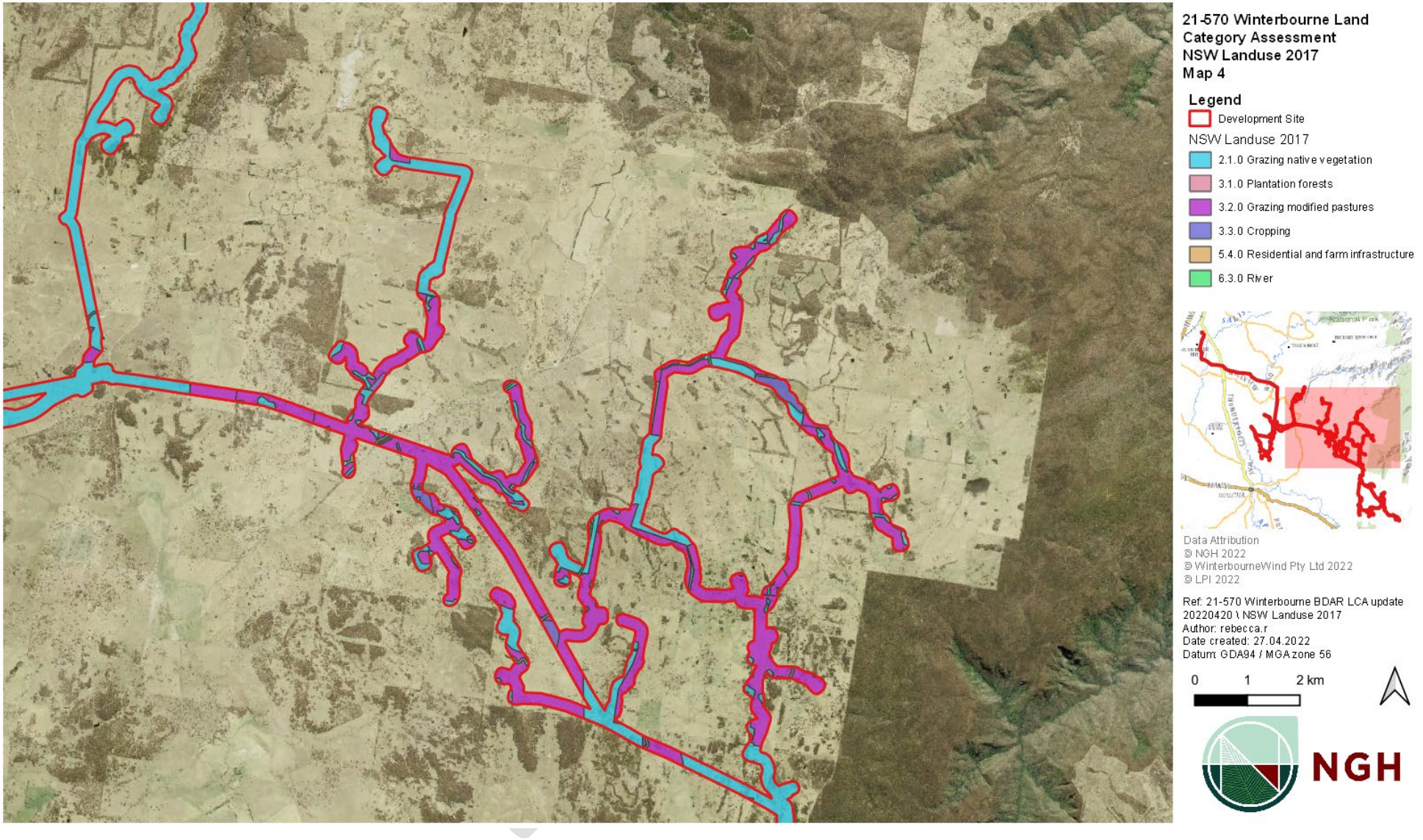
2 km
NGH


21-570 Winterbourne Land Category Assessment
NSW Landuse 2017
Map 4
Legend
Development Site
NSW Landuse 2017
2.1.0 Grazing native vegetation
3.1.0 Plantation forests
3.2.0 Grazing modified pastures
3.3.0 Cropping
5.4.0 Residential and farm infrastructure
6.3.0 River
Data Attribution
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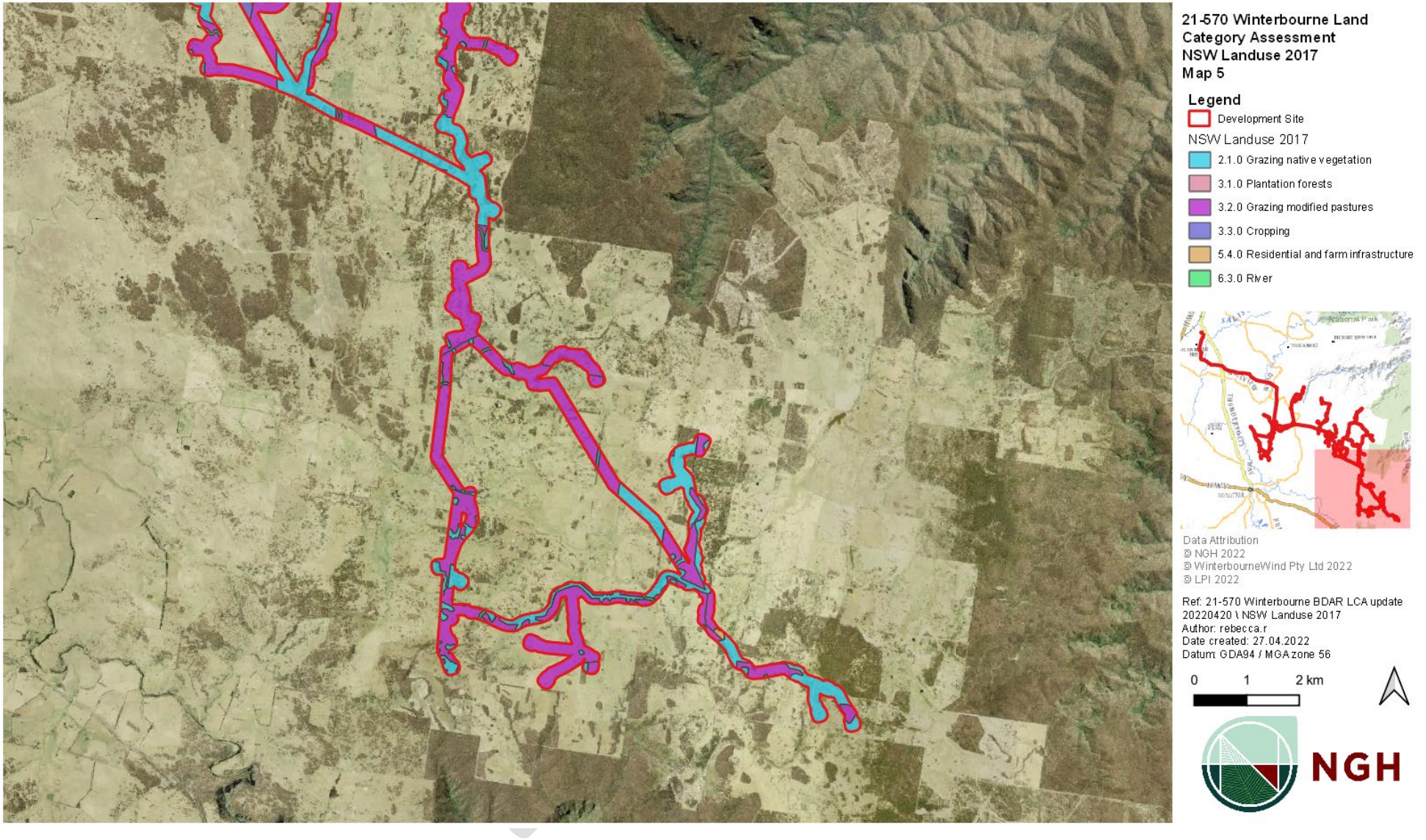
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ NSW Landuse 2017
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
NSW Landuse 2017
Map 5
Legend
Development Site
NSW Landuse 2017
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3.1.0 Plantation forests
3.2.0 Grazing modified pastures
3.3.0 Cropping
5.4.0 Residential and farm infrastructure
6.3.0 River
Data Attribution
© NGH 2022
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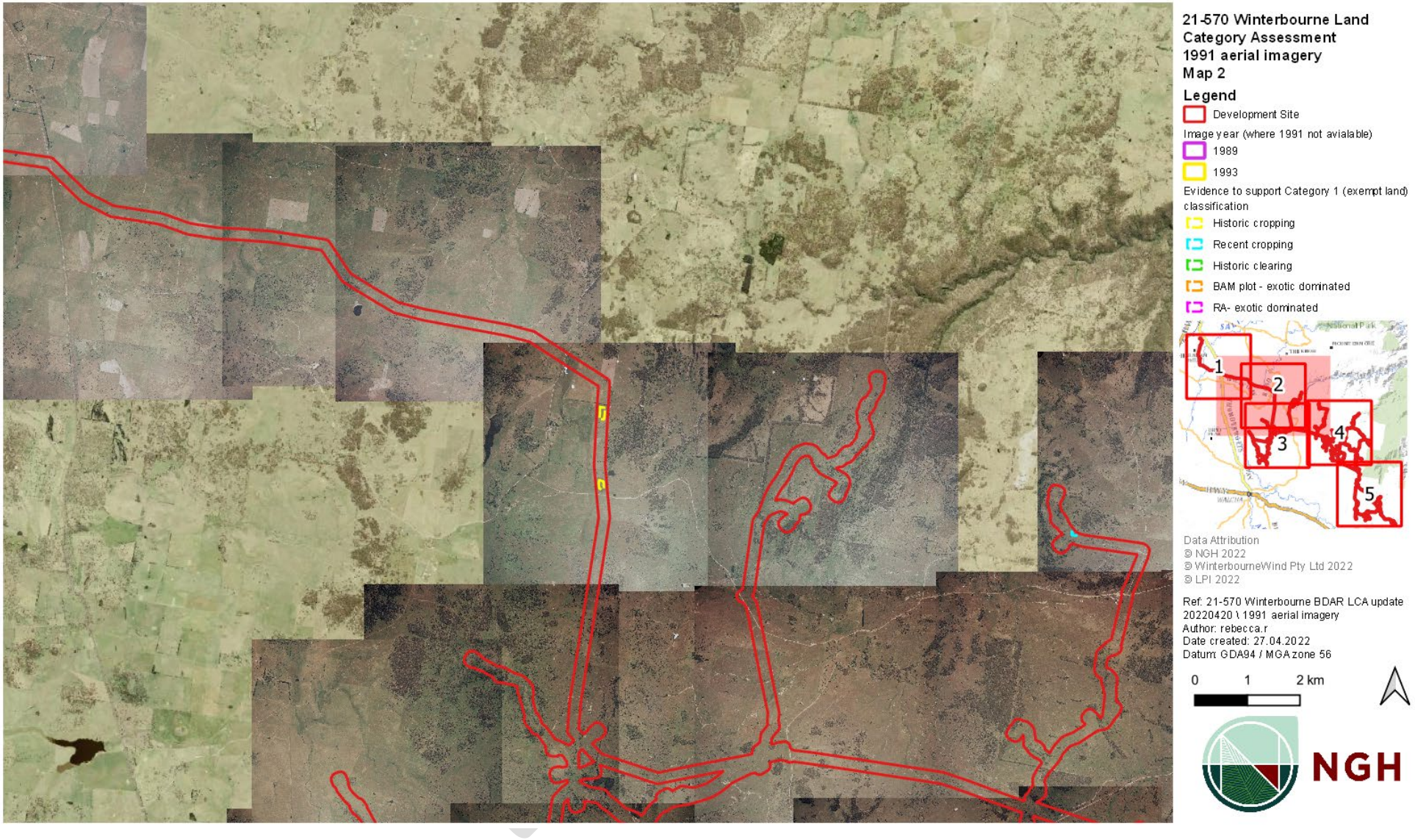
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ NSW Landuse 2017
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH

Appendix E Historical aerial imagery

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1991 aerial imagery
Map 2
Legend
Development Site
Image year (where 1991 not avialable)
1989
1993
Evidence to support Category 1 (exempt land) classification
Historic cropping
Recent cropping
Historic clearing
BAM plot - exotic dominated
RA- exotic dominated
1
2
3
4
5
Data Attribution
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© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ 1991 aerial imagery
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
1991 aerial imagery
Map 3
Legend
Development Site
Image year (where 1991 not avialable)
1989
1993
Evidence to support Category 1 (exempt land) classification
Historic cropping
Recent cropping
Historic clearing
BAM plot - exotic dominated
RA- exotic dominated
1
2
3
4
5
Data Attribution
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© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ 1991 aerial imagery
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
1991 aerial imagery
Map 4
Legend
Development Site
Image year (where 1991 not avialable)
1989
1993
Evidence to support Category 1 (exempt land) classification
Historic cropping
Recent cropping
Historic clearing
BAM plot - exotic dominated
RA- exotic dominated
1
2
3
4
5
Data Attribution
© NGH 2022
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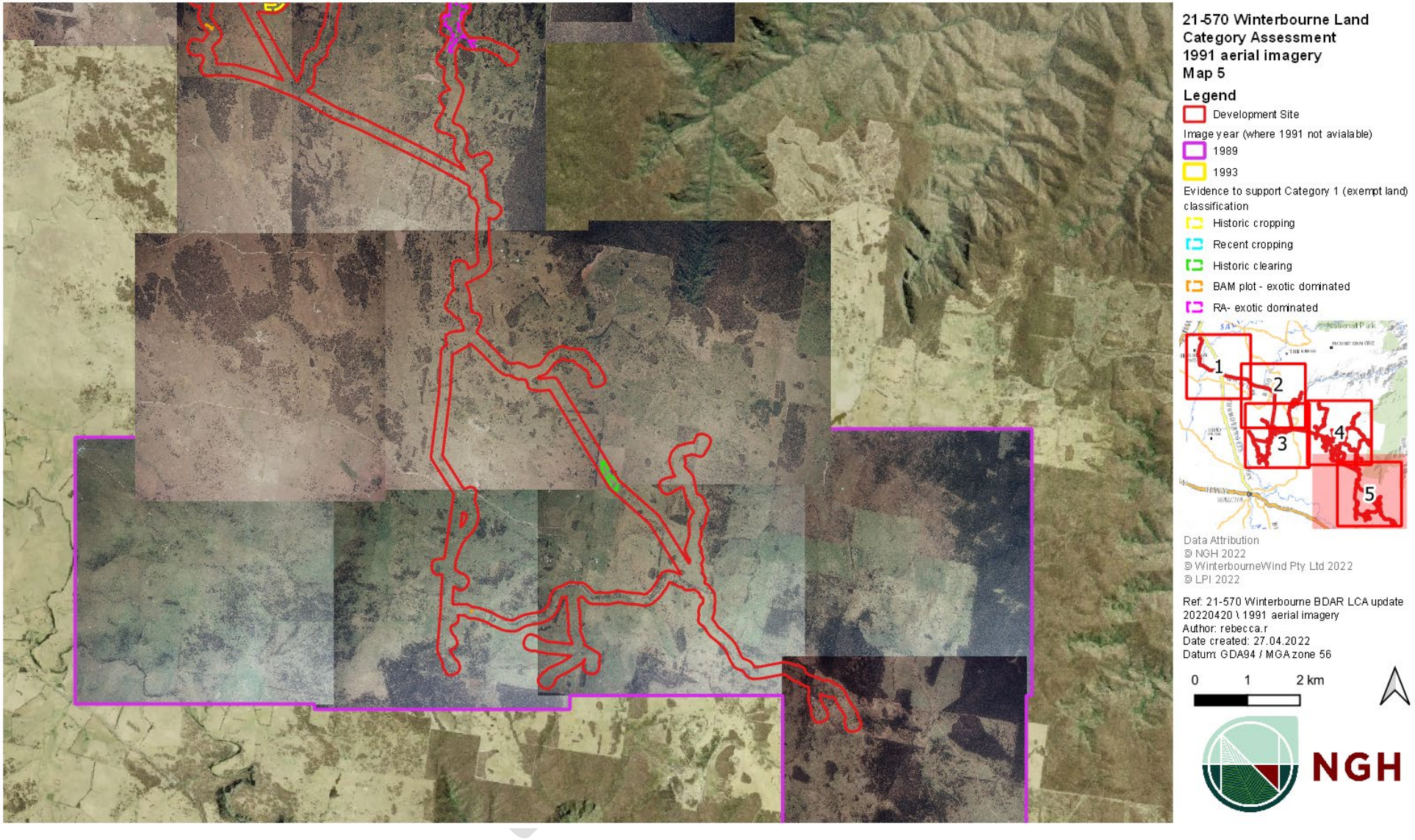
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ 1991 aerial imagery
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
1991 aerial imagery
Map 5
Legend
Development Site
Image year (where 1991 not avialable)
1989
1993
Evidence to support Category 1 (exempt land) classification
Historic cropping
Recent cropping
Historic clearing
BAM plot - exotic dominated
RA- exotic dominated
1
2
3
4
5
Data Attribution
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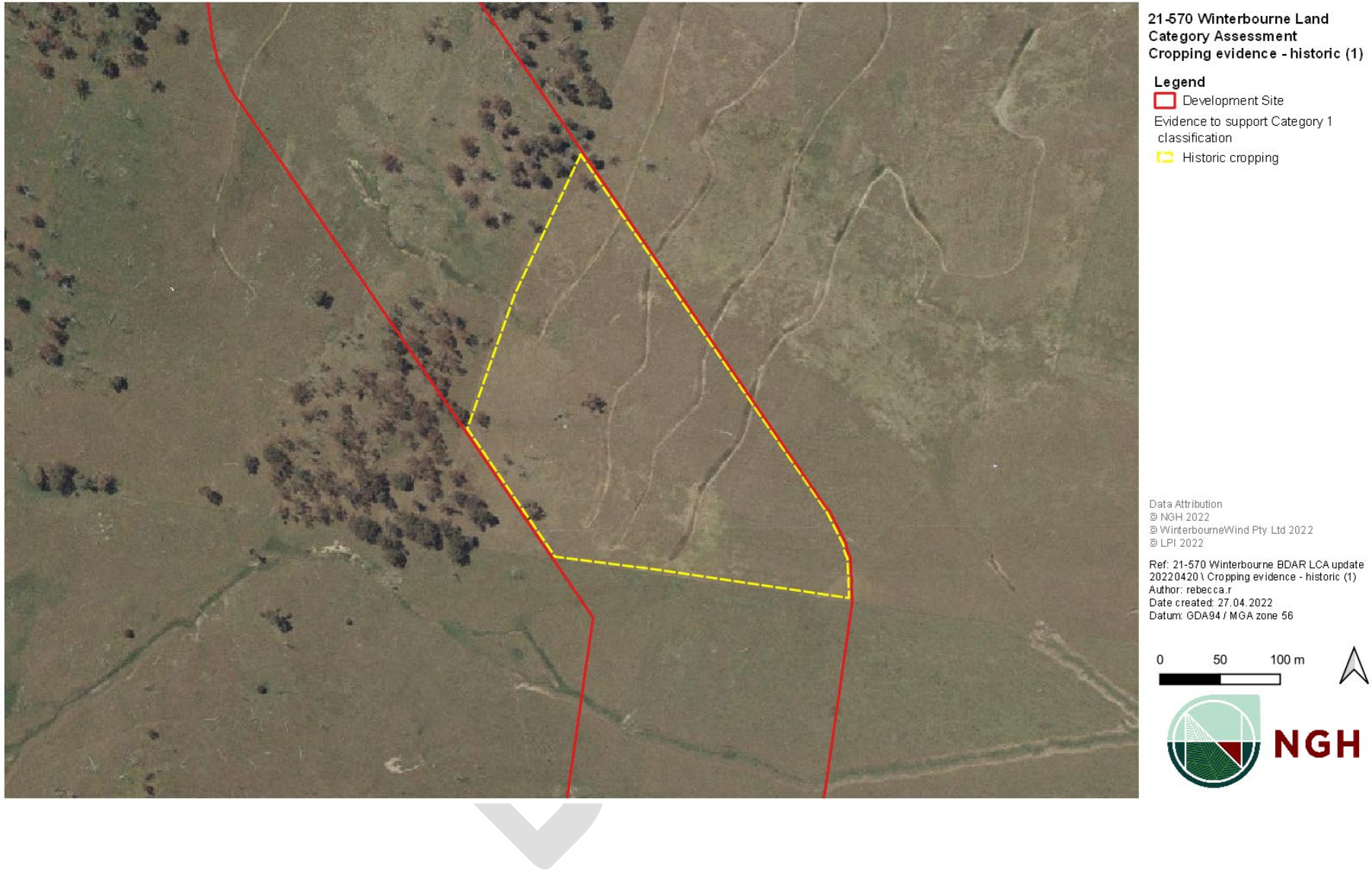
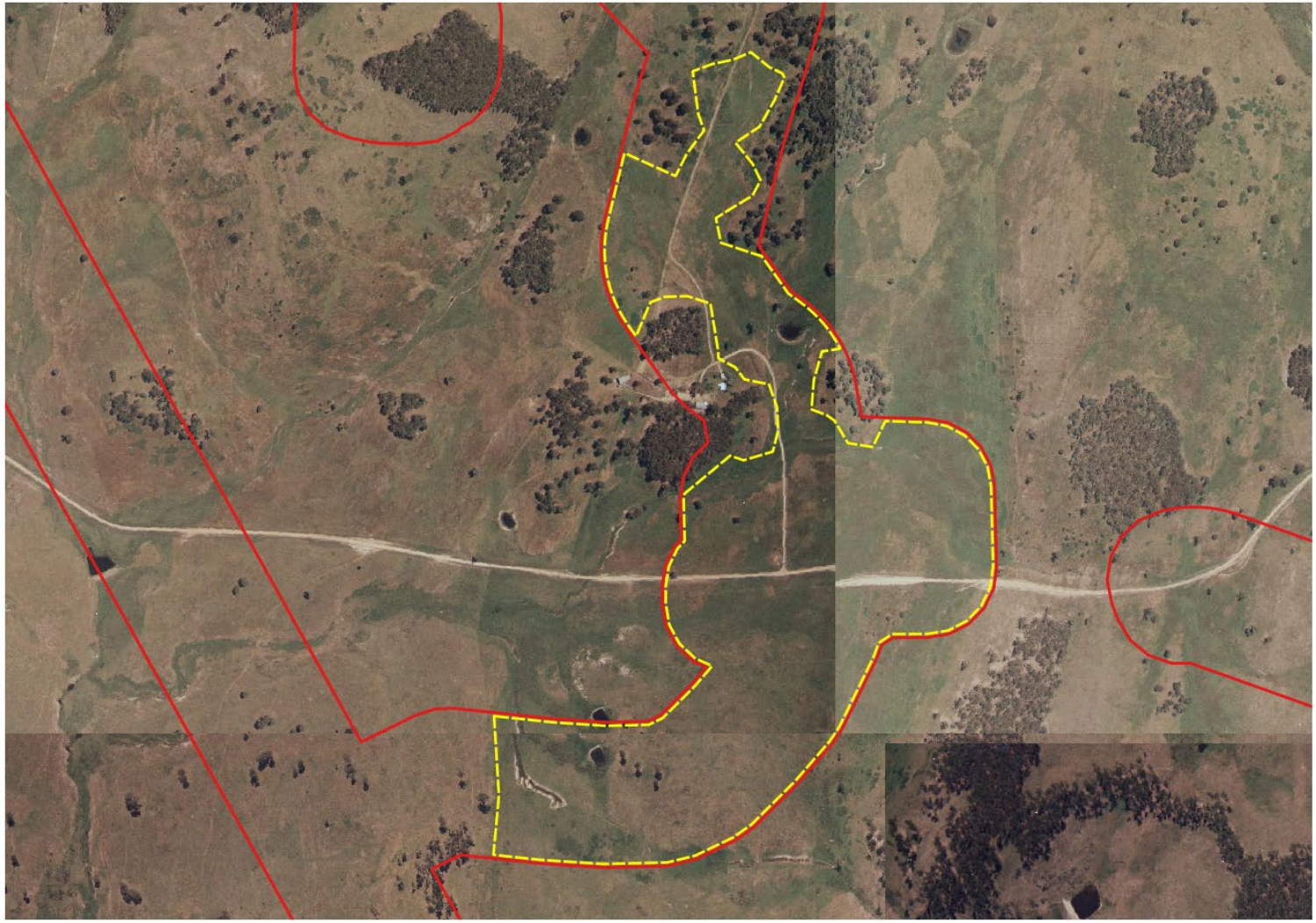
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ 1991 aerial imagery
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH

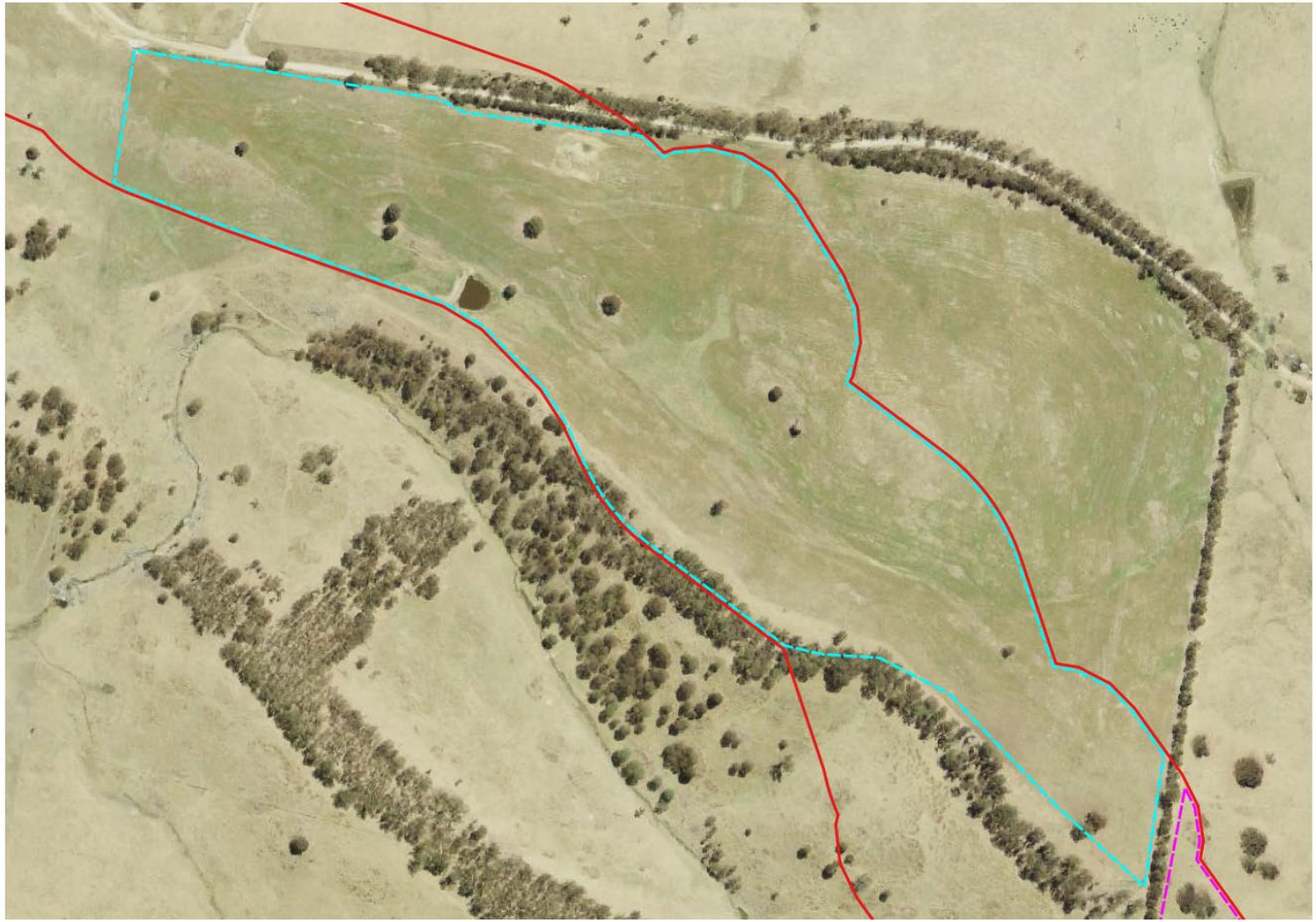
Appendix F Evidence of historic and recent cropping

The following four maps provide finer-scale examples of how historic and recent aerial imagery was used to show evidence of significant groundcover modification, i.e. cropping, and support classification of these areas as Category 1 (exempt land).

DRAFT


21-570 Winterbourne Land Category Assessment
Cropping evidence - historic (1)
Legend
Development Site
Evidence to support Category 1 classification
Historic cropping
Data Attribution
© NGH 2022
© WinterbourneWind Pty Ltd 2022
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Cropping evidence - historic (1)
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
50
100 m
NGH


21-570 Winterbourne Land Category Assessment
Cropping evidence - historic (2)
Legend
Development Site
Evidence to support Category 1 classification
Historic cropping
Data Attribution
© NGH 2022
© WinterbourneWind Pty Ltd 2022
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Cropping evidence - historic (2)
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0 50 100 m
NGH


21-570 Winterbourne Land Category Assessment
Cropping evidence - recent (1)
Legend
Development Site
Evidence to support Category 1 classification
Recent cropping
RA- exotic dominated
Data Attribution
© NGH 2022
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© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Cropping evidence - recent (1)
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
50
100 m
NGH


21-570 Winterbourne Land Category Assessment
Cropping evidence - recent (2)
Legend
Development Site
Evidence to support Category 1 classification
Recent cropping
Data Attribution
© NGH 2022
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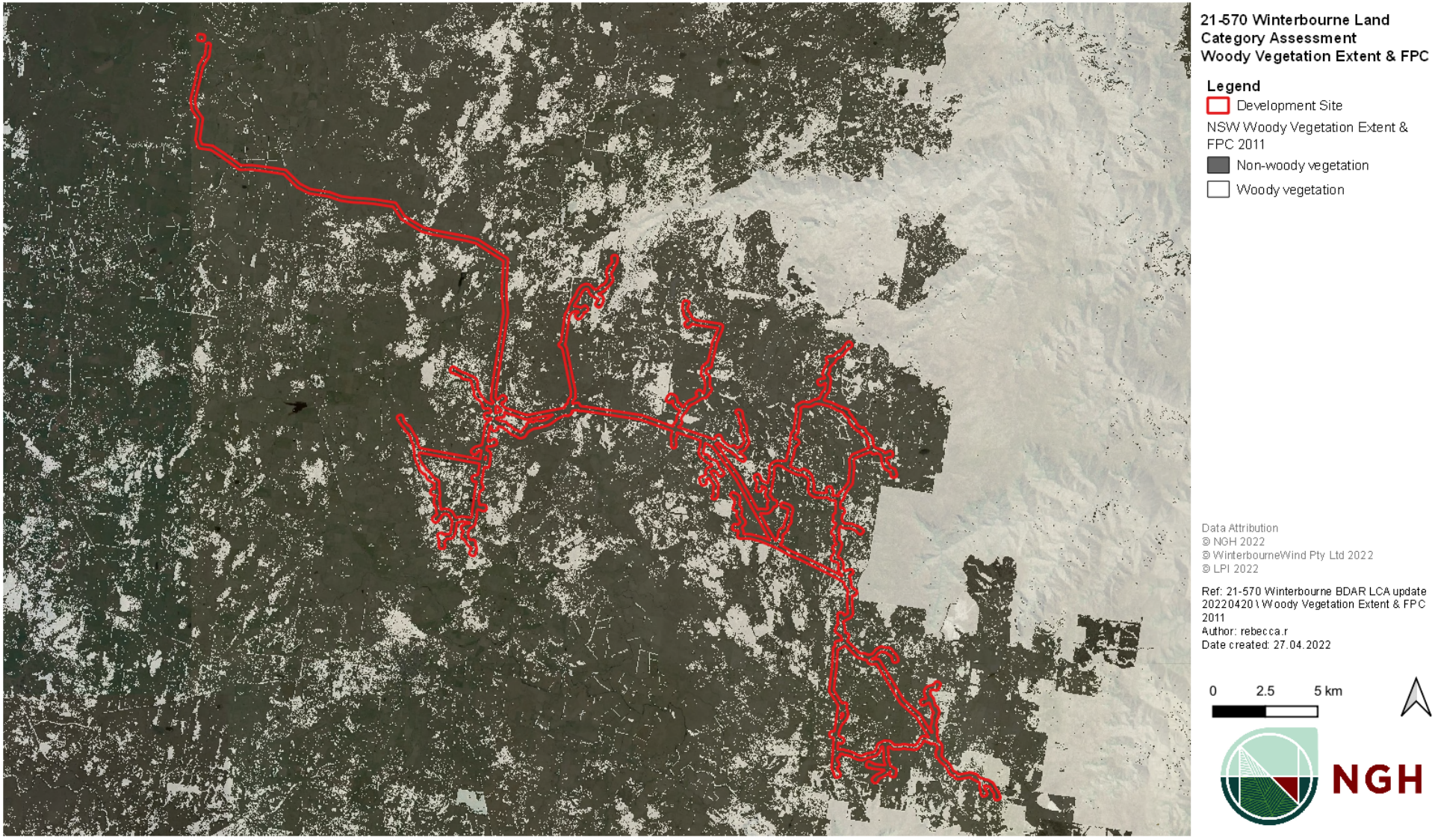
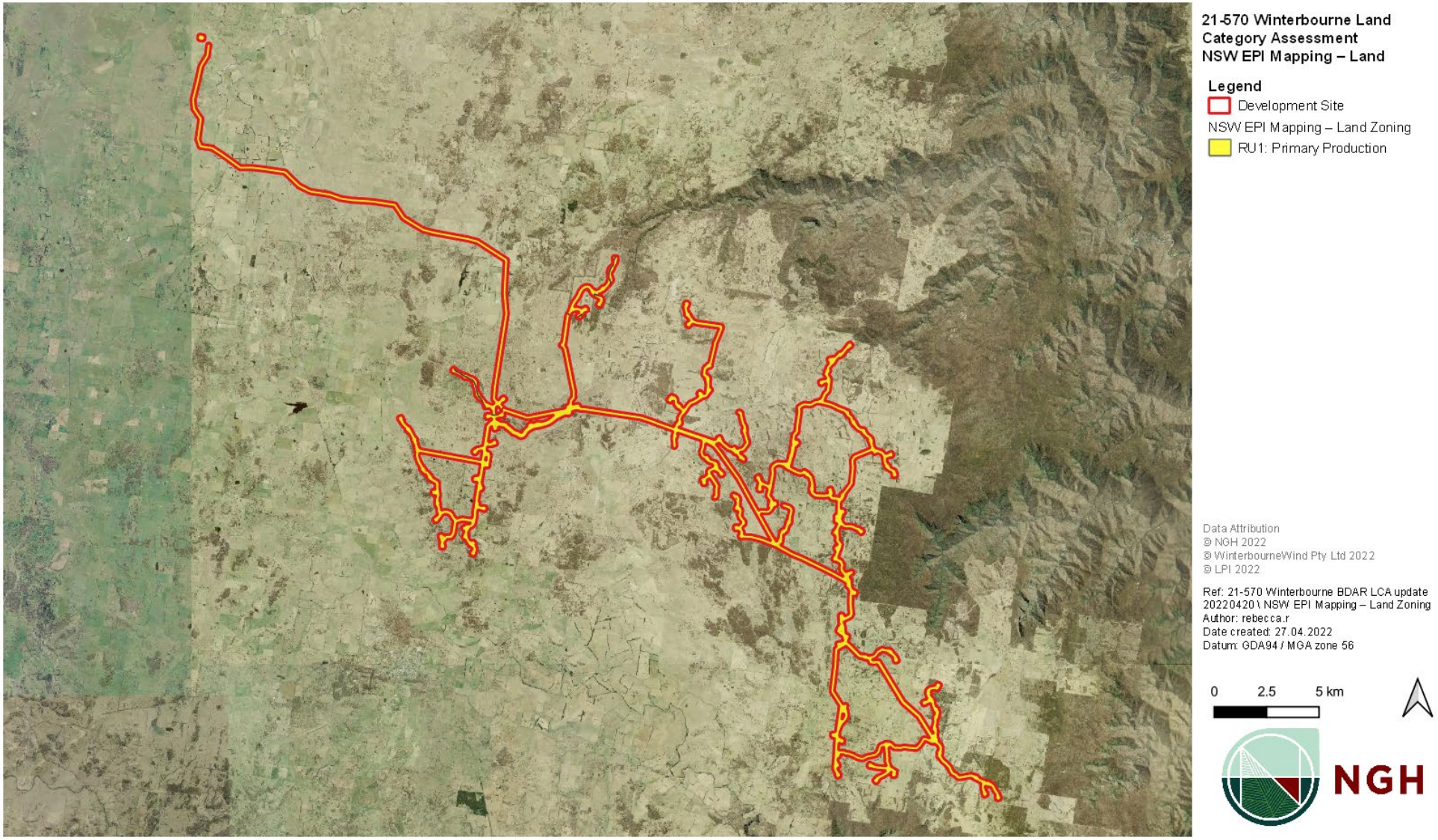
© LPI 2022
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Cropping evidence - recent (2)
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0 50 100 m
NGH

Appendix G NSW Woody Vegetation Extent & FPC 2011

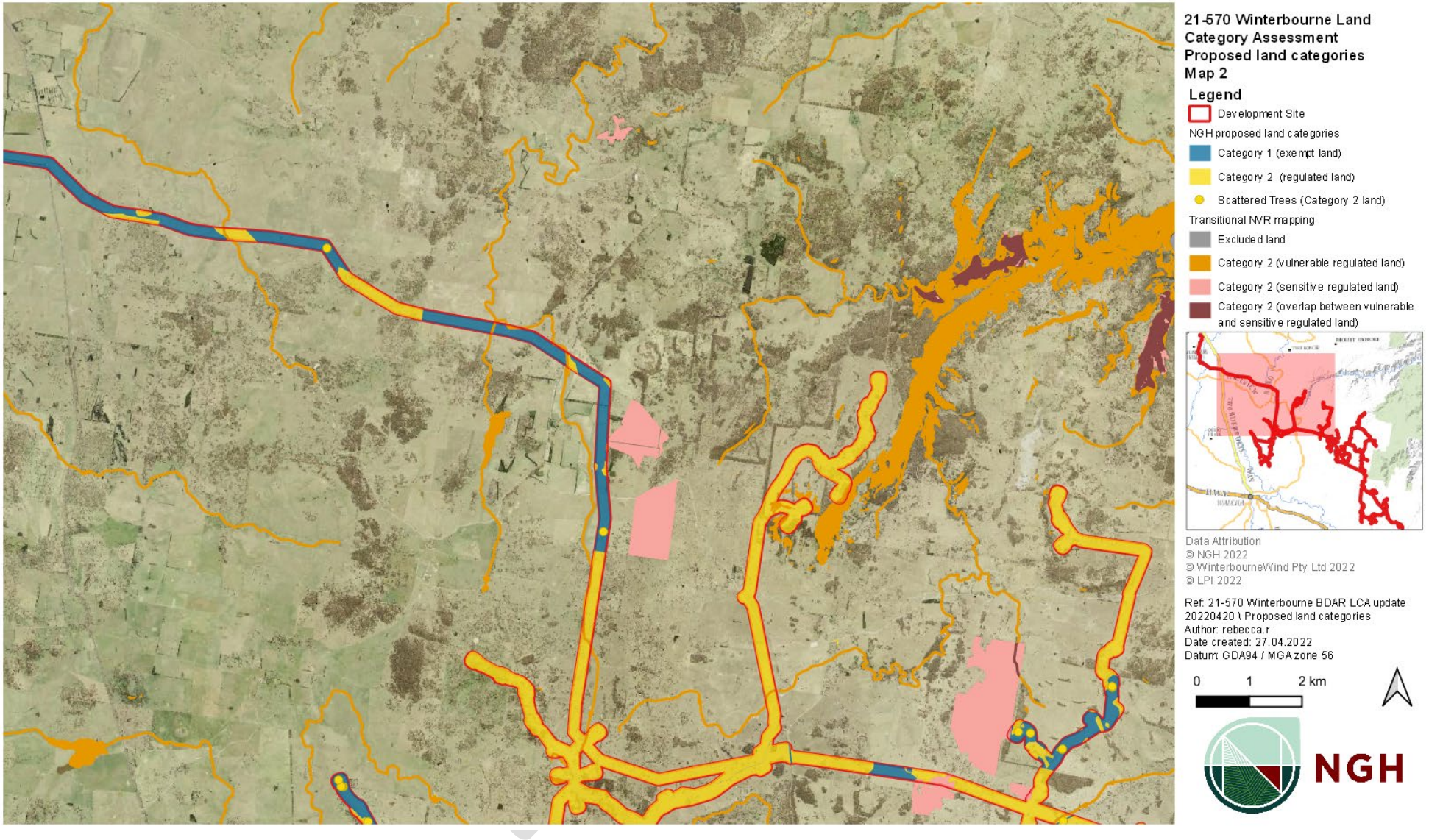


Appendix H NSW EPI Mapping – Land Zoning



Appendix I Proposed land categories




21-570 Winterbourne Land Category Assessment
Proposed land categories
Map 2
Legend
Development Site
NGH proposed land categories
Category 1 (exempt land)
Category 2 (regulated land)
Scattered Trees (Category 2 land)
Transitional NVR mapping
Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
Data Attribution
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Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Proposed land categories
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
Proposed land categories
Map 3
Legend
Development Site
NGH proposed land categories
Category 1 (exempt land)
Category 2 (regulated land)
Scattered Trees (Category 2 land)
Transitional NVR mapping
Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
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Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Proposed land categories
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
Proposed land categories
Map 4
Legend
Development Site
NGH proposed land categories
Category 1 (exempt land)
Category 2 (regulated land)
Scattered Trees (Category 2 land)
Transitional NVR mapping
Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
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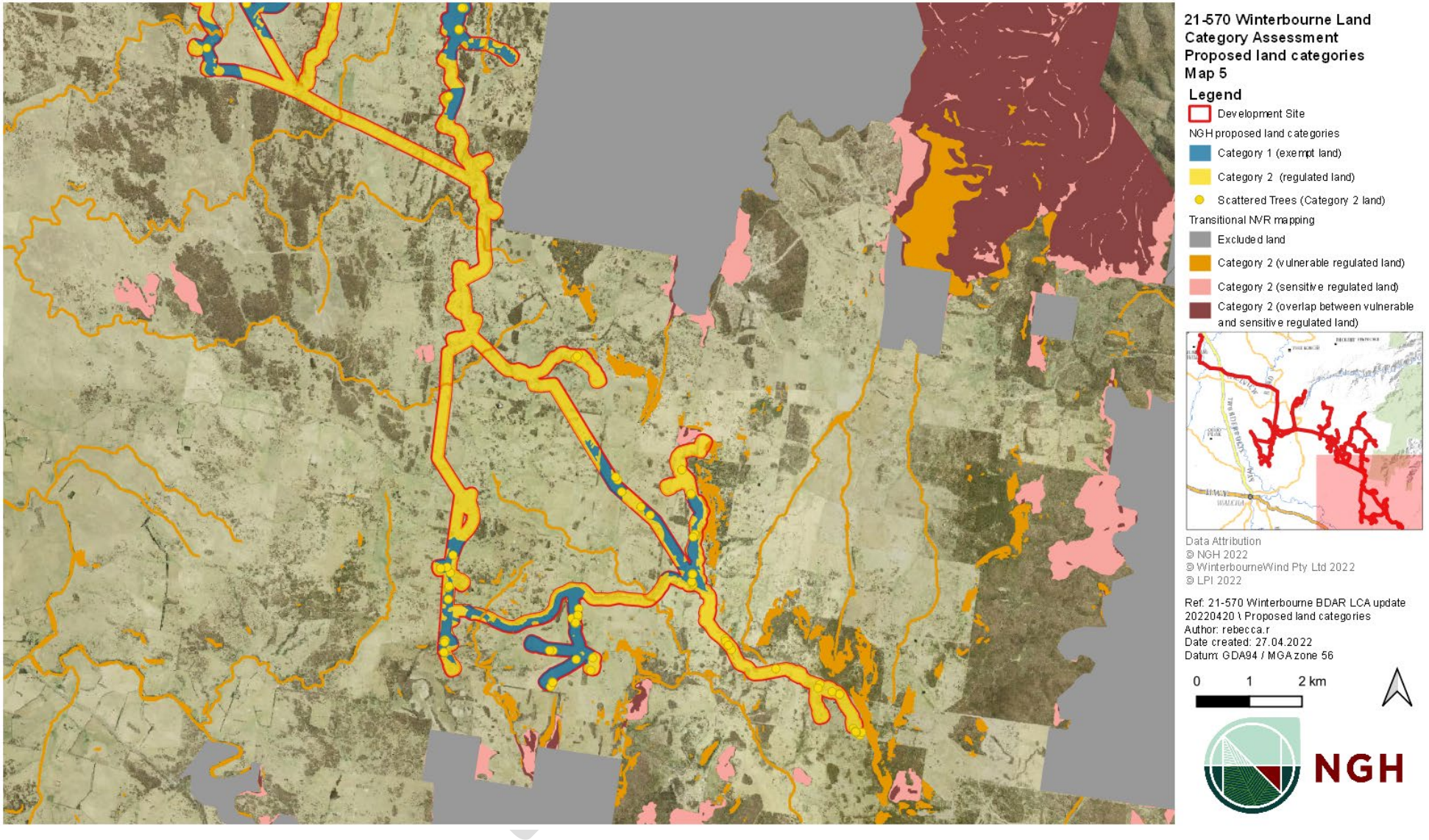
Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Proposed land categories
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH


21-570 Winterbourne Land Category Assessment
Proposed land categories
Map 5
Legend
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NGH proposed land categories
Category 1 (exempt land)
Category 2 (regulated land)
Scattered Trees (Category 2 land)
Transitional NVR mapping
Excluded land
Category 2 (vulnerable regulated land)
Category 2 (sensitive regulated land)
Category 2 (overlap between vulnerable and sensitive regulated land)
Data Attribution
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Ref: 21-570 Winterbourne BDAR LCA update 20220420 \ Proposed land categories
Author: rebecca.r
Date created: 27.04.2022
Datum: GDA94 / MGA zone 56
0
1
2 km
NGH

Appendix B Desktop haulage route risk assessment

Haul route biodiversity risk assessment

Winterbourne Wind Farm

April 2022

Project Number: 21-570



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Document verification

Project Title:	Winterbourne Wind Farm
Project Number:	21-570
Project File Name:	21-570 Haul Route Biodiversity Risk Assessment.V1.0

Revision	Date	Prepared by	Reviewed by	Approved by
V1.0	4/04/2022	Clancy Bowman Brooke Marshall	Brooke Marshall	Beth Kramer
	[Enter the date]			

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1. Introduction

The haulage of wind farm components during construction of the Winterbourne Wind Farm is proposed to comprise the following sections (Figure 1-1) and works:

1. Port of Newcastle to Tamworth (Section 1). Minor adjustments to the state highway network including:
    a. Temporary removal and replacement of road signs and other road furniture.
    b. Construction of small sections of hardstand immediately adjacent to the existing pavement edge.
2. Tamworth to Walcha (Section 2). Minor upgrades to the state highway network including:
    a. Temporary removal and replacement of road signs and other road furniture.
    b. Construction of small sections of hardstand immediately adjacent to the existing pavement edge.
    c. Pruning of roadside vegetation.
3. Walcha to proposal site (Section 3). Road and intersection widening and infrastructure upgrades including:
    a. Temporary removal and replacement of road signs and other road furniture.
    b. Construction of sections of hardstand immediately adjacent to the existing. pavement edge (on sealed roads), and construction of larger unpaved intersections at several existing unpaved intersections.
    c. Pruning of roadside vegetation.

While the final upgrades to the haulage network will be determined post approval in the detailed design stage by contractors appointed to the project, there are currently 38 locations identified where works are required to facilitate the oversize loads. Twelve of these sites are located within Section 1, two sites are located within Section 2 and 19 sites are within Section 3.

This desktop assessment considers Sections 1 and 2 only; 14 sites in total. It aims to assign a risk rating to each location in order to guide appropriate impact assessment and mitigation for these works.

The likely impacts associated with Section 3 are addressed within the Biodiversity Development Assessment Report (NGH 2022) for the project.

Table 1-1 Site summary

Section	Number of sites	Maximum area of impact (total) ha
1	12	0.47
2	2	0.06
Total		**0.53**

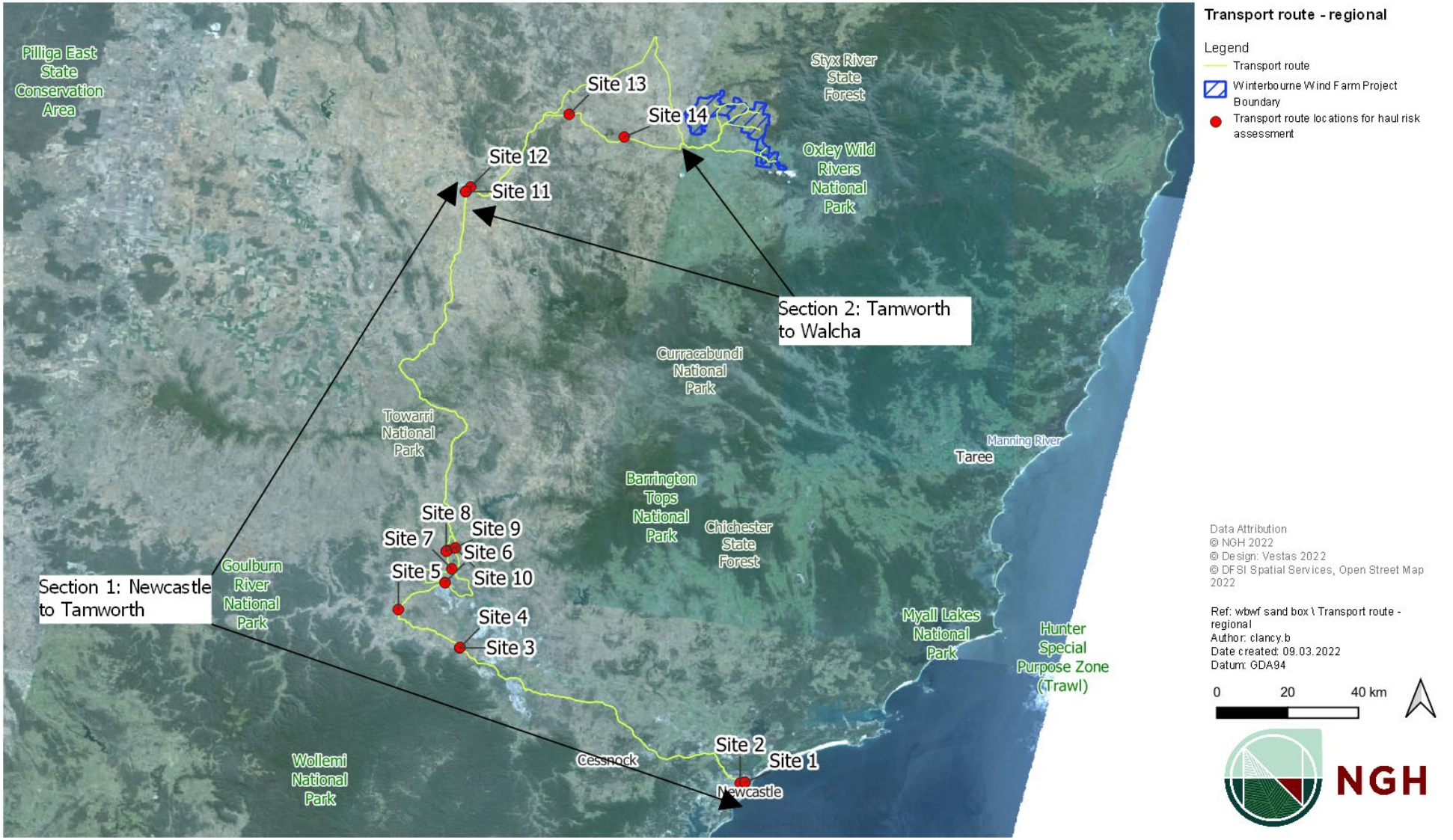


Figure 1-1 Haulage route sections

2. Methods

A desktop analysis of the biodiversity risks associated with proposed upgrades to Sections 1 and 2 of the haulage route was undertaken, considering:

- Aerial imagery
- Street View imagery (Google, 2022)
- Threatened species survey records (Bionet, 2022).

No desktop native vegetation map sets show native vegetation as being present in any of the proposed impacts areas of Sections 1 and 2. This is largely due to their location in and adjacent to areas which are already modified and subject to anthropogenic impacts.

A risk assessment approach was applied to each of the 14 works locations in consideration of:

- the extent and nature of works required
- the environmental context of the works location
- likely biodiversity impacts
- the potential to manage the impacts.

Quantitative risk ratings were assigned from high to low.

Recommendations are provided to guide appropriate impact assessment and mitigation for these works.

3. Results

3.1 Summary results

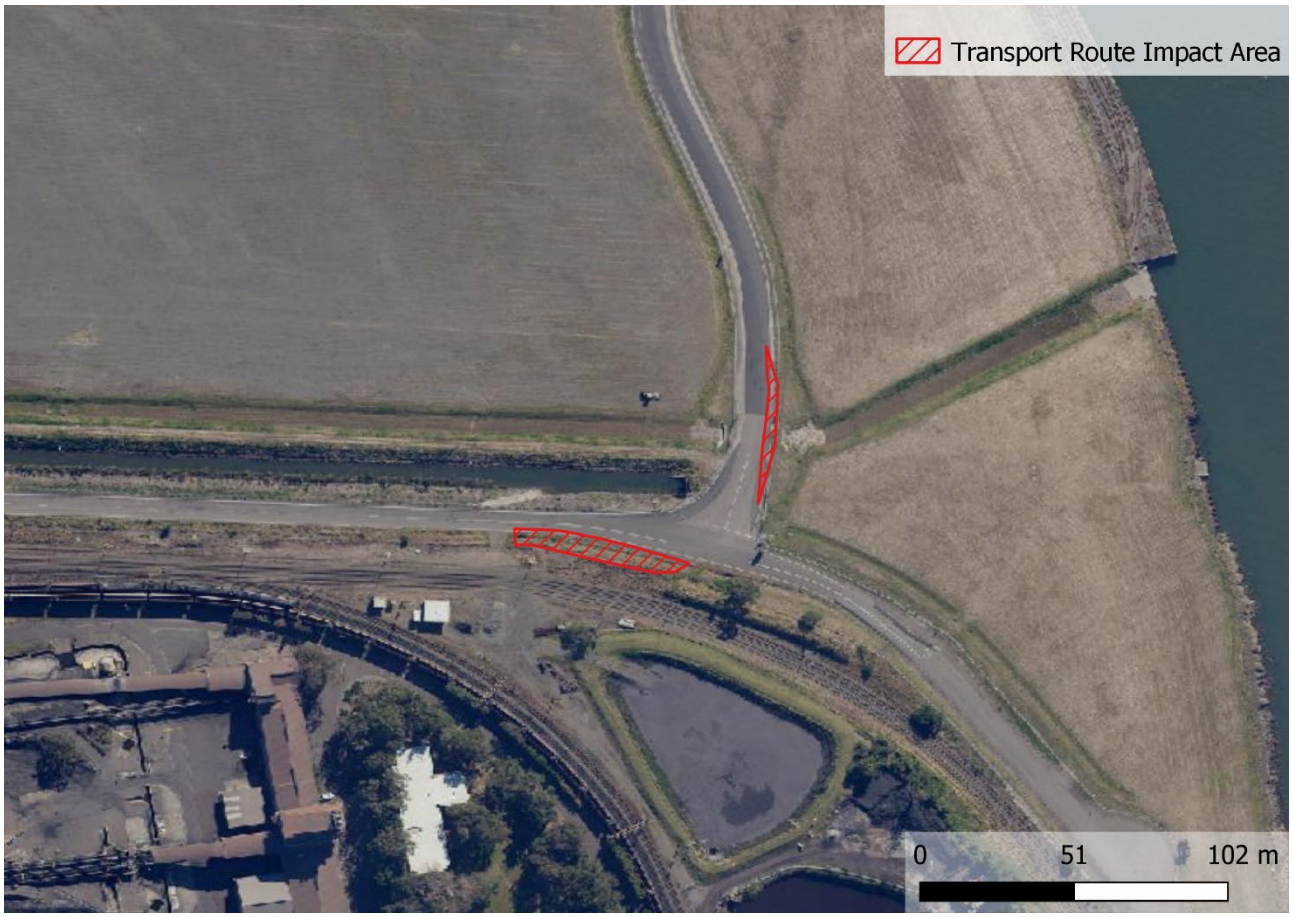
The detailed assessment is provided in Section 3.2 and summarised below (Table 3-1). The risk to conservation significant vegetation is considered very low, on the basis of the minor extent of impact and the highly modified context of the works locations. The risk to threatened species is considered low to moderate and able to be managed appropriately via standard controls in addition to preclearing surveys, at which time the need for any specific additional mitigation strategies can be considered.

Table 3-1 Results summary

Biodiversity risk rating	Number of sites	Key features	Recommendations
Low	2 (Sites 11 and 12)	Highly modified grassland habitat.	Standard requirement to minimise works footprint, employ sediment, erosion, weed and pathogen controls and stabilise areas promptly following works.
Low	9 (Sites 1, 2, 3, 4, 5, 7, 8, 9, 10)	Modified grassland habitat.	In addition to above, a preclearing site inspection is required to confirm that the works areas contain no habitat of importance to threatened species and that the standard management measures are adequate to control impacts.
Moderate	3 (Sites 6,13 and 14)	Modified grassland habitat with adjacent woodlands may contain more intact habitat.	In addition to above, the preclearing site inspection should verify no important values in adjacent habitat that may be affected by noise and vibration during works.
High	0	NA	NA

3.2 Detailed assessment

3.2.1 Transport route location 1, Section 1



Location: Corner of unnamed roads, Port Waratah, Newcastle NSW.

Extent and nature of impact: 0.058 ha, minor upgrades.

Environmental context: Modified road verge between port road and artificial drainage channel (north) and road verge between port road and heavy rail line (south).

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to construction of port infrastructure, heavy rail, and land reclamation.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert beneath port road at the northern impact area may provide roosting habitat for microbat species. Culvert would not be impacted/altered as a result of this proposal.

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.2 Transport route location 2, Section 1



Location: Corner of Industrial Drive and George Street, Mayfield East, Newcastle NSW.

Extent and nature of impact: 0.032 ha, minor upgrades.

Environmental context: Road verge between heavy rail line to the east and major road to the west.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to construction of port infrastructure, heavy rail, industrial development and road works.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.3 Transport route location 3, Section 1



Location: Corner of Pagan Street and Lonsdale Street, Jerrys Plain NSW.

Extent and nature of impact: 0.026 ha, minor upgrades.

Environmental context: Road verge between two lane road and residential dwelling.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to construction of urban development and road works.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.4 Transport route location 4, Section 1



Location: Lonsdale Street south of Queens Street, Jerrys Plain NSW.

Extent and nature of impact: 0.012 ha, minor upgrades.

Environmental context: Road verge between two lane road and cropped agricultural land.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to adjacent urban development, agricultural practices, and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.5 Transport route location 5, Section 1



Location: Corner of Jerrys Plains Road and Denman Road, Danman NSW.

Extent and nature of impact: 0.041 ha, minor upgrades.

Environmental context: Road verge between two lane road and cropped agricultural land.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to intensive agricultural activity and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.6 Transport route location 6, Section 1



Location: Corner of Denman Road and Bengalla Road, Muswellbrook NSW.

Extent and nature of impact: 0.035 ha, minor upgrades.

Environmental context: Road verge – gravel shoulder to the north, road batter to the south.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to agricultural activity and road presence. Adjacent woodland appears unlikely to support hollows or provide important habitat.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Moderate

Survey requirement: Preclearing site inspection to confirm above assumptions, particularly to verify no important values in adjacent habitat that may be affected by noise and vibration during works.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.7 Transport route location 7, Section 1



Location: Corner of Wybong Road and Kayuga Road Muswellbrook NSW

Extent and nature of impact: 0.060 ha, minor upgrades.

Environmental context: Road verge and cropped paddock.

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to agricultural activity and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

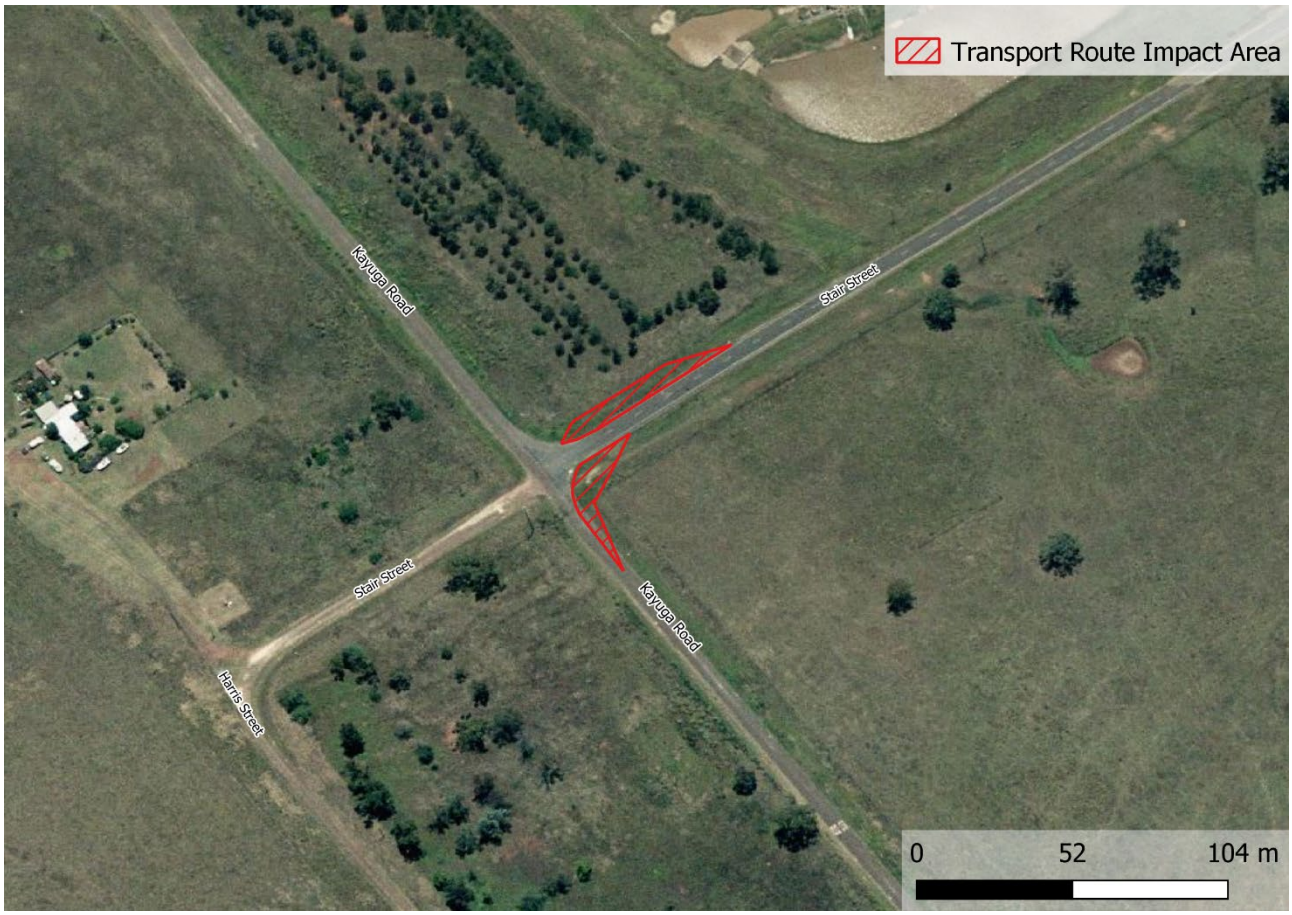
Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.8 Transport route location 8, Section 1



Location: Corner of Kayuga Road and Stair Street, Kayuga NSW.

Extent and nature of impact: 0.071 ha, minor upgrades.

Environmental context: Road verge between planted windrow (north) and open paddock (south)

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to agricultural activity and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.9 Transport route location 9, Section 1



Location: Stair Street 450 m north of Kayuga Road

Extent and nature of impact: 0.036 ha, minor upgrades.

Environmental context: Road, gravel shoulder (southwest) and batter (northeast).

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to agricultural activity and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.10 Transport route location 10, Section 1



Location: Corner of Stair Street and New England Highway, Aberdeen NSW.

Extent and nature of impact: 0.011 ha, minor upgrades.

Environmental context: Road verge/batter of New England Highway

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to agricultural activity and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

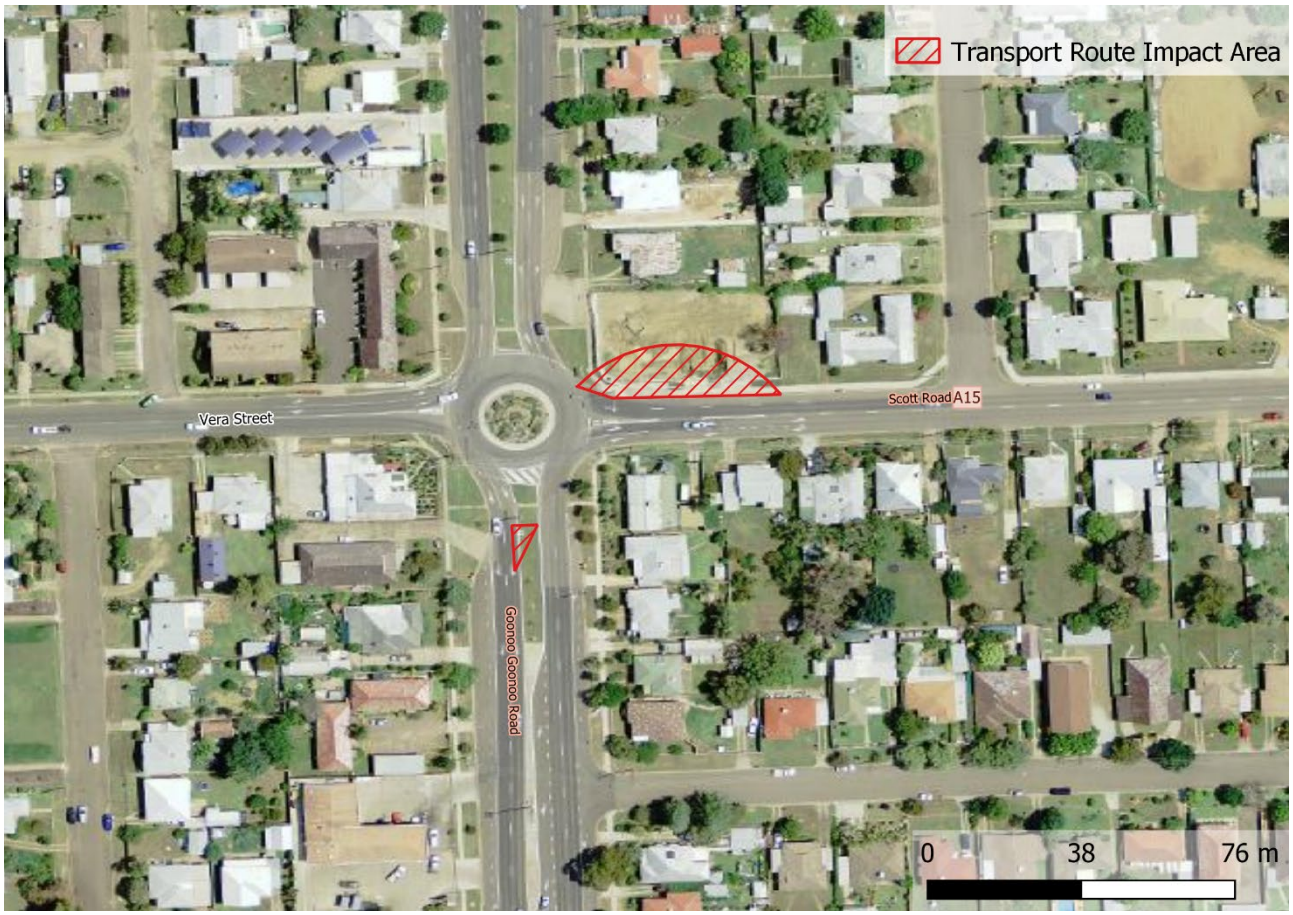
Biodiversity risk rating: Low

Survey requirement: Preclearing site inspection to confirm above assumptions.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.11 Transport route location 11, Section 1



Location: Corner of Scott Road and Goonoo Goonoo Road, Tamworth NSW.

Extent and nature of impact: 0.057 ha, minor upgrades.

Environmental context: Paved footpath and residential lot (north) road divider (south)

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to urban development and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

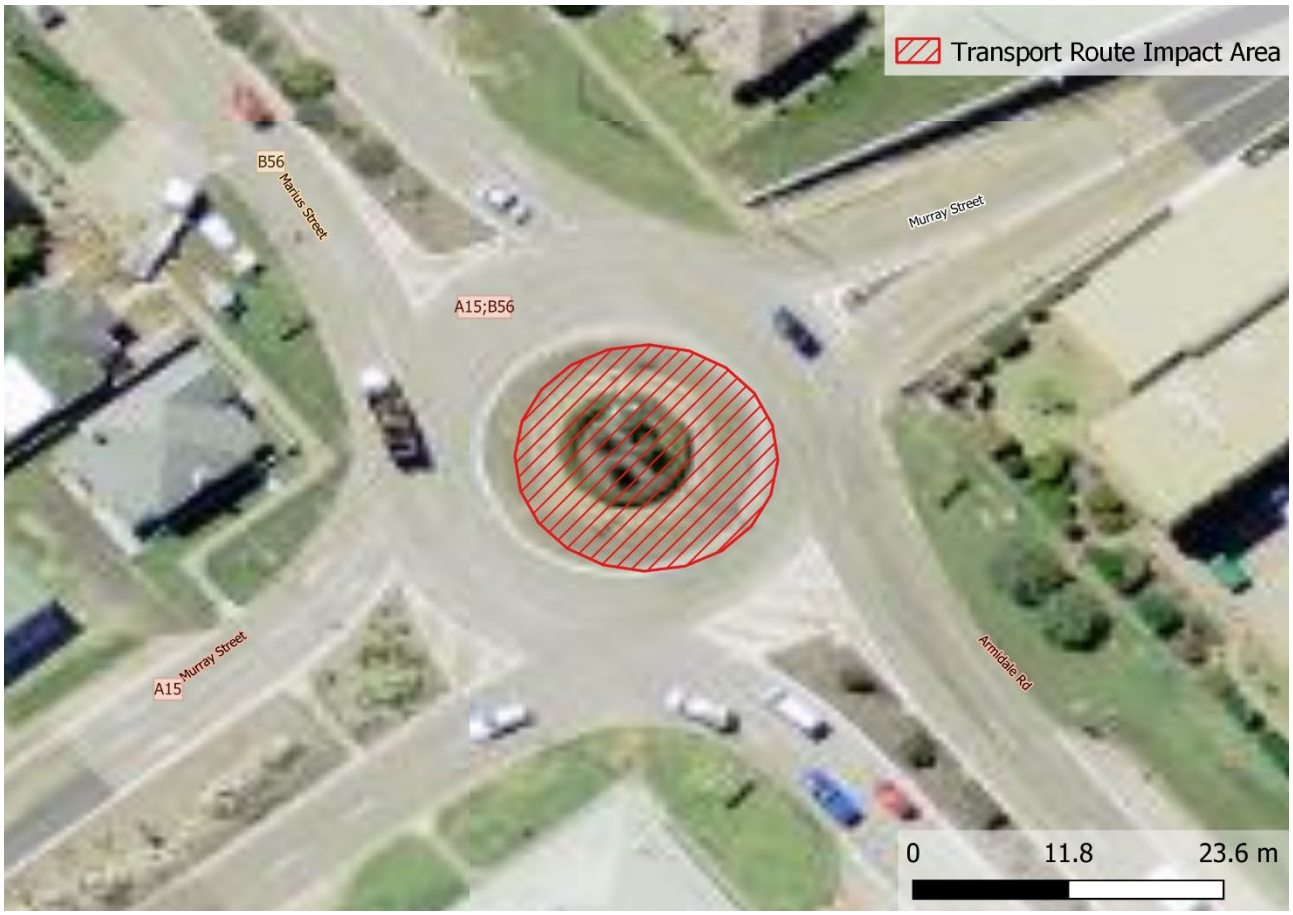
Biodiversity risk rating: Low

Survey requirement: None warranted

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.12 Transport route location 12, Section 1



Location: Corner of Murray Street and Armidale Road, Tamworth NSW.

Extent and nature of impact: 0.031 ha, minor upgrades.

Environmental context: Planted road vegetation in centre of roundabout

Remnant vegetation comment: No canopy trees present within impact area. High levels of disturbance due to urban development and road presence.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Low

Survey requirement: None warranted.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.13 Transport route location 13, Section 2



Location: Oxley Highway 8.9 km from intersection with New England Highway, Bendemeer NSW

Extent and nature of impact: 0.031 ha, road and intersection widening and infrastructure upgrades

Environmental context: Remnant vegetation along roadside.

Remnant vegetation comment: Numerous canopy trees along roadside. Moderate to low levels of disturbance due to road presence. Remnant vegetation present in this location.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species, however, given the presence of canopy trees and connectivity to larger stands of remnant vegetation, habitat may be present in this location. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Moderate

Survey requirement: Preclearing site inspection to confirm above assumptions, particularly to verify no important values in adjacent habitat that may be affected by noise and vibration during works.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

3.2.14 Transport route location 14, Section 2



Location: Oxley Highway at Surveyors Creek

Extent and nature of impact: 0.031 ha, road and intersection widening and infrastructure upgrades

Environmental context: Road verge south of approach to Surveyors Creek Road bridge

Remnant vegetation comment: Numerous canopy trees along roadside. Moderate to low levels of disturbance due to road presence. Remnant vegetation present in this location.

Threatened species habitat comment: Tree hollows are absent. Vegetation in the immediate (<3m) vicinity of roads typically provides poor foraging and breeding habitat for threatened species, however, given the presence of canopy trees and connectivity to larger stands of remnant vegetation, habitat may be present in this location. Wetland and creek lines absent. Culvert and caves absent.

Biodiversity risk rating: Moderate

Survey requirement: Preclearing site inspection to confirm above assumptions, particularly to verify no important values in adjacent habitat that may be affected by noise and vibration during works.

Management recommendations: Standard mitigation measures required to:

- Minimise the disturbance footprint.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly.

4. Recommendations

As this risk assessment has been completed by desktop assessment in advance of the detailed design of the road upgrades, the key recommendation for each site is a preclearing site inspection to confirm the assumptions, that the works areas contain no habitat of importance to threatened species and that the standard management measures are adequate to control impacts. This applies to all sites with the exception of 11 and 12, which are considered to be located in a highly modified context and not warrant further assessment.

For sites 6,13 and 14, an additional requirement to verify adjacent habitat values is included to manage potential for indirect impacts on more intact adjacent habitat that may be affected by noise and vibration during works. Specific additional mitigation strategies may be required to be developed on the basis of these preclearing surveys, including the requirement to offset clearing in accordance with the Biodiversity Assessment Method, pursuant to the *Biodiversity Conservation Act 2016*.

The standard mitigation measures required for each site include to:

- Minimise the disturbance footprint – this is required to confine the impact area to the minimum practical extent and to ensure adjacent areas are not adversely affected. Any ancillary works areas (i.e., for parking, storage and stockpiling areas) should be similarly assessed or confined to existing hardstand areas, at least 40m from waterways.
- Employ sediment and erosion controls, weed and pathogen hygiene during works.
- Stabilise areas of disturbance promptly, following works. Sterile cover crop, geofabric or mulch can be used depending on the location. Controls should remain in place until the areas are deemed stable and non-polluting.

In conclusion, the risk to conservation significant vegetation is considered very low, on the basis of extent of impact and the highly modified context of the works locations. The risk to threatened species is considered low to moderate and able to be managed appropriately via standard controls in addition to preclearing surveys, at which time the need for any specific additional mitigation strategies can be considered.

As a State Significant Development, the Winterbourne Wind Farm is required to assess biodiversity impacts under the Biodiversity Assessment Methodology. This risk assessment has determined it is highly unlikely the vegetation to be impacted by Section 1 and 2 of the haulage upgrade would generate:

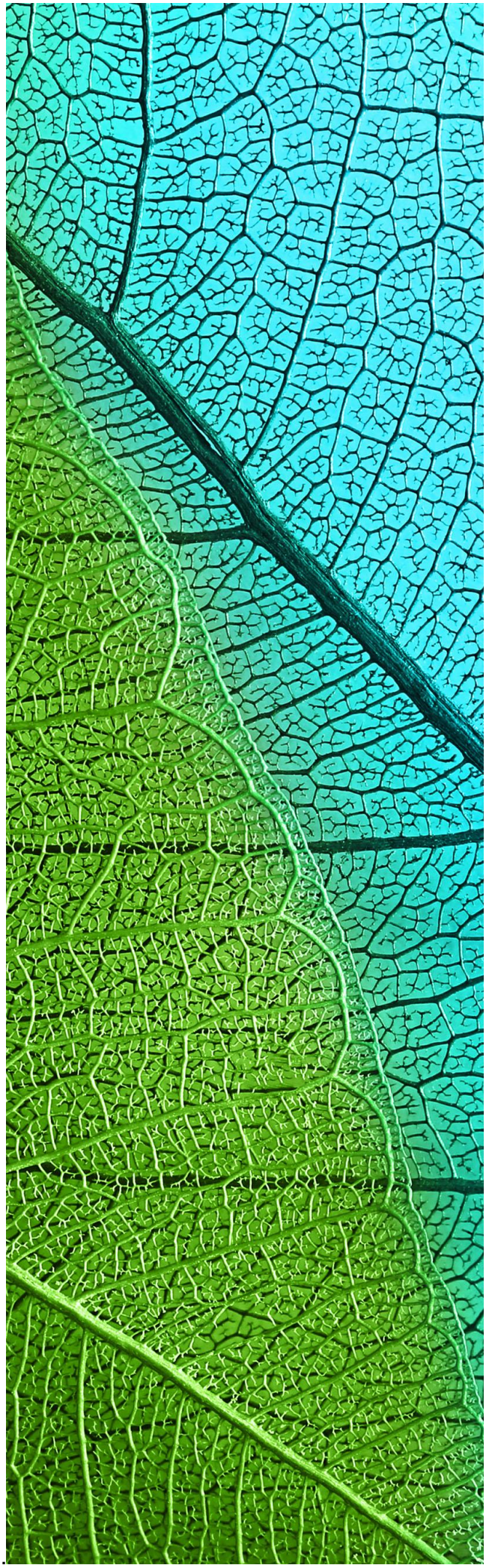
- areas of native vegetation clearing that generate ecosystem credits
- areas of threatened species habitat that generate species credits.

However, the preclearing surveys provide an opportunity to verify this assumption and if required, include additional polygons within the Biodiversity Development Assessment Report (NGH Pty Ltd 2022) which is determining the offset obligation for Stage 3 of the haulage network, the transmission line and all onsite wind farm components for the project.

References

NGH Pty Ltd (2022) *Winterbourne Wind Farm Biodiversity Development Assessment Report*, report to ERM and Vestas, April 2022.

Appendix C Bird utilisation survey reports



Winterbourne Wind Farm

Bird Utilisation and Raptor Surveys 2020 - 2022

Prepared for NGH consulting

February 2022
Report No. 19180.02 (1.3)

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1. Introduction

NGH Consultants Pty Ltd engaged Nature Advisory Pty Ltd to implement bird and bat surveys for the Winterbourne Wind Farm, 30km east of Walcha in the northern tablelands of NSW. This investigation was commissioned to provide baseline data on the utilisation by birds and bats of the wind farm site. This report presents the methods, results and findings of the bird utilisation and raptor surveys. The results of the bat surveys are presented in another report.

The bird utilisation survey (BUS) was undertaken consistent with the requirements for a "Level One" bird risk assessment in accordance with 'Wind Farms and Birds - Interim Standards for Risk Assessment' issued by the Australian Wind Energy Association (AusWEA 2005) and endorsed by the Clean Energy Council's Best Practice Guidelines for Wind Energy Developments in Australia (2018).

The raptor surveys were undertaken consistent with the requirements of the NSW Office of Environment and Heritage. All observed raptors were recorded and flight paths plotted.

Three pre-construction bird utilisation and raptor surveys were undertaken by experienced zoologists in spring 2020, autumn 2021 and summer 2022 to account for seasonal differences in bird activity and presence of species (due to migration). The dates and surveyors are detailed below.

- **Spring:** October 2020 (Dr Ahmad Barati and Candice Larkin)
- **Autumn:** March and April 2021 (Candice Larkin)
- **Summer**: January 2022 (Dr Ahmad Barati and Peter Lansley).

This report is divided into the following sections.

Section 2 describes the methods used and presents results for the bird utilisation survey

Section 3 describes the methods used and presents the results for the raptor survey

Section 4 provides conclusions in relation to bird activity and observed species of concern.

This investigation was undertaken by a team from Nature Advisory comprising Ahmad Barati (Zoologist), Candice Larkin (Zoologist), Peter Lansley (Senior Zoologist), Curtis Doughty (Senior Zoologist), Bernard O'Callaghan (Project Manager) and Brett Lane (Principal Consultant).

2. Bird Utilisation Survey

2.1. Methods

2.1.1. Fixed-point bird count method

The fixed-point bird count method involved an observer stationed at a survey point for 15 minutes. The adequacy of using 15 minutes as an interval to record the presence of birds during bird utilisation surveys was investigated in an earlier study at another wind farm site (Brett Lane & Associates Pty Ltd, unpublished data). This showed that 82 to 100 percent (average 88 percent) of species actually seen in one hour of surveying were seen in the initial 15 minutes of observation. Based on this result, the period of 15 minutes used in the formal bird utilisation surveys was considered adequate to generate representative data on the bird species in the area during the survey.

During this period of observation, all bird species and numbers of individual birds observed within 200 metres were recorded. The species, the number of birds and the height of the bird when first observed were documented. For species of concern (threatened species, waterbirds and raptors), the minimum and maximum heights were recorded.

Flight height was recorded in 10 metre intervals up to 60 metres, 20 metre intervals up to 120 metres then as 'above 120 metres'. The data are presented as below, at or above rotor swept area (RSA) height.

For Winterbourne Wind Farm (hereafter WWF) these heights are detailed below:

- A = Below RSA (< 40 metres above ground)
- B = At RSA (40 – 150 metres above ground)
- C = Above RSA (> 150 metres above ground).

2.1.2. Timing of bird surveys

The location of Bus points is shown in Figure 1. Table 1 and Table 2 indicate when each point was counted on each survey day. This schedule ensured that all points were visited equally during four different times of day to allow for time-of-day differences in bird movements and activity. The periods were:

- Before 10.00am;
- 10.00am to 12.30pm;
- 12.30 pm to 2.30 pm; and
- After 2.30 pm.

Every survey point (impact and reference) was visited eight times over the survey period

The bird utilisation surveys were undertaken during eight days in October 2020, six days in March-April 2021 and 5 days in January 2022 (Table 1). The timing included suitable periods for surveying birds. The spring survey gathering data on species richness during the breeding season and when spring/ summer migrants visit the wind farm area. The autumn survey covered a period when bird populations are usually at their maximum abundance following summer recruitment.

This schedule ensured that all points were visited at all times of day equally in both seasons, so that no time-of-day or seasonal biases affected the pooled count data.

Table 1: Fixed-point count schedule for each fixed-point bird count survey day (Oct 2020, Mar-Apr 2021, Jan 2022)

	Time/ date	5-Oct	6-Oct	10-Oct-	11-Oct	13-Oct	14-Oct	15 Oct-	16-Oct
Spring 20	8:00				REF1		BUS5	BUS5	
	8:30	BUS3	BUS1	REF1	BUS4	BUS8	BUS6	BUS6	
	9:00	BUS1	BUS3	BUS4		RF2	RF2		
	9:30		BUS2	BUS2		BUS7	BUS8	BUS7	
	10:00				BUS1			BUS8	BUS5
	10:30	BUS4	BUS4	BUS3	BUS2		BUS7	RF2	BUS6
	11:00	REF1	REF1	BUS1			BUS8	BUS7	
	11:30			BUS2	BUS3	BUS5	RF2	BUS6	
	12:00		REF1	BUS1	BUS3				
	12:30		BUS4		BUS1	BUS6	BUS5	BUS5	
	13:00			REF1	BUS2	RF2		BUS8	
	13:30			BUS4		BUS8	BUS7		
	14:00	BUS2	BUS3			BUS7	RF2	BUS6	
	14:30			BUS3	BUS2	RF2	BUS7	BUS5	
	15:00	REF1	BUS1			BUS8	BUS8	BUS6	
	15:30			BUS2			RF2	BUS5	
	16:00	BUS1	BUS3		REF1		BUS7	BUS6	
	16:30			BUS4	BUS4				
Autumn 21	Time/ date	8-Mar-	2-Apr	6-Apr	8-Apr	20-Apr	22-Apr		
	7:30					BUS6			
	8:00		RF2	BUS7	BUS3	RF1			
	8:30		BUS8	BUS9	BUS2	BUS4, RF1	BUS3		
	9:00		BUS9	BUS8	BUS6	BUS5	BUS5		
	9:30		BUS7	RF2		BUS4	BUS2		
	10:00			BUS6	BUS4, RF1	BUS3			
	10:30		BUS2	BUS8	BUS4	BUS5	BUS9		
	11:00		BUS6	BUS9	RF1	BUS3	BUS7		
	11:30	BUS2	RF2	BUS7, BUS8	BUS5				
	12:00		BUS8	RF2	BUS6	RF1			
	12:30	BUS4	RF2	BUS9	BUS2	BUS5	BUS4		
	13:00		BUS7	BUS7					
	13:30		BUS2	BUS9, BUS8		BUS3	RF1, BUS3		
	14:00		BUS6			BUS5			
	14:30	BUS3	RF1		BUS8, RF2	BUS4, BUS6	BUS5		
	15:00		BUS6		BUS7				
	15:30				BUS9	BUS2	BUS3		

	16:00				BUS7, BUS9	BUS5, BUS4			
	16:30				BUS8	RF1			
	17:00				RF2	BUS2			
Summer 22	Time/ Date	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan			
	6:30					BUS 8			
	7:00				BUS2	REF2			
	7:30			BUS3	BUS 7				
	8:00			BUS 13	REF1	BUS 13			
	8:30			REF 2/REF1	BUS 8/BUS4	BUS2			
	9:00			BUS 12		BUS 7			
	9:30		BUS3	BUS4	BUS12/ BUS5	BUS5			
	10:00		BUS 7	BUS 8/BUS3	REF2/R EF1				
	10:30	BUS 8				BUS 12			
	11:00	BUS2	REF1	BUS5	BUS 13/BUS 5	BUS4			
	11:30	BUS2	BUS 13	BUS 7	BUS 12				
	12:00		REF 2/BUS4						
	12:30		BUS 12	BUS13/ BUS3		BUS 8			
	13:00	BUS 7/REF1		REF2/B US2					
	13:30	REF1	BUS8/B US5		BUS 8	BUS7/B US2			
	14:00	BUS4		BUS12/ BUS5	REF 2	BUS3			
	14:30	REF2/B US4	BUS 13			BUS3			
	15:00		REF2/B US2	REF1					
	15:30		BUS 12	BUS4		BUS3			
	16:00	BUS12/ BUS5	BUS3	BUS 7					
	16:30	BUS5	BUS 8	REF1		BUS2			
	17:00	BUS 13			BUS 13	BUS4			
	17:30		BUS 7						

Note: See Figure 1 for survey point locations. The prefix 'RF' refers to reference points and BUS to impact points. See below for explanation of changes in points.

2.1.3. Locations of survey points

Ten fixed survey points were established: eight impact points and two reference points. Impact points were located near proposed turbine sites and reference points were located at least 500 metres away from proposed turbine sites in areas of similar habitat (see Figure 1). In autumn 2021, BUS 1 was replaced by a new BUS 9 point and in summer 2022, BUS 1 and BUS 9 were abandoned and replaced

by BUS 12 and BUS 13. The changes in some of the BUS points was necessitated by change in the basic layout of the turbines and weather-related access constraints.

The survey points were distributed as evenly as possible (subject to access constraints) across the wind farm to sample the various habitat types and maximise coverage in areas where wind turbines are proposed (Figure 1). Impact points were positioned on elevated ground, allowing a clear view in all directions. Table 2 below provides a description of the habitats associated with each impact and reference point.

Table 2: Habitat associated with each BUS point at Winterbourne Wind Farm

Survey Point	Habitat Description
BUS1	Located on the top of the ridge, scattered stringybark with grass understory.
BUS2	Sheep pasture with a few paddock trees, and one riparian strip close by.
BUS3	Scrappy stringybark timbered ridge adjacent to pasture.
BUS4	Stringybark grassland ridge.
BUS5	Sheep pasture with few, small scattered trees, approximately 500m away from woodland patch.
BUS6	Dirt road on side of sloped wooded paddock, with some shrub ground cover.
BUS7	Mid-slope pasture surrounded by open woodland with mature New England Peppermint (*Eucalyptus nova-anglica*) and Blakely's Red Gum - adjacent to large ridge.
BUS8	Pasture surrounded by open woodland with mature New England Peppermint and small tree ferns.
BUS9	Top of ridge in cleared grassland paddock.
BUS12	Cleared mixed native and exotic pasture on a saddle between two hills, scattered paddock eucalypts and some bracken and little or no shrub cover with few fallen branches.
BU13	Ridge line, with cleared pasture, mostly exotic grass and forest block close by to the south-east and degraded understorey.
Ref1	Stringybark grassland gully with stream.
Ref2	Open paddock near roadside with scattered mature New England Peppermint and stringy bark.

2.1.4. Incidental observations

In addition to the observations during fixed-point counts, incidental observations of birds of concern (threatened species, raptors, waterbirds) were made whilst travelling throughout the wind farm site. Notes are also made on woodland birds observed in remnant woodlands and any early morning and evening roosting movements. Emphasis was placed on observing birds that were moving through the site at RSA height.

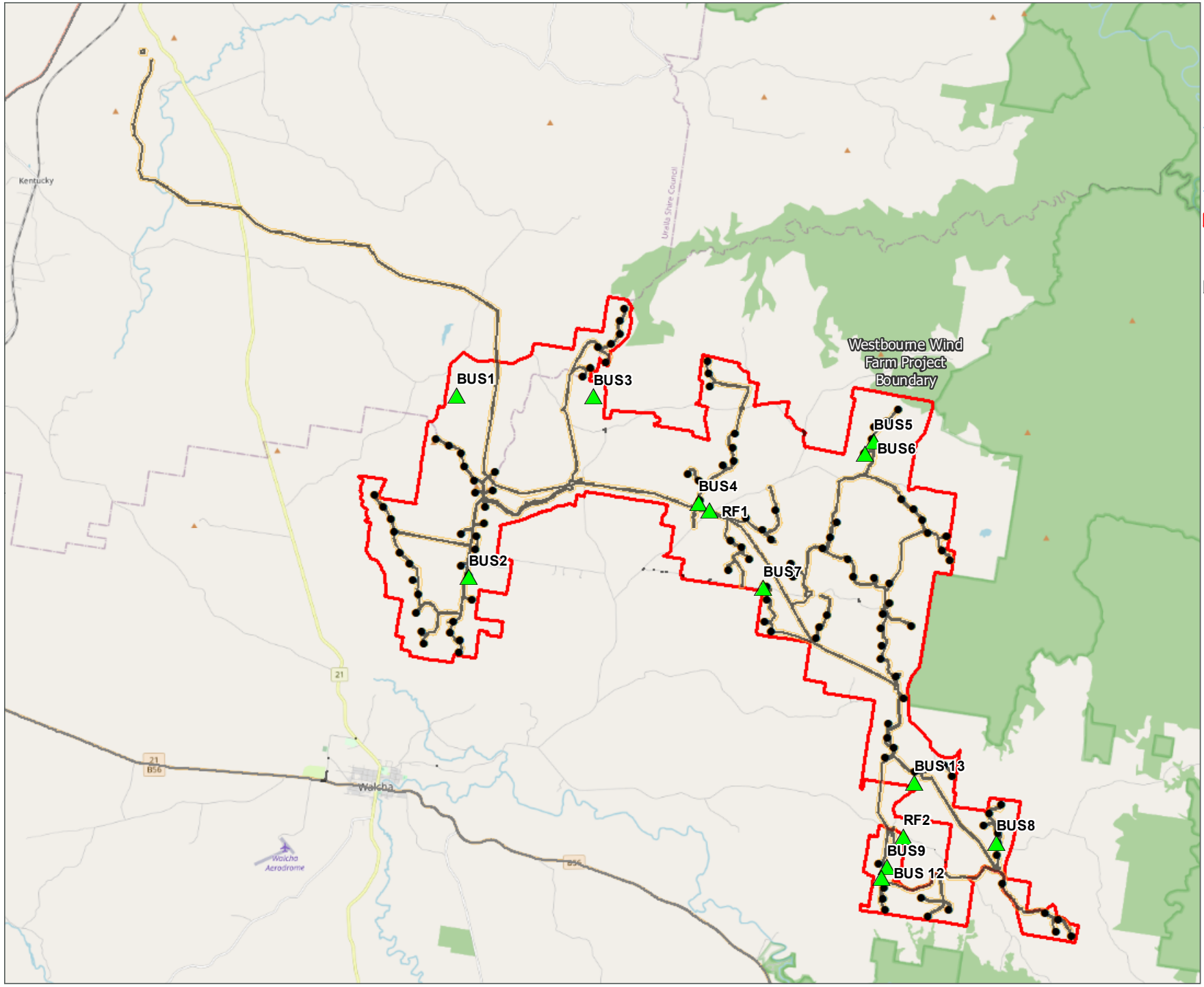


Figure 1: Location of bird utilisation survey sites at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

N

Metres
0 3,600

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

2.1.5. Data preparation and statistical analysis

All observations were recorded in pre-defined data sheets. Raw data were then entered into an Excel spreadsheet, and tables and graphs were extracted. Graphs were generated in Microsoft Excel and R (R Core Team 2018). First, the suitability of the survey method was checked using a cumulative species number graph (Figure 2). Frequency of observation of each species (i.e. the number of surveys in which a species was detected) was determined for impact and reference points separately. The distribution of individuals in height categories was calculated as a percentage for impact and reference points. To investigate the variations of species diversity and abundance between impact and reference points, analysis of variance (ANOVA) was performed, with number of species (termed 'species diversity' here) and abundance as dependent factors and points type (impact/reference) as the predicting parameter. Abundance data were log-transferred to meet normal distribution in ANOVA tests. All statistical analyses were undertaken in R environment (R Core Team 2018).

2.1.6. Limitations

The purpose of the surveys was to collect data on the usage of the site by resident and migratory birds. For these reasons, the utilisation rates and species relative abundances recorded during the current surveys are representative of the site for the period covered as they take into consideration time-of-day and seasonal differences in bird activity and species occurrence. They are therefore considered to provide a valid basis on which to assess the bird risks associated with the WWF.

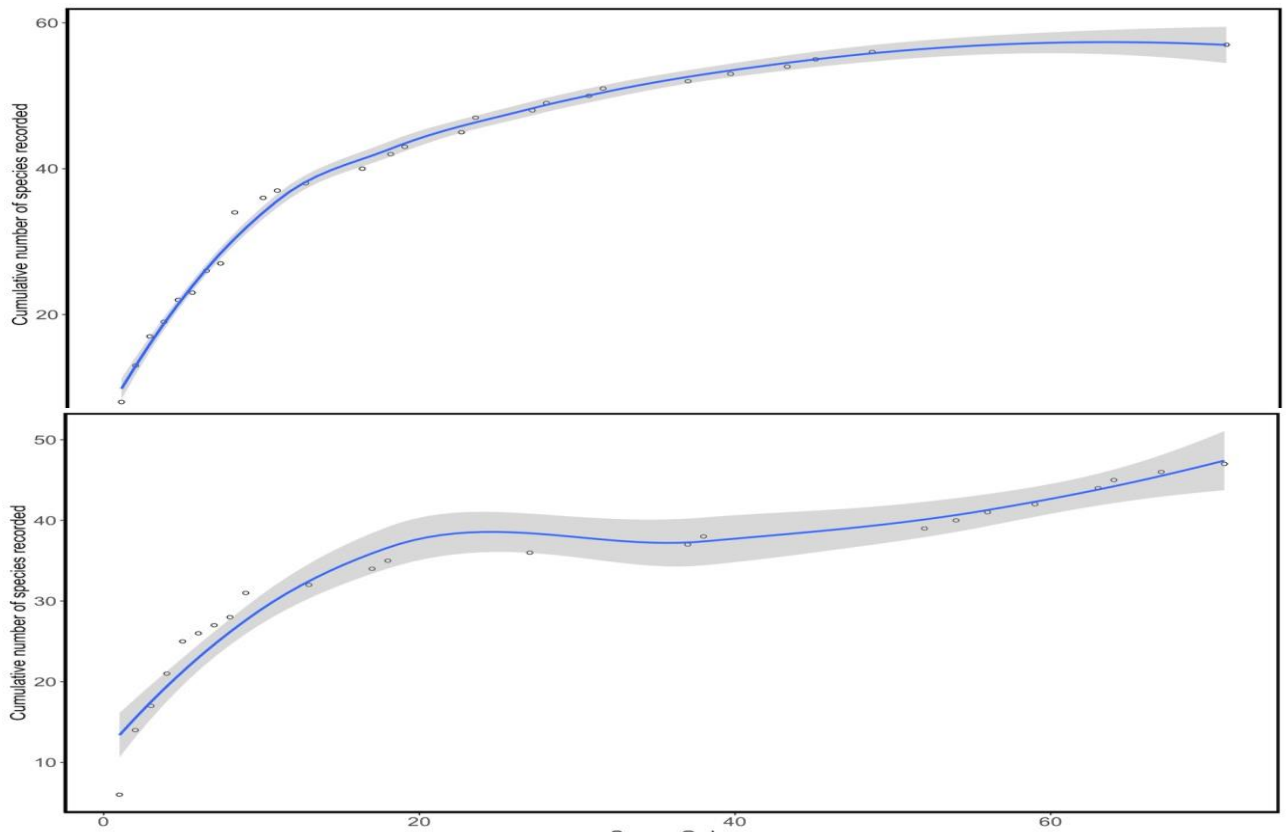
2.2. Results

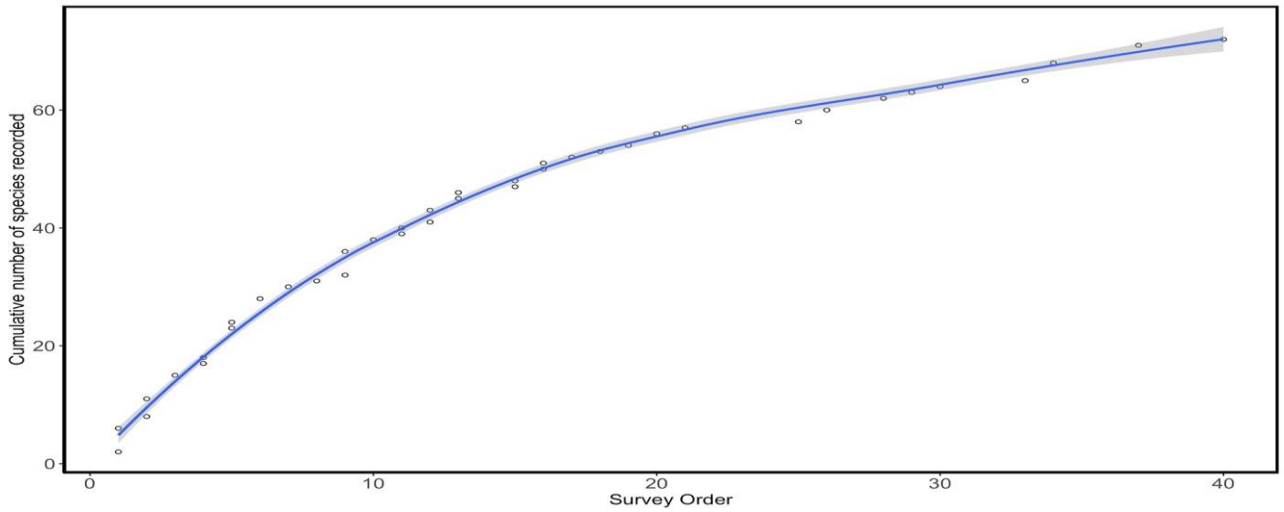
2.2.1. Survey suitability

The cumulative number of species observed from the consecutive fixed-point bird counts conducted at the observation points during the BUS are plotted in Figure 2.

The cumulative species–count sequence curve shows a clear asymptote for the three surveying periods, suggesting that the number of new species added to the diversity levelled off after around 50 counts in the spring and summer BUS and about 30 counts in the autumn BUS, with only a few species added afterwards. This supports the adequacy of using eight replicates to generate representative data on the bird species in the area during the survey period.

Figure 2: The cumulative number of species of birds recorded during consecutive counts of the Spring (upper), autumn (middle) and summer (lower) BUS at WWF





2.2.2. *Species composition*

The number of bird species recorded during BUS was over 90 species. A total 65 bird species were recorded during the spring 2020 and autumn 2021 surveys, and a total of 72 bird species were recorded during the summer 2022 survey. Of all species recorded, 64 species were recorded at the impact points and 35 at the reference points during spring and autumn and 67 and 29 birds respectively at the impact and reference points in summer 2022 (Table 3).

Species recorded were predominantly farmland and bushland species with some records of raptors and waterbirds. Total utilisation (cumulative counts) of each species recorded at the observation point is presented in Table 3 for the impact sites and Table 4 for the reference sites.

Species diversity varied between the three seasons. Diversity was highest in summer and lowest in autumn. Species composition (diversity) differs between months due to seasonal changes in presence and abundance of migratory species, changes in foraging behaviour and seasonal distribution of birds among various habitats.

The five most common species (percent of total birds recorded during the three seasons) at the impact and reference points are presented below.

Impact points	Reference points
1. Australian Magpie (12.5%),	Eastern Rosella (16.3%),
2. Torresian Crow (8.9%),	Torresian Crow (14.5%),
3. Yellow-rumped Thornbill (8,3%),	Noisy Miner (13,2%),
4. Eastern Rosella (7.0%),	Australian Magpie (10.5%),
5. Superb Fairywren (5.8%),	Galah (8.8%).

These five species comprised 42.5% of all birds recorded at the impact points and 63.3% at the reference points. On seasonal basis, the same species were also the dominant forms at the impact and reference points, however, other species such as Galah, Noisy Miner and Common Staling were part of the dominant five in certain seasons.

The number of species, their abundance and flight heights are summarized for each of the three seasons of the survey in Table 3 for the impact sites, and in Table 4 for the reference sites. More details of each observation point at each of the three seasons are detailed in appendix 1 – 5.

Diversity (i.e., number of species recorded per site) varied between the observation points, and was influenced mainly by surrounding habitat, and number of species was usually higher at points surrounded by remnant woodland vegetation, with lower species richness occurring at grazed, open, agricultural land.

Species also differed in terms of their seasonal abundance (i.e., total number of individuals) at both impact (Table 3) and reference points (Table 4). Bird numbers also differed between each of the observation points, but generally there were no indication that the difference was significant and birds, were almost homogenously distributed between the observation points.

Generally, bird abundance was lower in the summer survey compared with both spring and autumn, however, diversity was in reverse, as it was much higher in summer compared to spring and autumn (Table 3).

The pattern of bird numbers and diversity at the reference points was like that of the impact points with the same bird species dominating the counts (Table 4).

Table 3: Summary of the diversity, numbers and height distribution of bird at the impact survey points recorded during three seasons at WWF.

Species	spring 20				autumn 21				Summer 22				Grand Total				% Imp.
	A	B	C	Tot	A	B	C	Tot	A	B	C	Tot.	A	B	C	Tot.	
Australian Magpie	134			134	213			213	100	2		102	447	2		449	12.4
Torresian Crow	109			109	205	2		207	3			3	317	2		319	8.8
Yellow-rumped Thornbill	183			183	53			53	63			63	299			299	8.3
Eastern Rosella	90			90	108			108	55			55	253			253	7
Superb Fairy-wren	115			115	59			59	35			35	209			209	5.8
Noisy Miner	54			54	95			95	54			54	203			203	5.6
Galah	74			74	103	3		106	18			18	195	3		198	5.5
Striated Pardalote	98			98	16			16	32			32	146			146	4
Wedge-tailed Eagle	10	31		41	13	51		64		1	27	28	23	83	27	133	3.7
Common Starling					2			2	80			80	82			82	2.3
Crimson Rosella	22			22	36			36	22			22	80			80	2.2
White-throated Treecreeper	29			29	22			22	27			27	78			78	2.2
Red-rumped Parrot	8			8	60			60	8			8	76			76	2.1
Australian Wood Duck	4			4	58			58	7			7	69			69	1.9
Grey Butcherbird	28			28	17			17	10			10	55			55	1.5
Red Wattlebird	5			5	30			30	16			16	51			51	1.4
White-winged Chough	5			5	13			13	30			30	48			48	1.3
Willie Wagtail	18			18	11			11	18			18	47			47	1.3
Black-faced Cuckoo-shrike	24			24	5			5	14			14	43			43	1.2
Varied Sitella	3			3	23			23	17			17	43			43	1.2
Sulphur-crested Cockatoo	16			16	3			3	17	5		22	36	5		41	1.1
Little Corella	14			14					26			26	40			40	1.1
Pied Currawong	21			21	11			11	4	1		5	36	1		37	1
Noisy Friarbird	24			24	2			2	6			6	32			32	0.9
Nankeen Kestrel	10	3		13	6	1		7	2	6		8	18	10		28	0.8

Species	spring 20				autumn 21				Summer 22				Grand Total				% Imp.
	A	B	C	Tot	A	B	C	Tot	A	B	C	Tot.	A	B	C	Tot.	
Welcome Swallow	2			2	6			6	20			20	28			28	0.8
Laughing Kookaburra	7			7	12			12	7			7	26			26	0.7
Rufous Whistler	12			12	2			2	10			10	24			24	0.7
Striated Thornbill					9			9	15			15	24			24	0.7
Australian Raven	6	3		9					4	8		12	10	11		21	0.6
Dusky Woodswallow									21			21	21			21	0.6
Black-chinned Honeyeater	19			19									19			19	0.5
Rainbow Lorikeet					17			17	2			2	19			19	0.5
White-browed Scrubwren	14			14	2			2	2			2	18			18	0.5
Yellow-faced Honeyeater									17			17	17			17	0.5
Brown-headed Honeyeater									16			16	16			16	0.4
Grey Fantail					6			6	10			10	16			16	0.4
Weebill	16			16									16			16	0.4
Fuscous Honeyeater	14			14					1			1	15			15	0.4
Straw-necked Ibis	14			14									14			14	0.4
Tree Martin	5			5	4			4	5			5	14			14	0.4
Buff-rumped Thornbill									13			13	13			13	0.4
Masked Lapwing	4			4	7			7	2			2	13			13	0.4
Eastern Spinebill									12			12	12			12	0.3
Yellow Thornbill									12			12	12			12	0.3
Australasian Pipit					4			4	7			7	11			11	0.3
Brown Falcon	3			3	2	1		3	1	4		5	6	5		11	0.3
Forest Raven									10	1		11	10	1		11	0.3
White-throated Gerygone	9			9	2			2					11			11	0.3
Magpie-lark	6			6					4			4	10			10	0.3
Australian King Parrot	9			9									9			9	0.2

Species	spring 20				autumn 21				Summer 22				Grand Total				% Imp.
	A	B	C	Tot	A	B	C	Tot	A	B	C	Tot.	A	B	C	Tot.	
Diamond Firetail									9			9	9			9	0.2
Grey Shrike-thrush	8			8	1			1					9			9	0.2
Pied Butcherbird	2			2					6			6	8			8	0.2
Stubble Quail									8			8	8			8	0.2
Leaden Flycatcher	7			7									7			7	0.2
Little Raven									7			7	7			7	0.2
Restless Flycatcher	5			5	2			2					7			7	0.2
Rufous Songlark	2			2					5			5	7			7	0.2
Olive-backed Oriole	4			4	2			2					6			6	0.2
Crested Pigeon	2			2	2			2	1			1	5			5	0.1
Brown Honeyeater									4			4	4			4	0.1
Fairy Martin									4			4	4			4	0.1
Fan-tailed Cuckoo									4			4	4			4	0.1
Little Friarbird	4			4									4			4	0.1
Speckled Warbler					4			4					4			4	0.1
Pallid Cuckoo									3			3	3			3	0.1
Yellow-tailed Black Cockatoo	3			3					0				3			3	0.1
Australian Ibis									2			2	2			2	0.1
Black-shouldered Kite	1			1		1		1					1	1		2	0.1
Brown Goshawk	1			1					1			1	2			2	0.1
Eastern Yellow Robin	2			2									2			2	0.1
Glossy Black Cockatoo					2			2					2			2	0.1
Musk Lorikeet									2			2	2			2	0.1
Spotted Pardalote	2			2									2			2	0.1
White-eared Honeyeater									2			2	2			2	0.1
White-naped Honeyeater									2			2	2			2	0.1

Species	spring 20				autumn 21				Summer 22				Grand Total				% Imp.
	A	B	C	Tot	A	B	C	Tot	A	B	C	Tot.	A	B	C	Tot.	
Australasian Darter		1		1										1		1	0.0
Brown Quail									1			1	1			1	0.0
Jacky Winter	1			1									1			1	0.0
Little Lorikeet									1			1	1			1	0.0
Mistletoebird									1			1	1			1	0.0
Olive-backed Oriole					1			1					1			1	0.0
Pacific Black Duck									1			1	1			1	0.0
Whistling Kite		1		1										1		1	0.0
Grand Total	1282	38	0	1320	1251	59	0	1310	923	29	27	979	3456	126	27	3609	100

Notes: A = below (<40m); B = at (40-150 m); C = over (.150m) RSA heights; Tot = Total; % Imp = percentage impact.

Table 4: Summary of the diversity, numbers and height distribution of bird at the reference survey points recorded during three seasons at WWF

Species	Spring 2020				Autumn 2021				Summer 2022				Combined seasons			
	R1		R2		R1		R2		R1		R2					%
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	Tot,	Imp.
Eastern Rosella	25		32		47		34		19		18		**175**	**0**	**175**	16.3
Torresian Crow	16		48		23		69						**156**	**0**	**156**	14.5
Noisy Miner	15		23		28		20		39		17		**142**	**0**	**142**	13.2
Australian Magpie	13		19		28		30		9		14		**113**	**0**	**113**	10.5
Galah	17		6		63		5		4				**95**	**0**	**95**	8.8
Red-rumped Parrot					83				3		1		**87**	**0**	**87**	8.1
Crimson Rosella	6	2	2		4		17		7				**36**	**2**	**38**	3.5
Striated Pardalote	6		20				6		2		2		**36**	**0**	**36**	3.4
Straw-necked Ibis	5		25										**30**	**0**	**30**	2.8
Grey Butcherbird	2		5		5		8		3				**23**	**0**	**23**	2.1
Sulphur-crested Cockatoo	10				1	2	1		5		2		**19**	**2**	**21**	2
Yellow-rumped Thornbill	17								3				**20**	**0**	**20**	1.9
Black-faced Cuckoo-shrike	8						2		4		3		**17**	**0**	**17**	1.6
Noisy Friarbird	10		1						2				**13**	**0**	**13**	1.2
Wedge-tailed Eagle				2	4	5	1						**5**	**7**	**12**	1.1
Nankeen Kestrel			6		1		1		2	1	1		**11**	**1**	**12**	1.1
Laughing Kookaburra			1						9				**10**	**0**	**10**	0.9
Little Corella	9												**9**	**0**	**9**	0.8
Pied Currawong	2		4								3		**9**	**0**	**9**	0.8
Magpie-lark	2						5						**7**	**0**	**7**	0.7
Common Starling	1								5				**6**	**0**	**6**	0.6
Willie Wagtail	1		1				1		3				**6**	**0**	**6**	0.6
Little Raven											5		**5**	**0**	**5**	0.5
Red Wattlebird							2				2		**4**	**0**	**4**	0.4
Masked Lapwing	3												**3**	**0**	**3**	0.3

Species	Spring 2020				Autumn 2021				Summer 2022				Combined seasons			
	R1		R2		R1		R2		R1		R2					%
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	Tot,	Imp.
Weebill					3								3	0	3	0.3
Tree Martin			3										3	0	3	0.3
Australian Raven									2				2	0	2	0.2
Australian Wood Duck	2												2	0	2	0.2
Pacific Black Duck					2								2	0	2	0.2
Welcome Swallow					2								2	0	2	0.2
Australasian King Parrot									1				1	0	1	0.1
Crested Pigeon									1				1	0	1	0.1
Dollarbird									1				1	0	1	0.1
Grey Shrike-thrush									1				1	0	1	0.1
White-throated Treecreeper					1								1	0	1	0.1
Australasian Pipit							1						1	0	1	0.1
Forest Raven											1		1	0	1	0.1
Olive-backed Oriole							1						1	0	1	0.1
White-throated Gerygone			1										1	0	1	0.1
Totals	170	2	197	2	295	7	204	0	127	1	69	0	1062	12	1074	100

Notes: A = below RSA (<40m); B = at RSA (40-150 m); % Imp. = percentage impact. No birds were recorded over 150m, thus not included in table.

2.2.3. *Flight height*

Bird heights were classified as (A) below RSA (< 40 metres), (B) at RSA (40–150 metres), and (C) above RSA (> 150 metres) heights based on current specifications of proposed operational turbines at WWF. Table 5 present the detailed results of the number of birds recorded at the different flight heights during the three seasonal of surveys. The same data is further summarised in Figure 3.

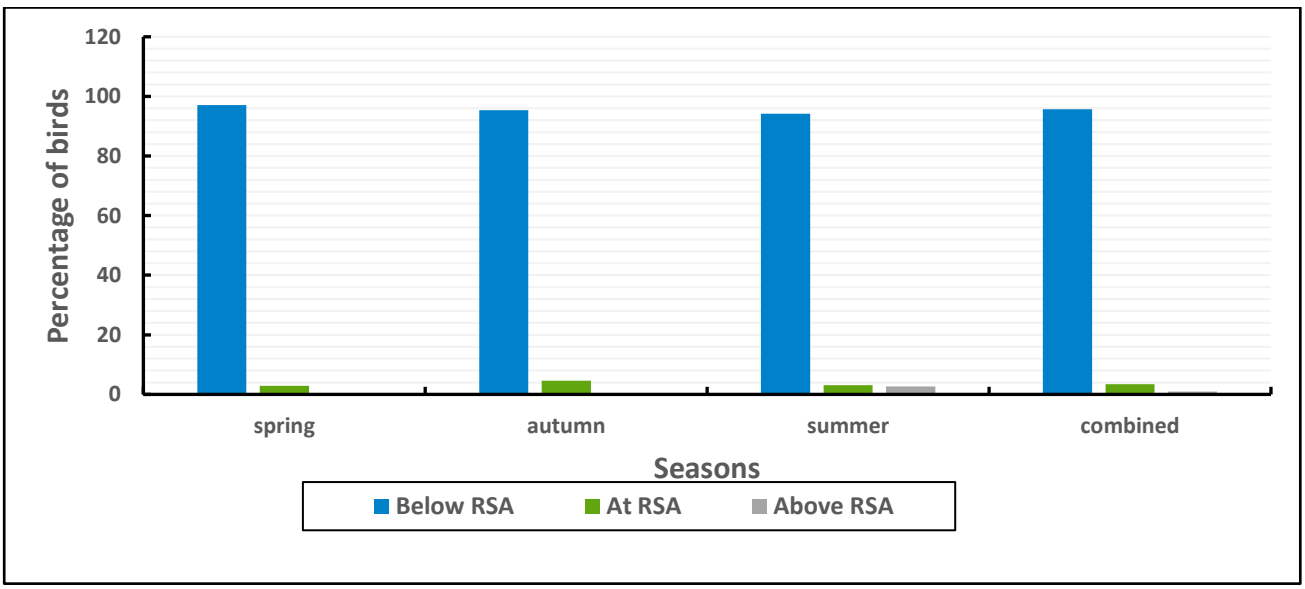
Most birds were recorded below RSA height at impact points with an overall percentage of 95.7, 3.4, and 0.9 below, at and above RSA heights, respectively. These flight heights are very comparable to height distribution of birds at many other wind farms in Australia (Nature Advisory data), Notably, the percentage of birds flying above RSA height was unusually high, comprising 27 individual observations of Wedge-tailed Eagles.

Flight heights at the reference sites was comparable to the impact points; however, the majority were recorded flying below RSA heights (98.5 below; 1.5 at, and 0 Above RSA heights, respectively).

Table 5: Summary of number of birds recorded at the three flight heights at WWF

Flight Height	Impact survey points		Reference survey points	
	Number of birds	Percentage of all birds	Number of birds	Percentage of all birds
A (below RSA)	2533	96.3	867	98.7
B (at RSA)	98	3.7	11	1.3
C (above RSA)	0	0	0	0
Total birds recorded	**2631**		**878**	

Figure 3: The number of birds recorded at three heights (data from table 5) at WWF



A combined three seasons summary of the most abundant species flying at RSA is provided below in Table 6. These accounted for 3.5% of the total birds observed at impact survey points. The Wedge-tailed Eagle was by far the most observed bird flying at RSA height, making up 72.8% of the five most important birds at RSA heights and 62.4% of all observed eagle flights (Table 6). In addition, a considerable number was also observed flying above RSA heights.

Table 6: The five most abundant species flying at RSA height at WWF

The five most dominant species at RSA heights	Number of birds at				% at RSA	% Of imp. sps.	% all birds
	A	B	C	Total			
Wedge-tailed Eagle	23	83	27	133	62.4	72.8	3.7
Australian Raven	10	11	0	21	52.4	9.6	0.6
Nankeen Kestrel	18	10	0	28	35.7	8.8	0.8
Sulphur-crested Cockatoo	36	5	0	41	12.2	4.4	1.1
Brown Falcon	6	5	0	11	45.5	4.4	0.3
Total of five important species	**93**	**114**	**27**	**234**	**48.7**	**100.0**	**6.5**
Total all birds at impact points	**3456**	**126**	**27**	**3609**	**3.5**		**100.0**

RSA heights: Below (,40m), at (40-150m); Above (.150 m).

2.2.4. Raptors

Seven raptor species were recorded during the season surveys at impact points, comprising 179 individual observations (Table 7). Of all raptors counted, 57% of observations were recorded at RSA height. The presence of these raptors varied between the seasons and were recorded in relatively low numbers except the Wedge-tailed Eagle (The raw data are presented in Appendices 1 -3). Two raptors were recorded at the reference sites, namely Wedge-tailed Eagle and Nankeen Kestrel. Both were recorded from 12 observations comprising 1.1% of all birds at the reference sites (Table 4).

Wedge-tailed eagle was the most abundant raptor species at WWF impact sites during the three seasons of BUS. It was seen regularly throughout the study area across all seasons. Numbers observed were particularly high during autumn (64 observations), less in spring (41) and fewer in summer (28) (Table 3). Of the total number of eagles seen (133), 62.4% were observed flying at RSA heights. Similarly, they formed 74.3% of all raptors. And 3.7% of all birds observed during the three seasons of BUS.

Nankeen Kestrel and Brown Falcon were next in abundance but in much lower numbers than the Wedge-tailed Eagle. The remaining four raptors were seen occasionally in very low numbers (Table7).

Raptors are at risk of collision with operating turbines. Based on experience at other wind farms, carcasses of Wedge-tailed Eagles, Nankeen kestrels and Brown Falcons are found consistently under wind turbines (Nature Advisory data).

At the WWF, the number of Wedge-tailed Eagles was noticeably higher compared with other wind farms with similar settings (Nature Advisory data). The utilisation rate of eagles was estimated as 0.66 eagles per hectare per hour, a value higher than the range of observed values (0.01 – 0.44) calculated from ten other wind farms (Nature Advisory data).

No raptor nesting activities within the wind farm was confirmed in the surveys, however Wedge-tailed Eagles were observed performing courtship behaviour, as well as one individual carrying a stick, a behaviour associated with nest building.

2.2.5. Waterbirds

During this survey, six waterbird species were recorded at impact points, comprising a total of 100 observations. The most common waterbird species was the Australian Wood Duck with a total of 69 observations recorded (Table 7). The Australian Wood Duck is a very common farmland waterbird which commonly roosts along the edges of farm dams and forages in open paddocks next to farm dams.

The Straw-necked Ibis is another waterbird species which can regularly be seen flying and foraging in flocks. Like the Australian Wood Duck, it is also regularly seen near farm dams and adjacent pasture. The other four waterbirds were less abundant and were recorded on fewer occasions (Table 7). Only one observation of a waterbird was made at RSA height on one impact points during the three seasonal BUS.

The risk of waterbirds colliding with turbines is considered low.

Table 7: Raptor and waterbird species recorded at impact points during spring, autumn and summer BUS at WWF

Species	Number raptors/waterbirds at				% at RSA	% Of Rap. / waterbirds	% Of all birds
	A	B	C	Tot.			
Wedge-tailed Eagle	23	83	27	133	62.4	74.3	3.7
Nankeen Kestrel	18	10	0	28	35.7	15.6	0.8
Brown Falcon	6	5	0	11	45.5	6.1	0.3
Black-shouldered Kite	1	1	0	2	50.0	1.1	0.1
Brown Goshawk	2	0	0	2	0.0	1.1	0.1
Peregrine Falcon	0	2	0	2	100.0	1.1	0.1
Whistling Kite	0	1	0	1	100.0	0.6	0.0
Total raptors	**50**	**102**	**27**	**179**	**57.0**	**100.0**	**5.0**
Waterbirds							
Australian Wood Duck	69	0	0	69	0.0	69.0	1.9
Straw-necked Ibis	14	0	0	14	0.0	14.0	0.4
Masked Lapwing	13	0	0	13	0.0	13.0	0.4
Australian Ibis	2	0	0	2	0.0	2.0	0.1
Australasian Darter	0	1	0	1	100.0	1.0	0.0
Pacific Black Duck	1	0	0	1	0.0	1.0	0.0
Total waterbirds	**99**	**1**	**0**	**100**	**1.0**	**100.0**	
Total all impact birds	**3456**	**126**	**27**	**3609**			**100.0**

2.2.6. Threatened Species

The majority birds found to utilise the proposed wind farm site were common farmland and woodland bird species. Of all species recorded during the formal bird utilisation surveys, six species were listed as threatened under the NSW *Biodiversity Conservation Act 2016* (BC Act) (Figure 4). These species are considered below. An additional species, the Little Eagle was recorded incidentally.

Diamond Firetail (*Stagonopleura guttata*): Recorded from nine observation during summer BUS. These birds are usually found in small flocks inhabiting grassy undercover underneath open forests or woodlands, and feed exclusively on the ground. Do not fly at RSA height.

Little Lorikeet (*Glossopsitta pusilla*): Recorded from a single observation of one bird during the summer BUS. This species usually congregates in small flocks where they feed on nectar and pollen in the canopy of open eucalyptus forest and woodland. Usually fly at tree canopy height below the RSA height.

Speckled Warbler (*Chthonicola sagittate*): Recorded from four observation during autumn BUS. The species inhabits open eucalyptus woodland with rocky gullies, ridges and tussocky grass. Forage on ground often with other small birds. Do not fly at RSA height.

Varied Sitella (*Daphoenositta chrysoptera*): Recorded from 43 observations during BUS divided almost equal over the three seasons of the survey. Small birds of upper branches often unnoticed with incessant twittering. Forage downward on branches and tree trunks. Do not fly at RSA height.

The above four species are strictly small bush birds and rarely venture outside cover, therefore not exposed to collision with operating turbines.

Dusky Woodswallow (*Artamus cyanopterus cyanopterus*): Recorded on six occasions at BUS point 3 during the summer BUS, likely a summer migrant to the region. Frome three to five birds recorded together. Usually occurring in dry open forest and woodland but can occur in a variety of habitats. This species has a preference of flying from ground level to canopy heights, though is known to fly at RSA heights on some occasions.

Glossy Black-Cockatoo (*Calyptorhynchus lathami*): Recorded from a single observation of a pair of birds during autumn BUS near the Oxley Wild Rivers National Park. The bird occurs at low densities in the New England Region and rarely found away from Allocasuarina or Casuarina (she-oak) trees, which provide their primary food source (Crowley, G. M. & Garnett, S.T. (2001).

Little Eagle (*Hieraaetus morphnoides*): Recorded in the region outside the wind farm and not during formal bird utilisation surveys counts. The Little Eagle is a vulnerable under the BC Act, found across the New England Tablelands, and is at risk of colliding with operating turbines, as they routinely fly at RSA heights. The species may be displaced by the presence of Wedge-tailed Eagle and is unlikely to have occurred at any of the BUS locations due to high Wedge-tailed Eagle densities. The bird was located on Moona Plains Rd, near the intersection of the Emu Creek Road approximately five kilometres from the nearest proposed turbine location. There are historic records of this species breeding at Eastlake a large dam along Jacks Creek, as recently as 2017 (Larkin *et al.,* 2020), a property bordering the proposed wind farm site to the north. This nesting site was recently been overtaken by a pair of White-bellied Sea-Eagle which now nest here each year (Larkin pers.comm)

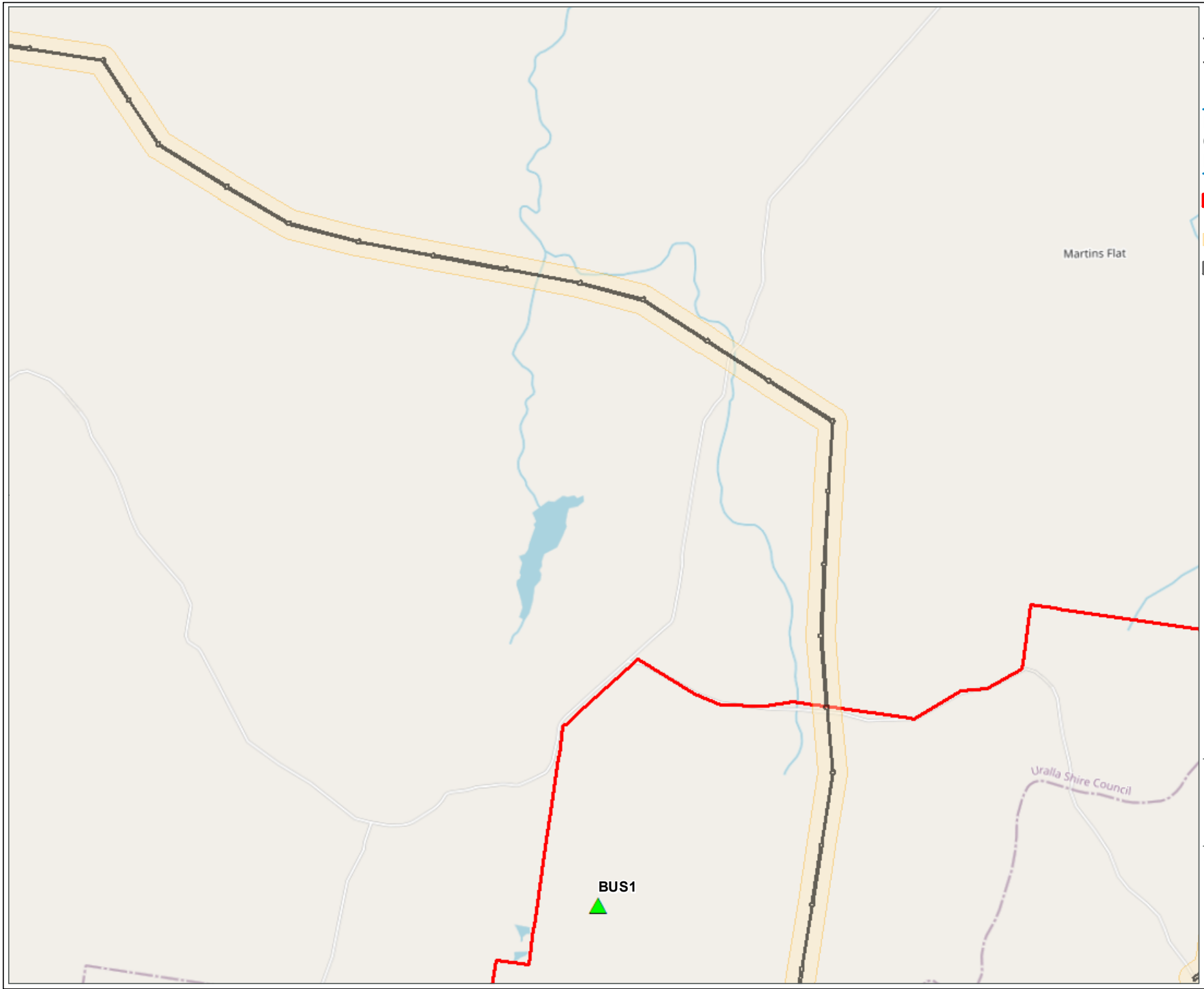
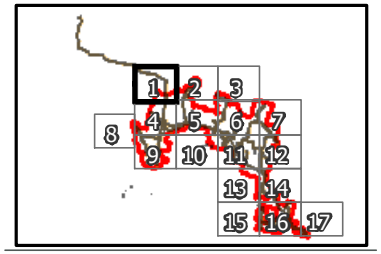


Figure 4-1: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points



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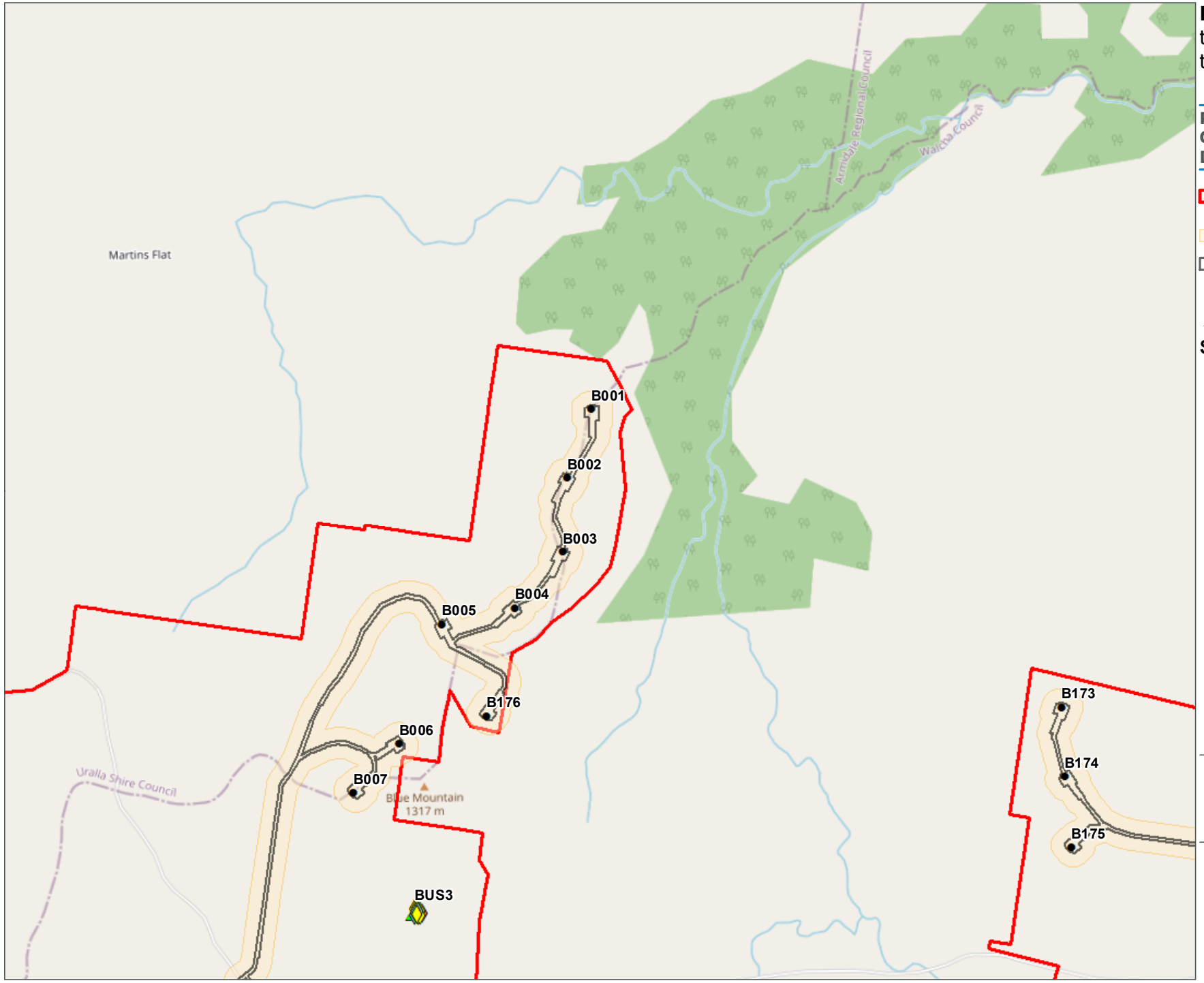


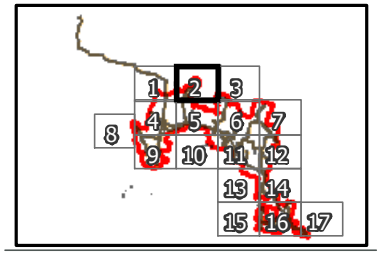
Figure 4-2: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Diamond Firetail
- Dusky Woodswallow
- Speckled Warbler
- Varied Sitella



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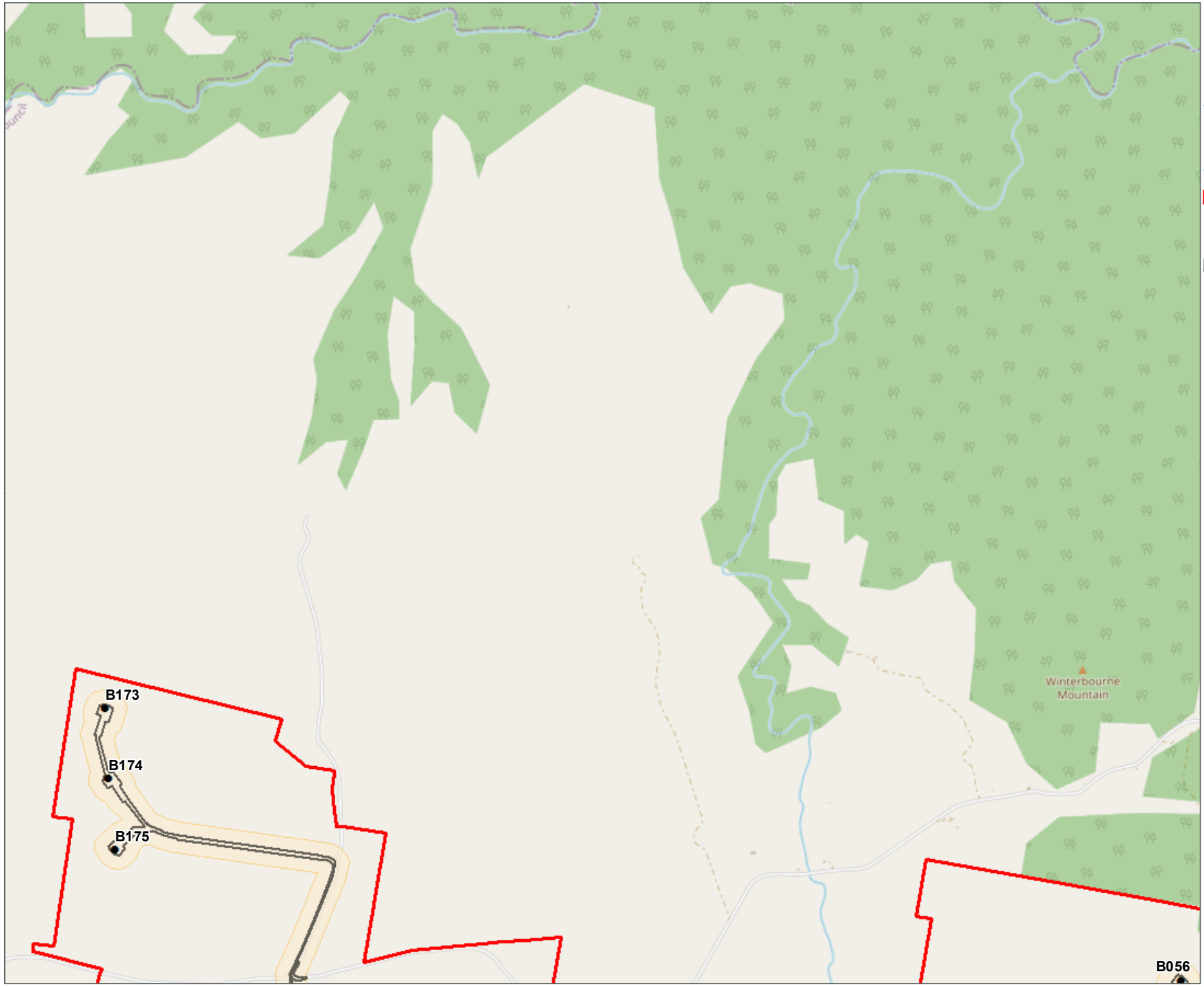
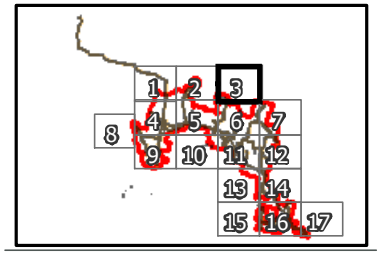


Figure 4-3: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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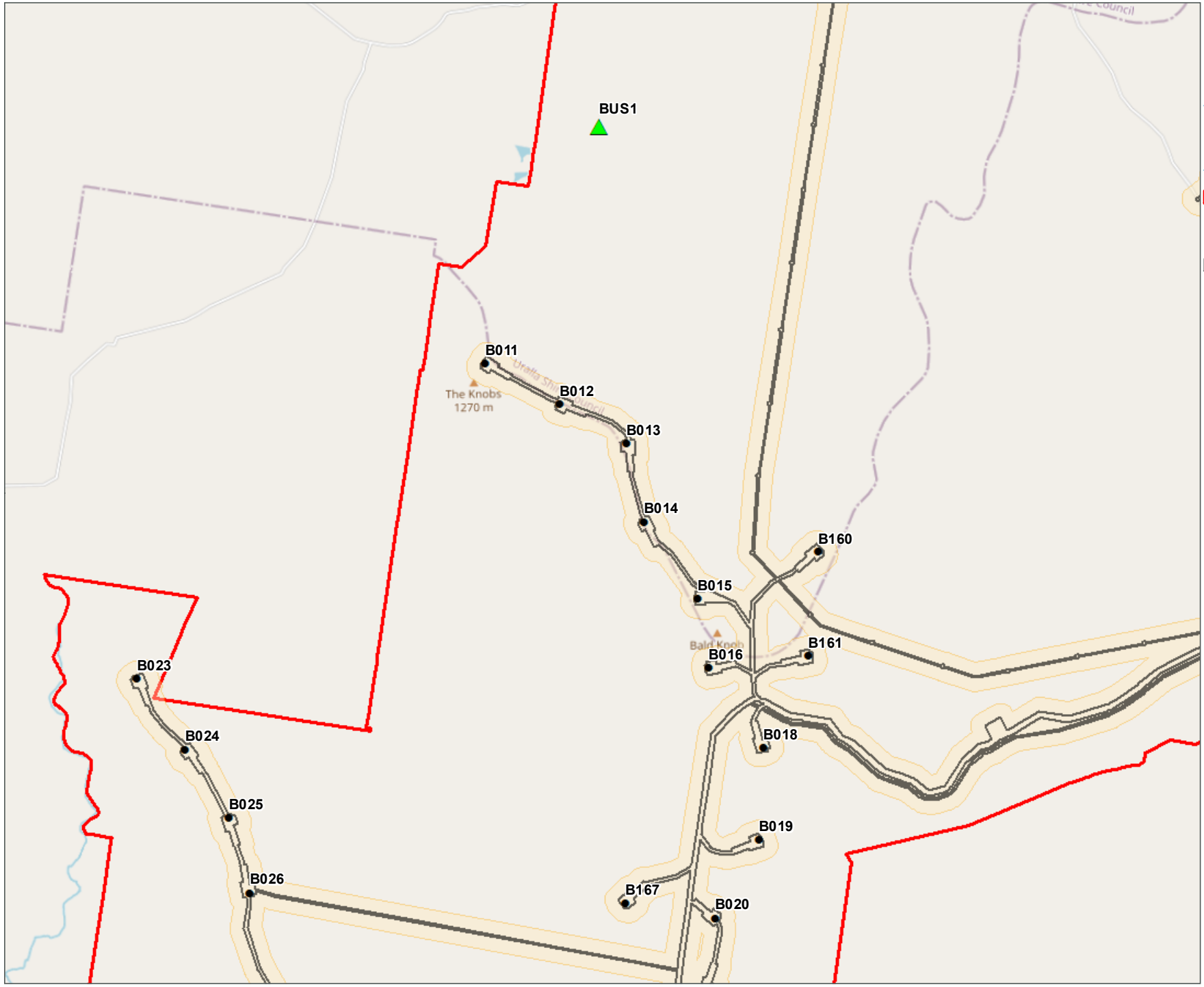

Figure 4-4: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

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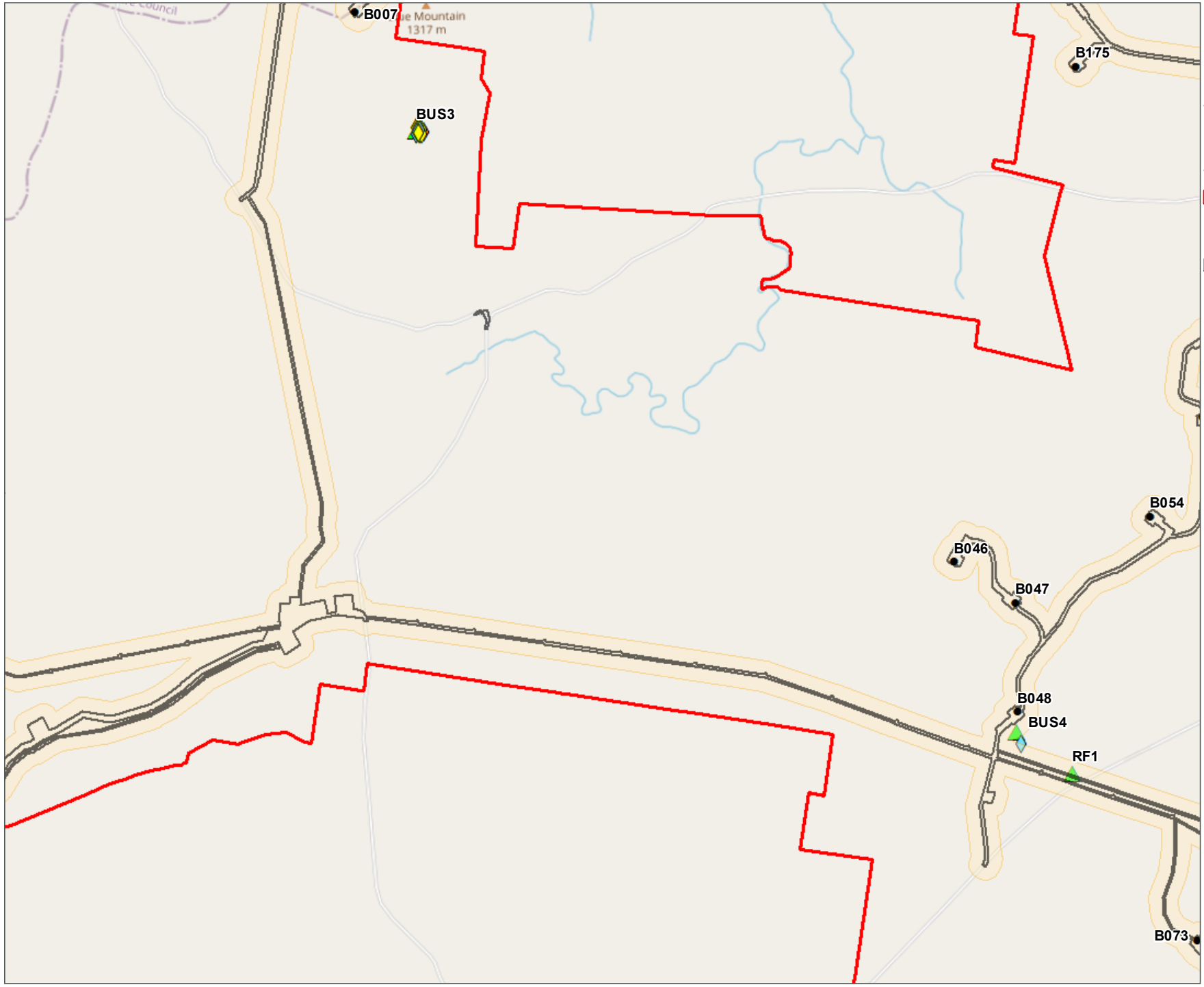


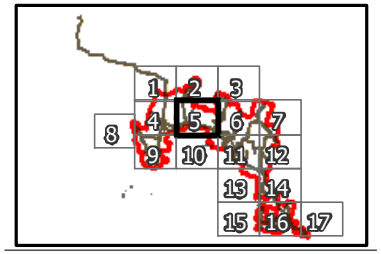
Figure 4-5: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Diamond Firetail
- Dusky Woodswallow
- Speckled Warbler
- Varied Sitella



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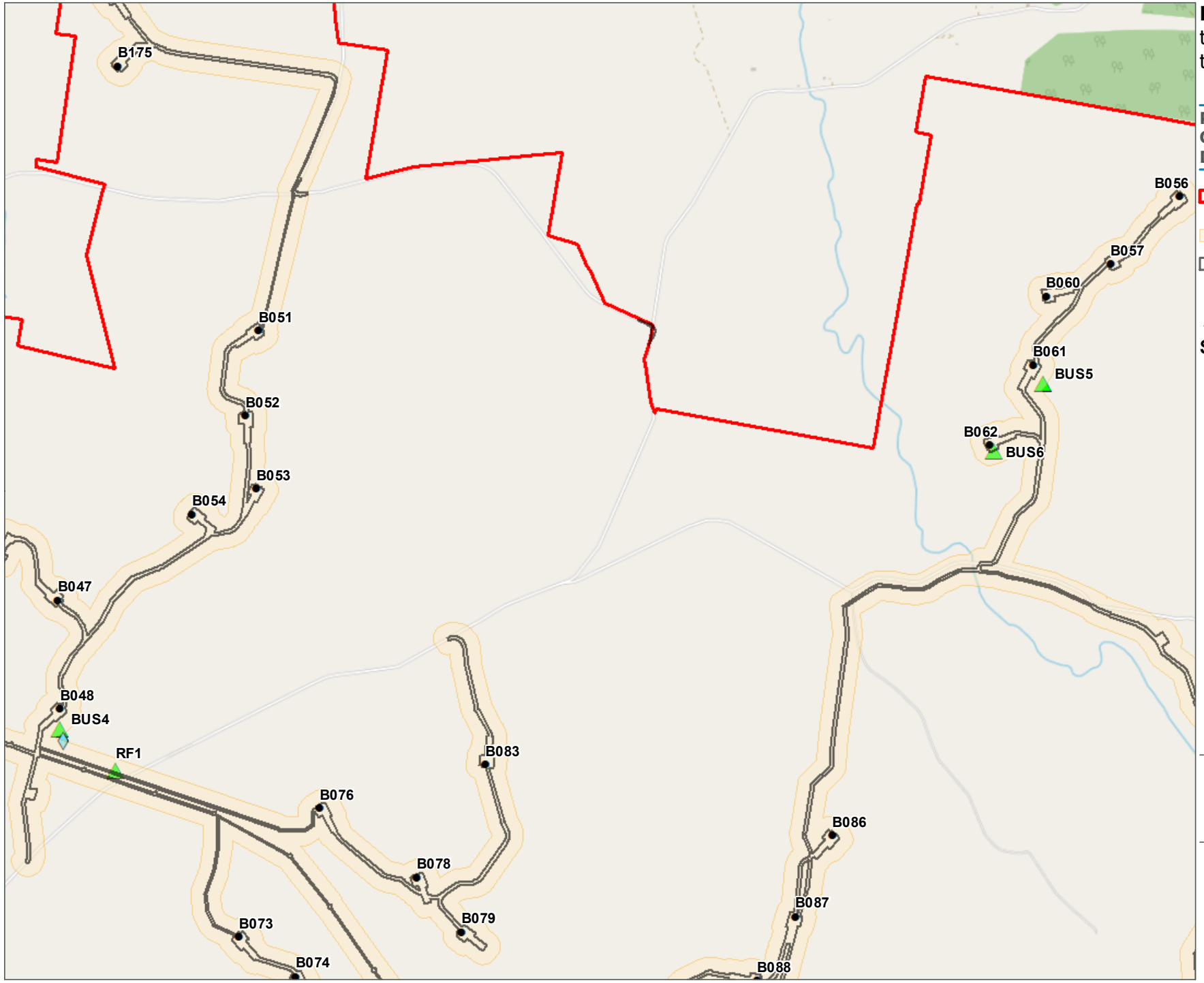


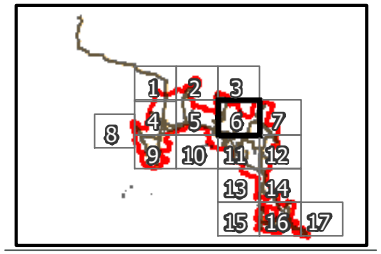
Figure 4-6: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Diamond Firetail



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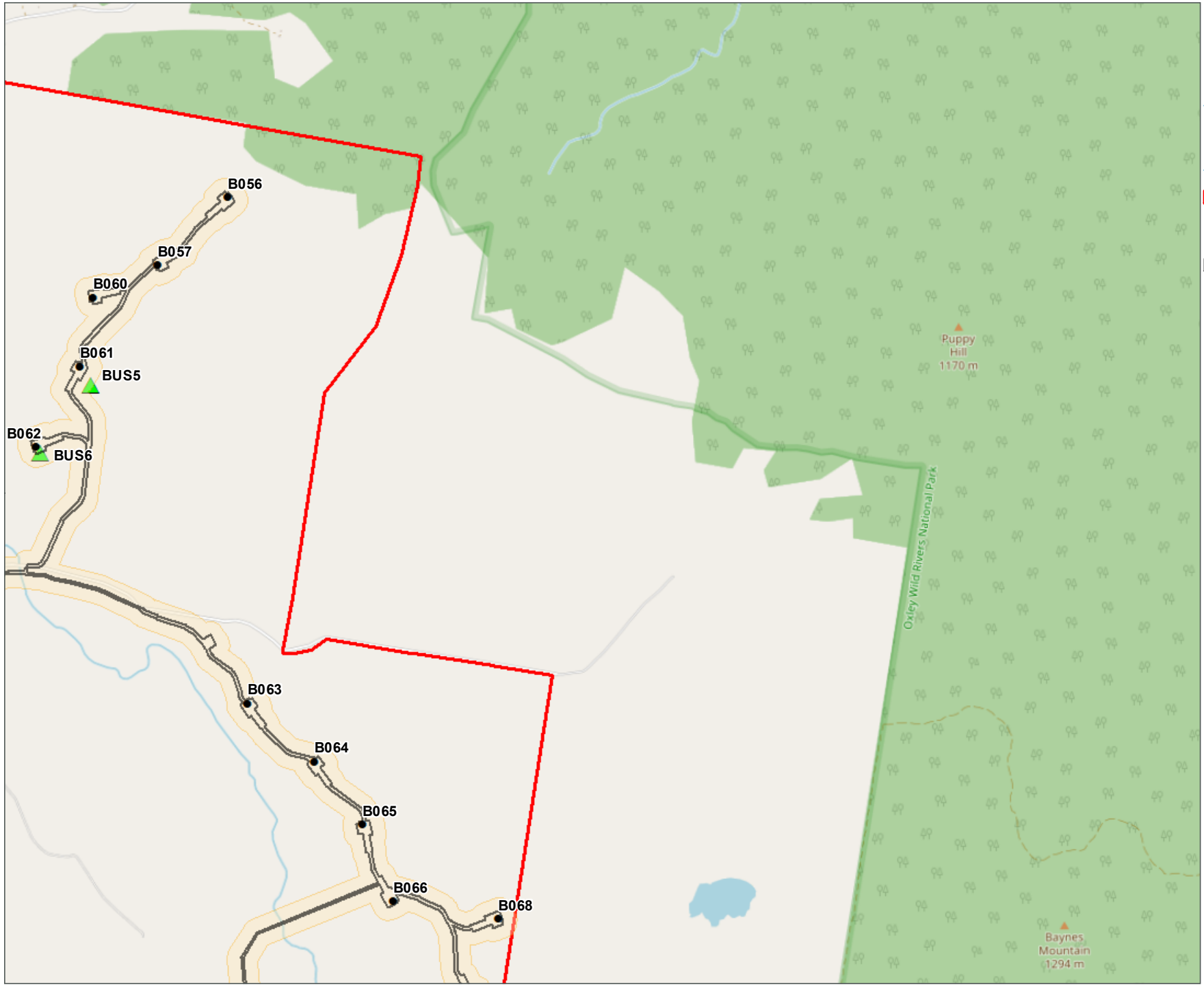
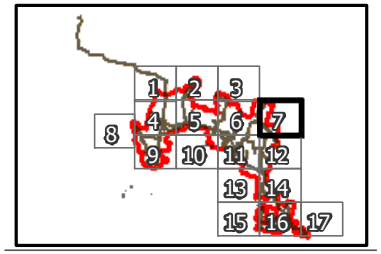


Figure 4-7: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points



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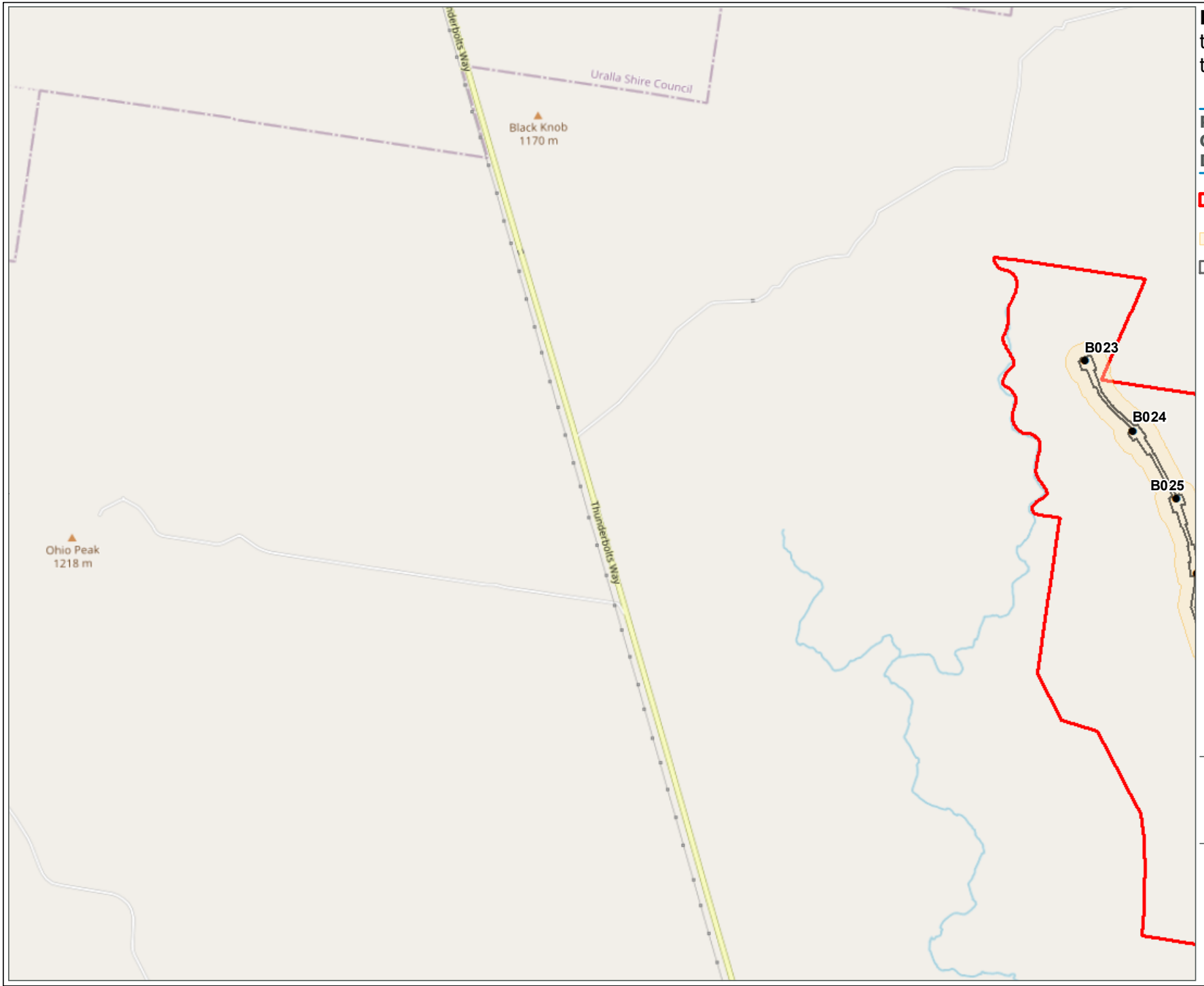

Figure 4-8: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

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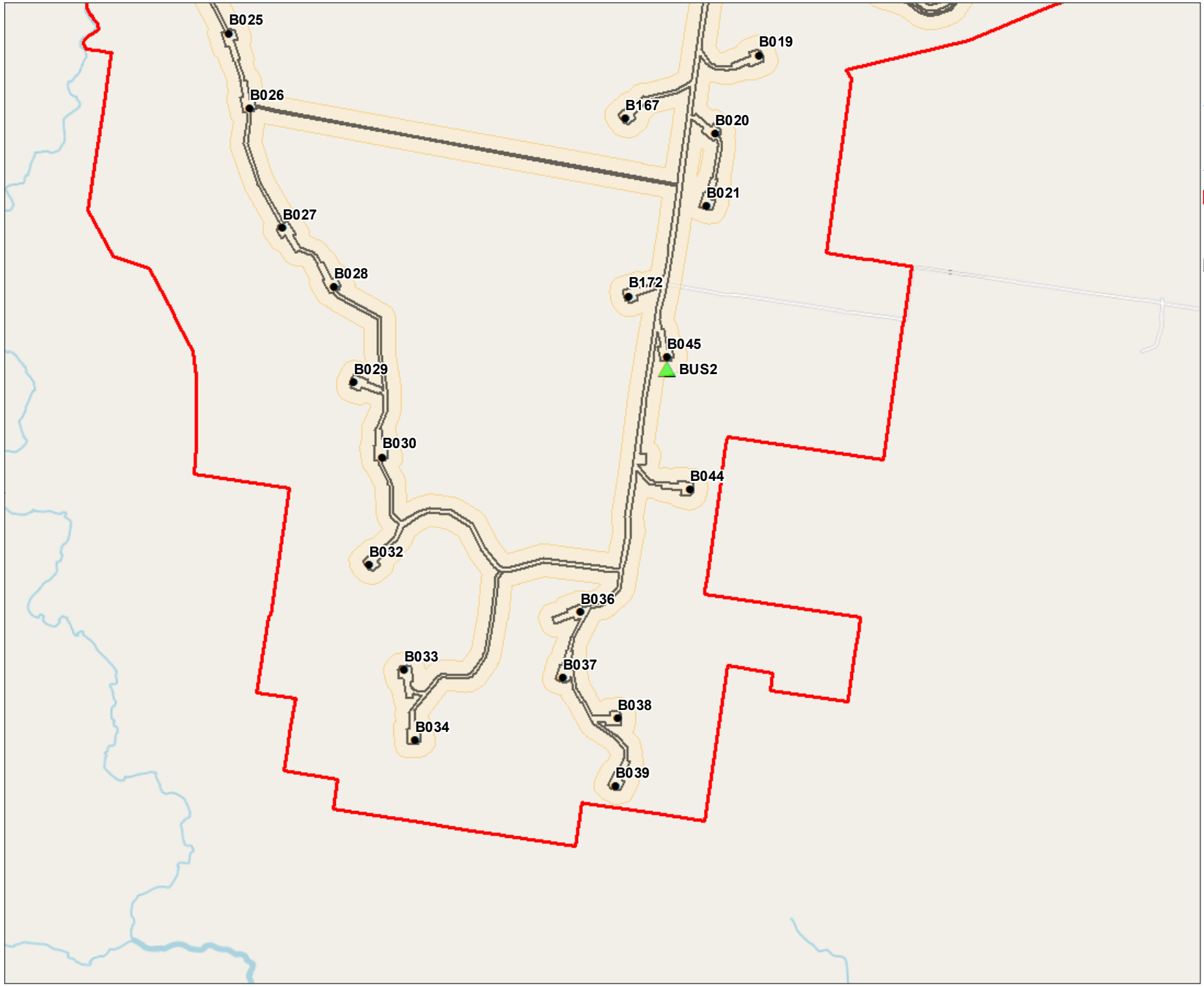
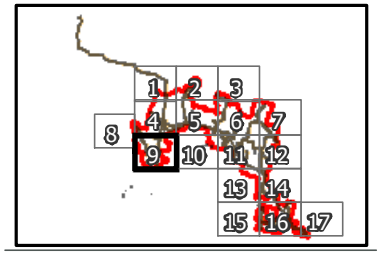


Figure 4-9: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points



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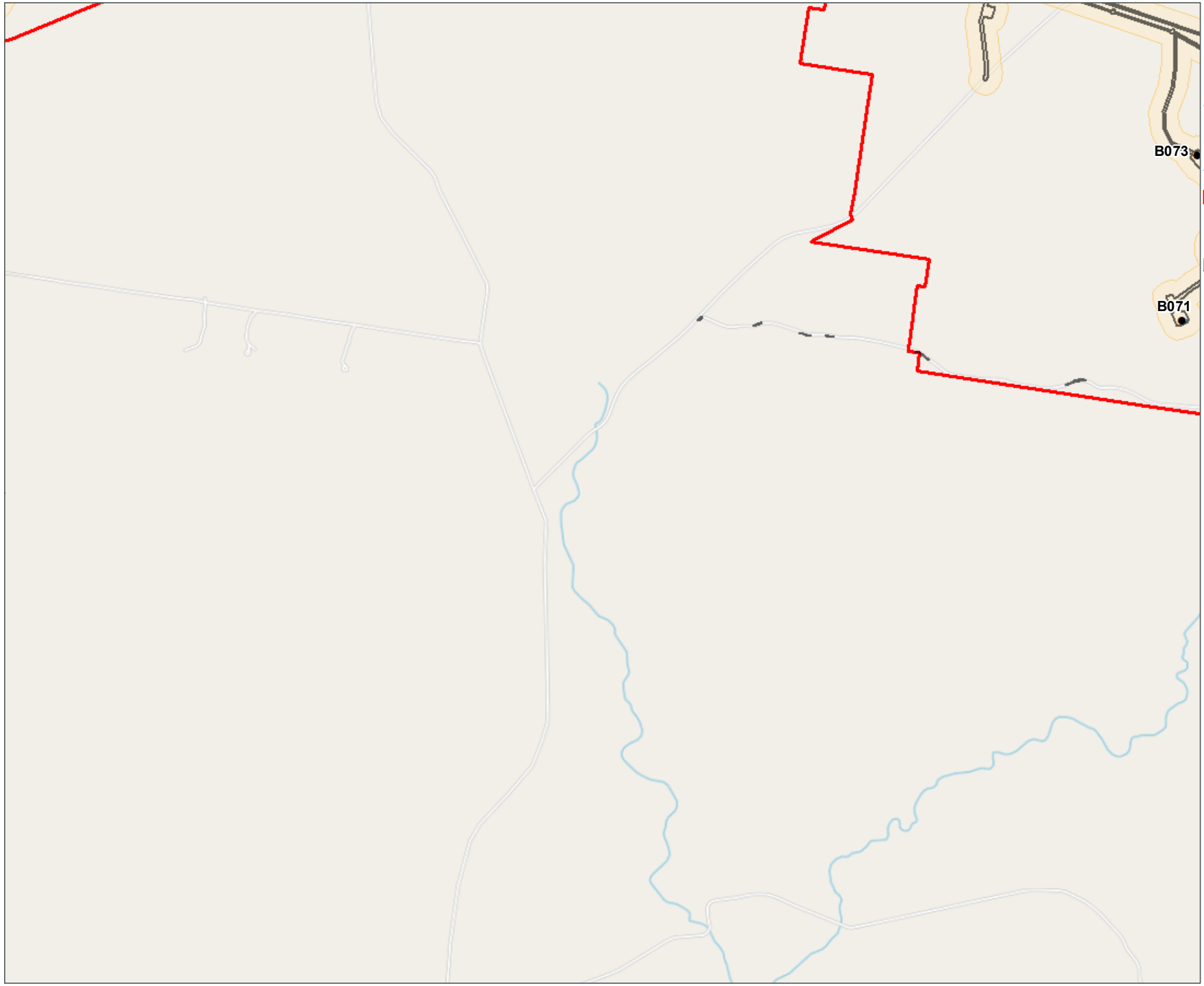
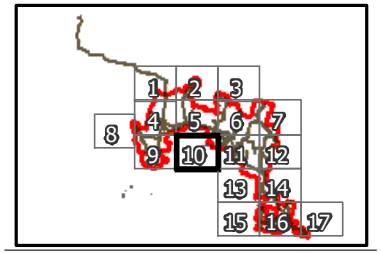


Figure 4-10: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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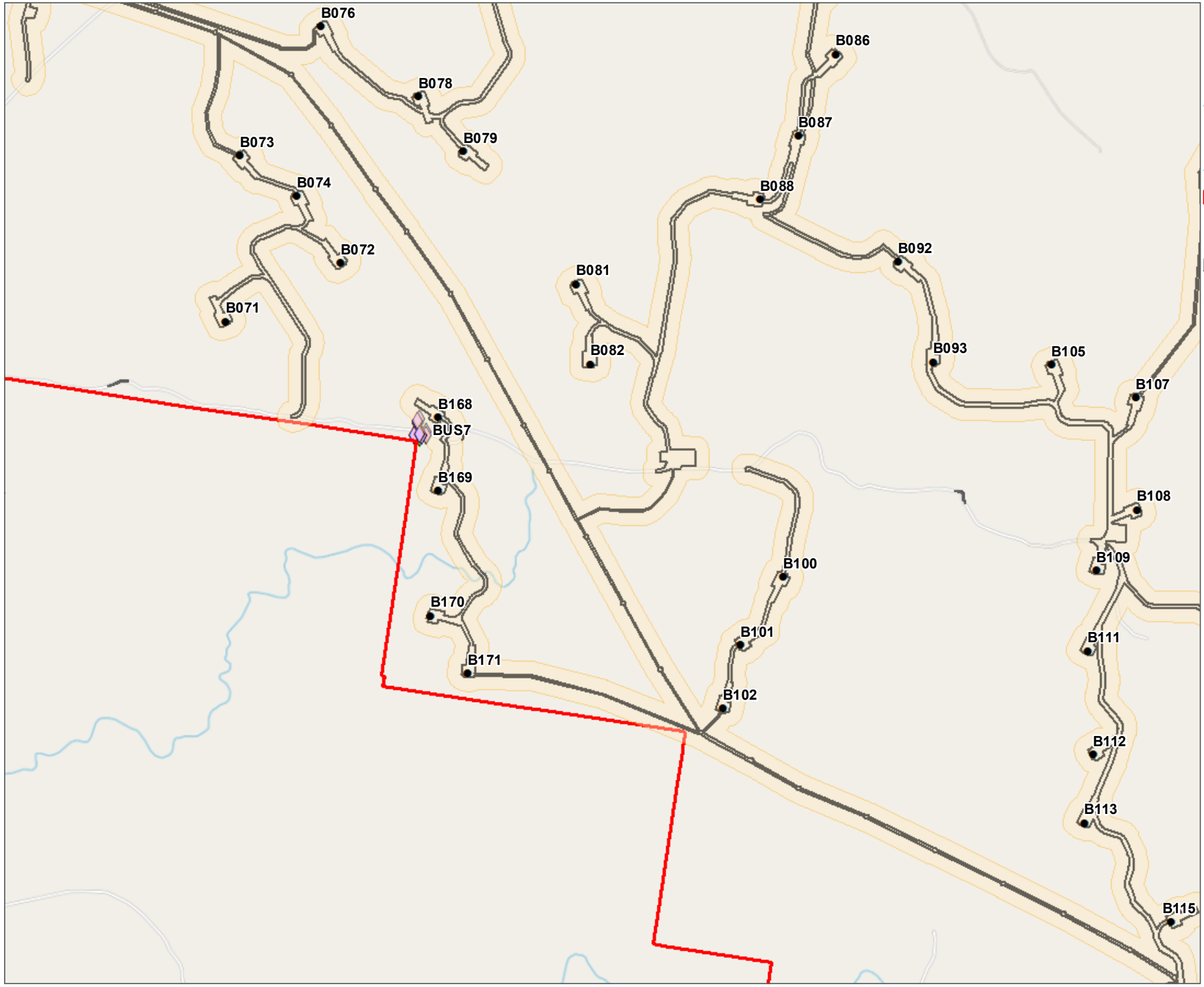


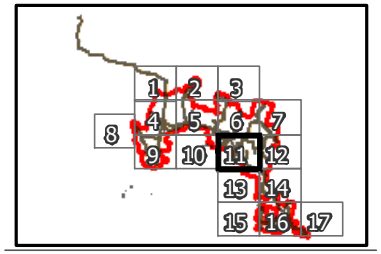
Figure 4-11: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Glossy Black Cockatoo
- Varied Sitella



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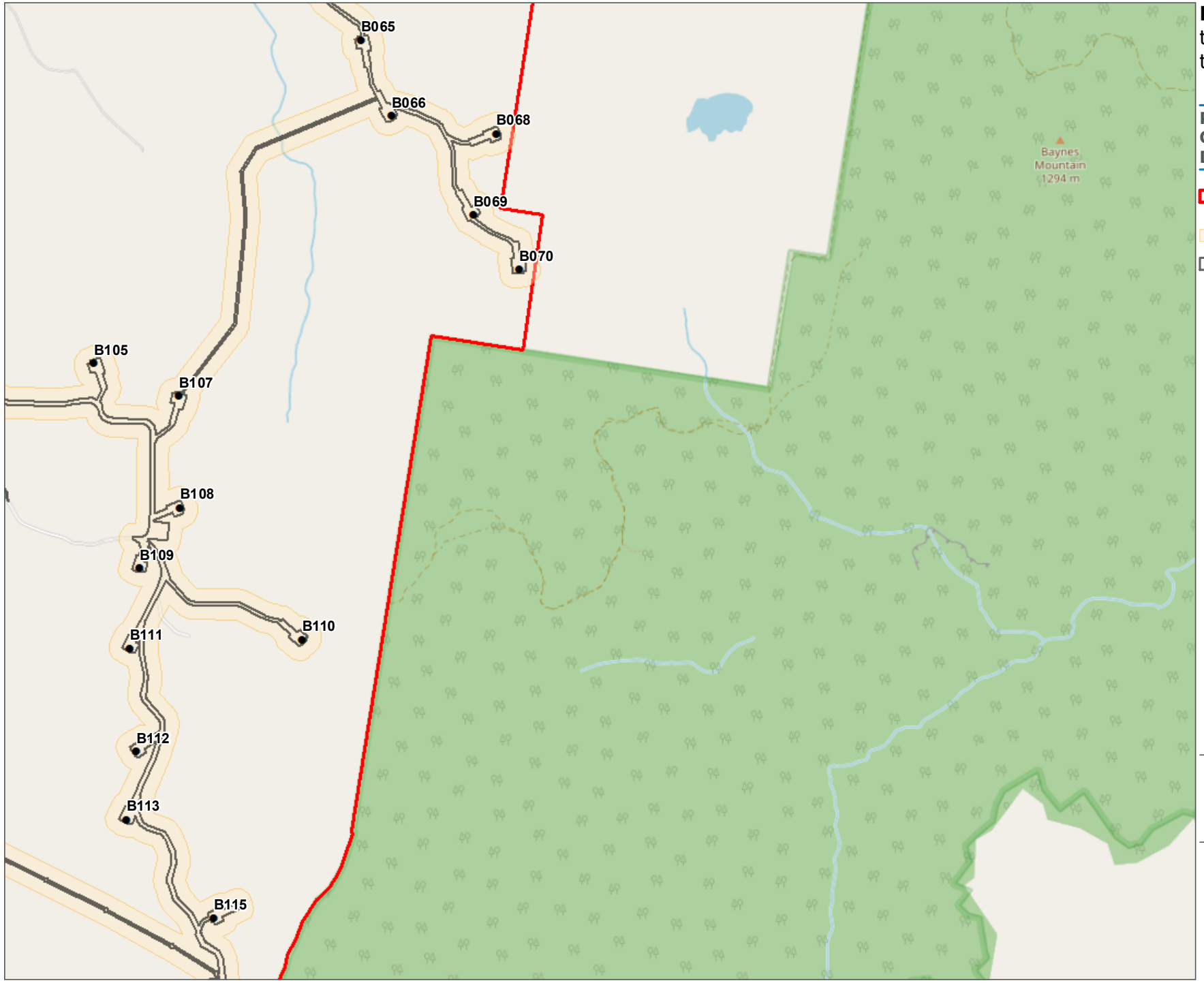
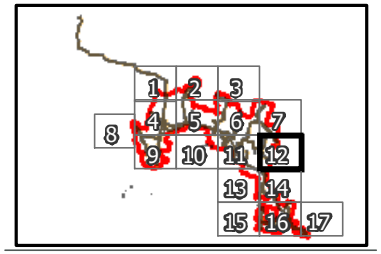


Figure 4-12: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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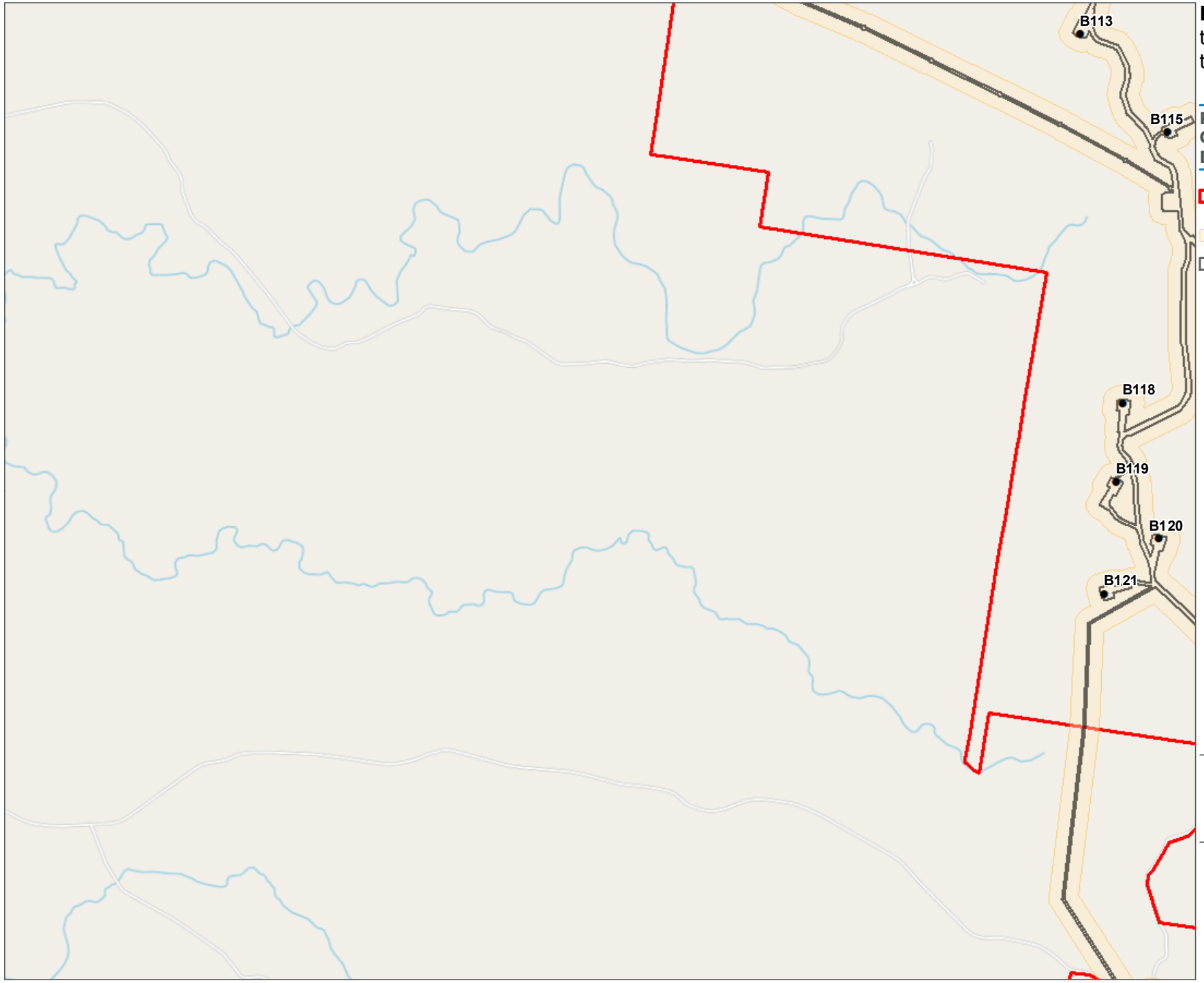
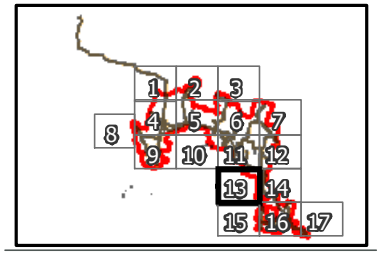


Figure 4-13: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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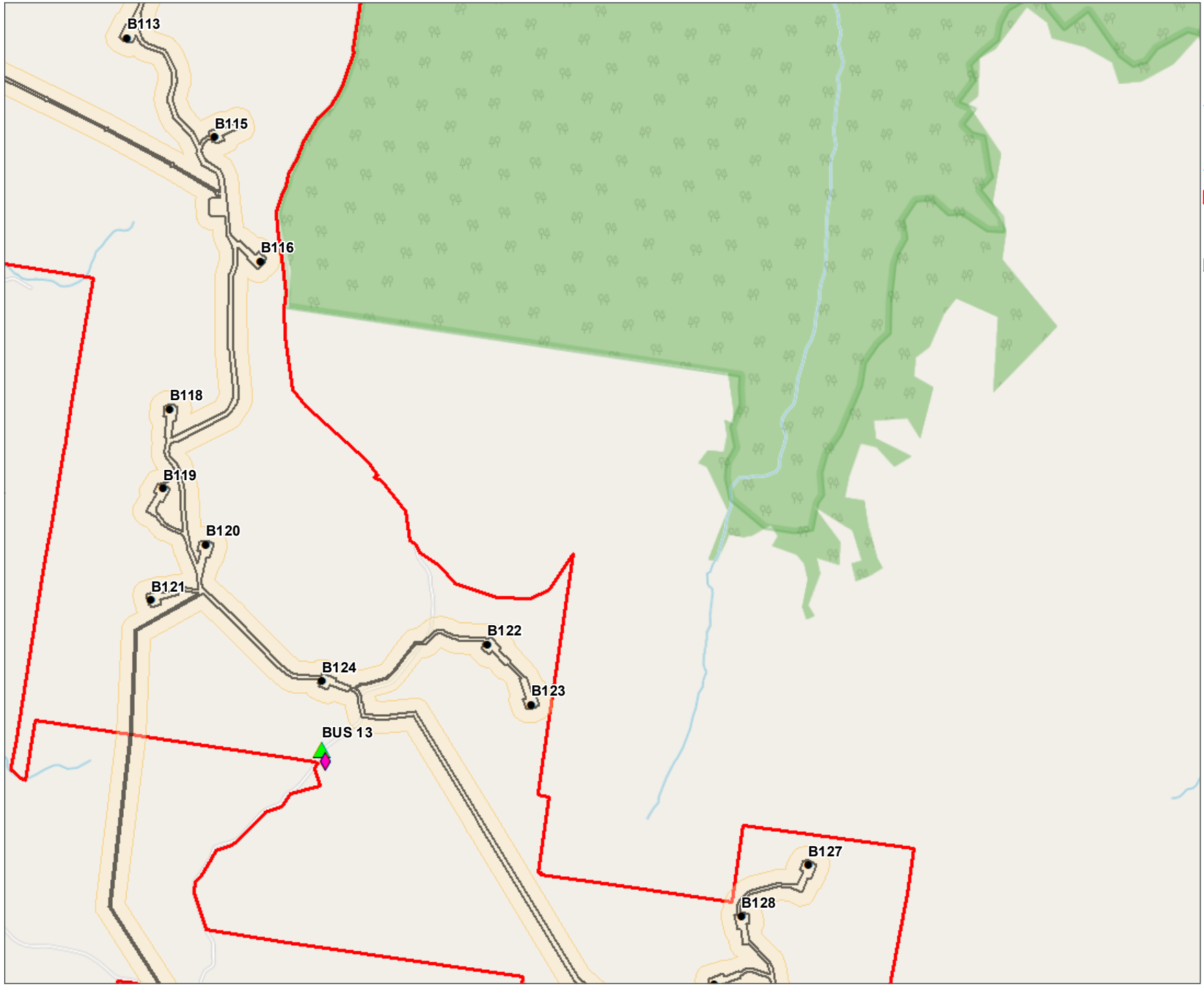


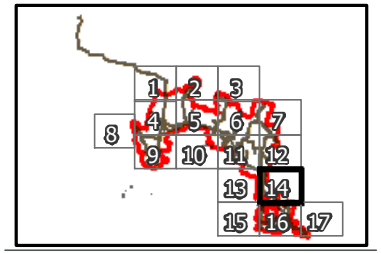
Figure 4-14: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Little Lorikeet



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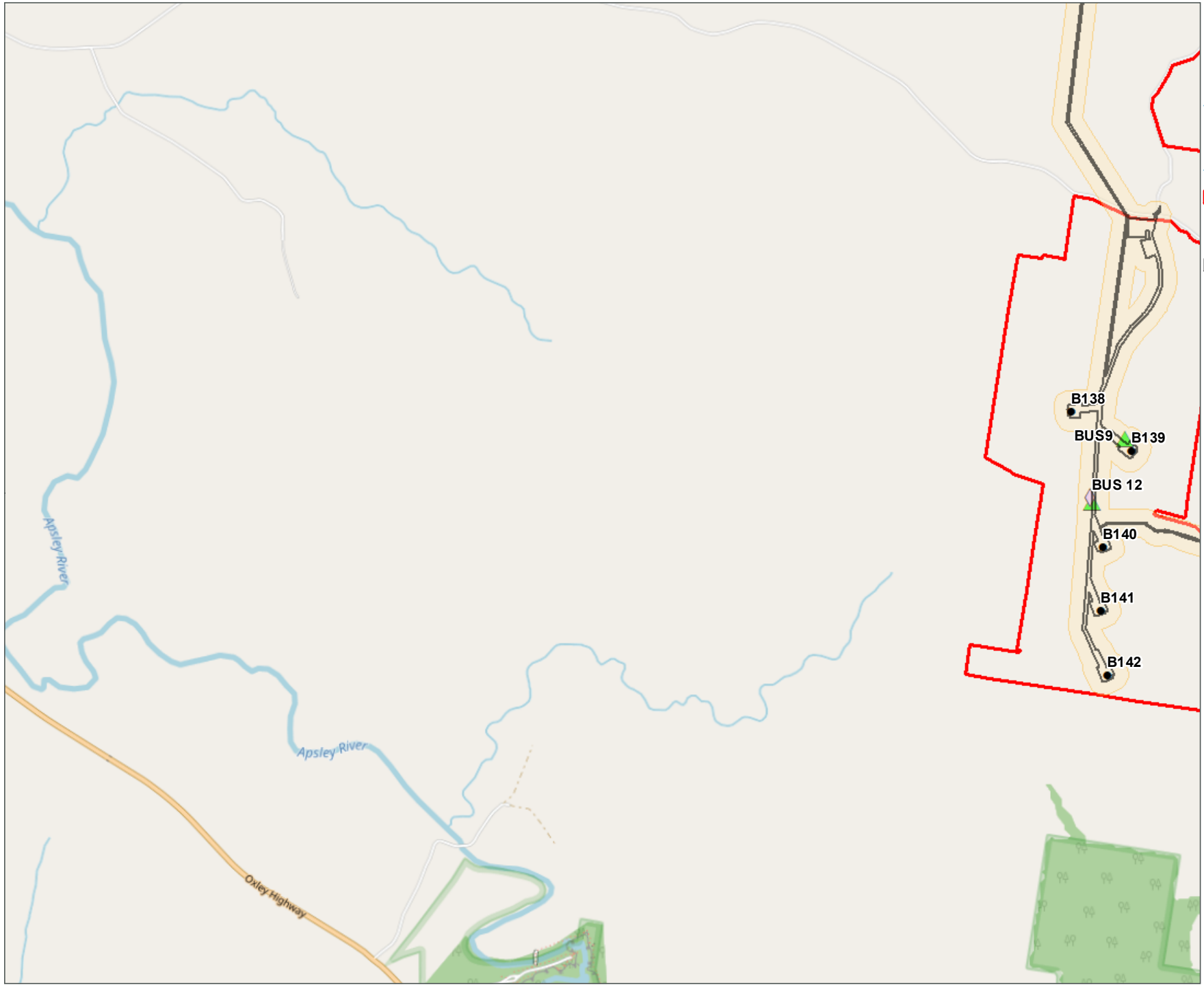

Figure 4-15: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

Winterbourne wind farm boundary
Development site
Development footprint
Turbines
BUS points

Species name

Varied Sitella

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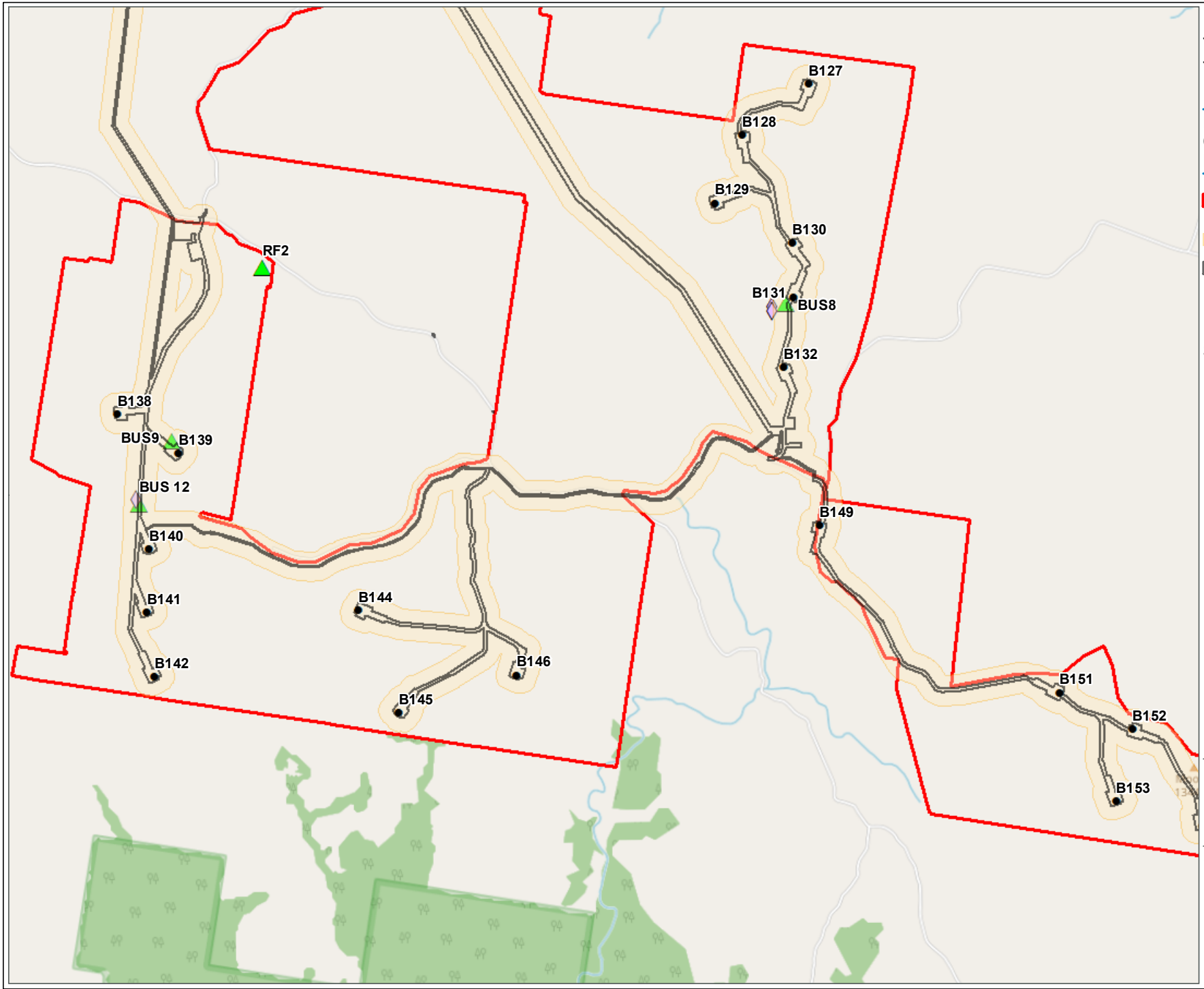


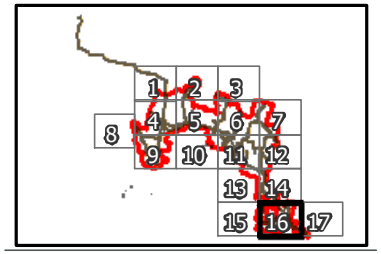
Figure 4-16: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

Species name

- Varied Sitella



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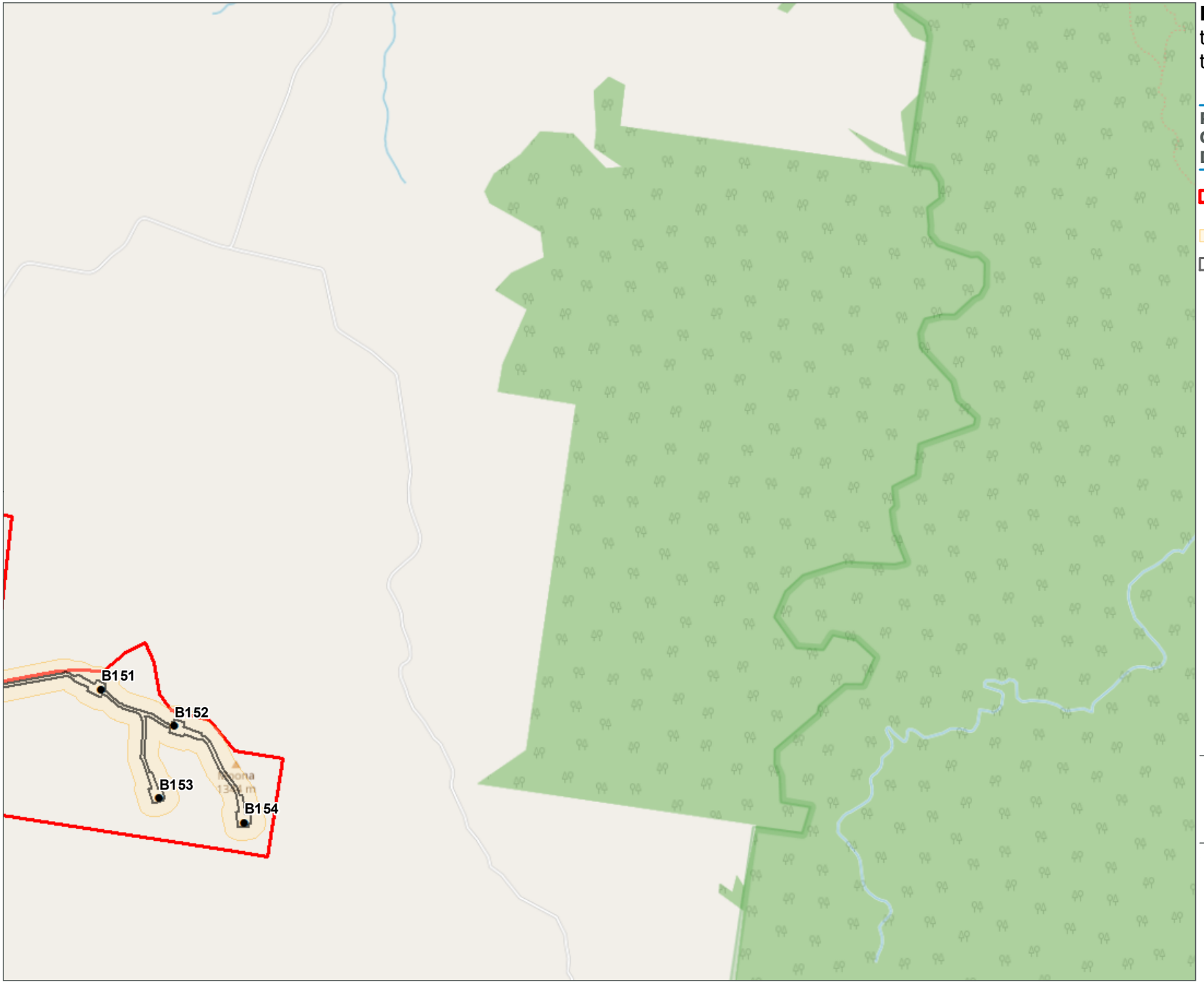

Figure 4-17: Locations of threatened birds recorded in the study area

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

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3. Raptor Survey

3.1. Methods

While undertaking the BUS, White-throated Needletail targeted surveys and traversing across the study area incidental observations of raptors were recorded. When a raptor was observed the following data was documented.

- Species name
- Count of birds
- Time first observed
- Time the bird/s flew out of sight or landed
- Distance and bearing from observer
- The location of the bird (either Air, perched or ground)
- Height of the bird when first observed
- The height range of the bird (minimum and maximum heights)
- Elevation of the fixed point
- The landscape the bird was observed in (either valley, slope or ridge)
- Flight direction (either toward, away, parallel to ridge or circling), and
- Flight behaviour (either soaring, gliding, hovering, flapping, display, resting, mobbing or foraging).

All raw data recorded is presented in Appendix 6. All flight paths were marked onto flight path maps (see Figures 5-1 to 5-12).

3.2. Results

In total, 98 observations were recorded from five raptor species at the proposed Winterbourne Wind Farm during the surveys. The species recorded included the following:

- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Wedge-tailed Eagle.

The Wedge-tailed Eagle was the most abundant and active raptor species at the proposed wind farm site and was recorded throughout. The species accounted for 67% of all raptors observed at the proposed wind farm site (Figures 5-1 to 5-12). The species accounted for 24% of all raptor observations. This species is frequently observed both below and at RSA heights

The Brown Falcon seen very occasionally with only 6 observations recorded consisting of 6% of all observations (Figures 5-1 to 5-12). Two observations were of single birds and two observations were of pairs. The Brown Falcon was observed flying below and at RSA heights.

Very few observations of Brown Goshawk with only three observations recorded consisting of 3% of the total flights plotted. Only single birds reported and all were recorded below RSA heights putting these birds at minimal risk of collision with turbines.

It was difficult to estimate exactly how many Wedge-tailed eagle were utilising the wind farm site. No nesting sites were observed though courtship behaviour and stick carrying was observed which would

indicate that there are resident pairs that are nesting nearby. As reported in the BUS the Wedge-tailed was most active during autumn and was observed flying at RSA height regularly. The Nankeen Kestrel was the second most abundant raptor species recorded at the proposed wind farm site The species accounted for 24% of all raptor observations. This species is frequently observed both below and at RSA heights

The Brown Falcon seen very occasionally with only 6 observations recorded consisting of 6% of all observations. Two observations were of single birds and two observations were of pairs. The Brown Falcon was observed flying below and at RSA heights.

Very few observations of Brown Goshawk with only three observations recorded consisting of 3% of the total flights plotted. Only single birds reported and all were recorded below RSA heights putting these birds at minimal risk of collision with turbines.

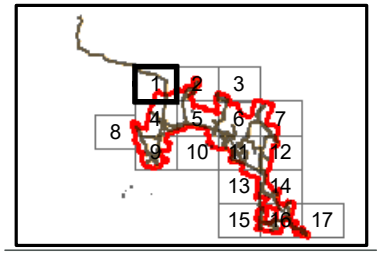
No listed species of raptors have been recorded utilising the proposed Winterbourne Wind Farm site. The Little Eagle, listed as vulnerable under the BC Act, has been reported in the surrounding region.



Figure 5-1: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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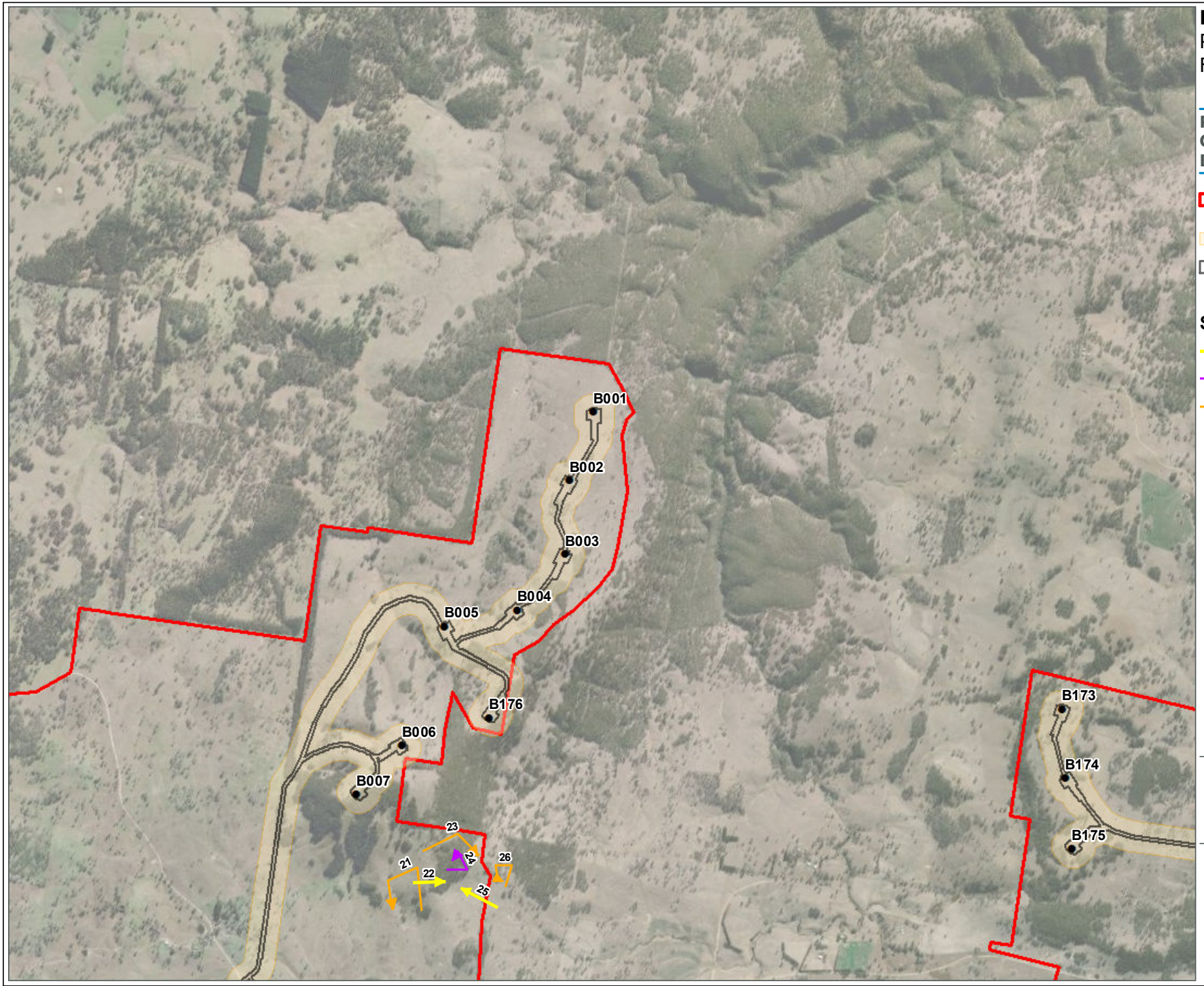

Figure 5-2: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Brown Falcon
- Nankeen Kestrel
- Wedge-tailed Eagle

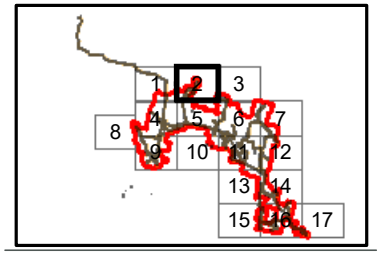

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Figure 5-3: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

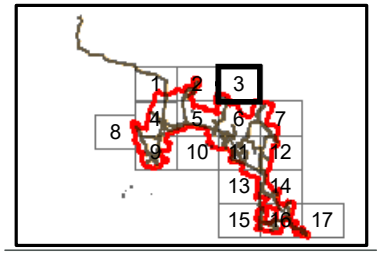

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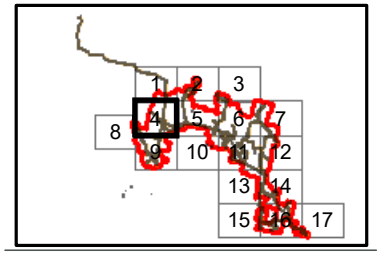
Figure 5-4: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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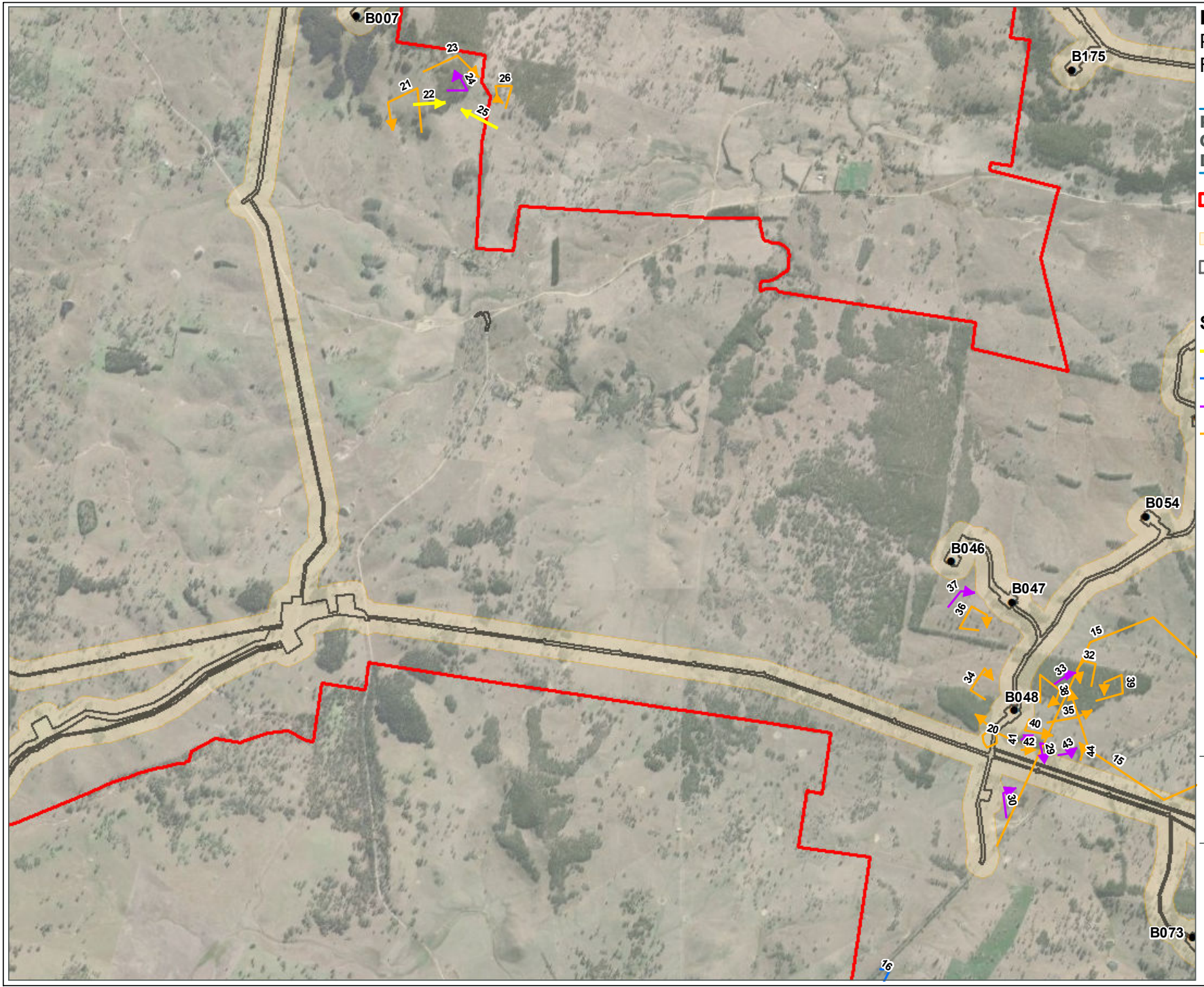

Figure 5-5: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Wedge-tailed Eagle

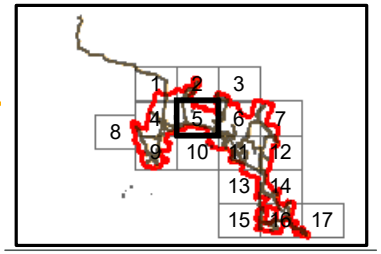

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Figure 5-6: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Brown Falcon
- Nankeen Kestrel
- Wedge-tailed Eagle

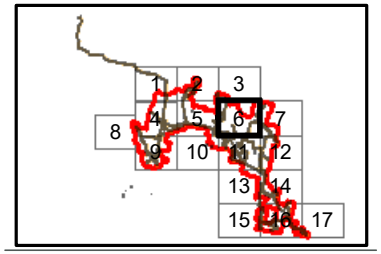

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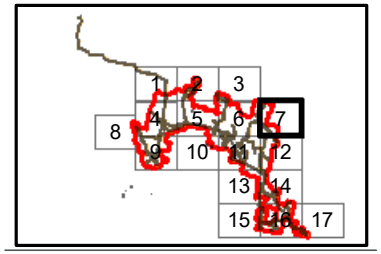
Figure 5-7: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Brown Falcon
- Wedge-tailed Eagle



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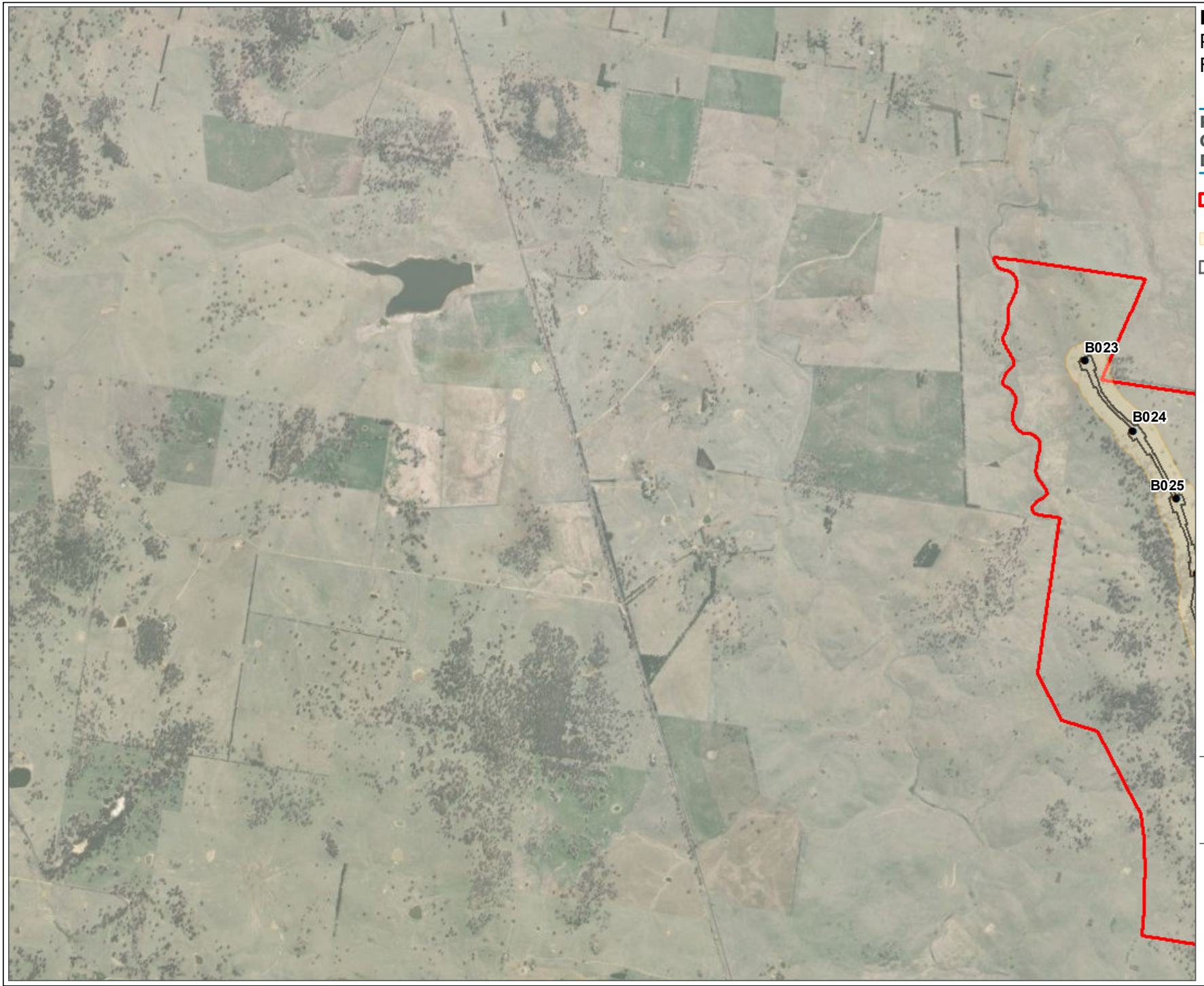
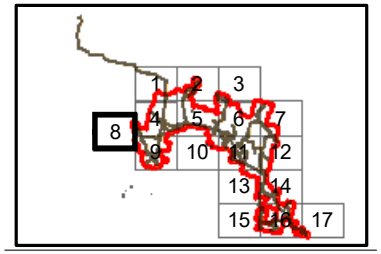


Figure 5-8: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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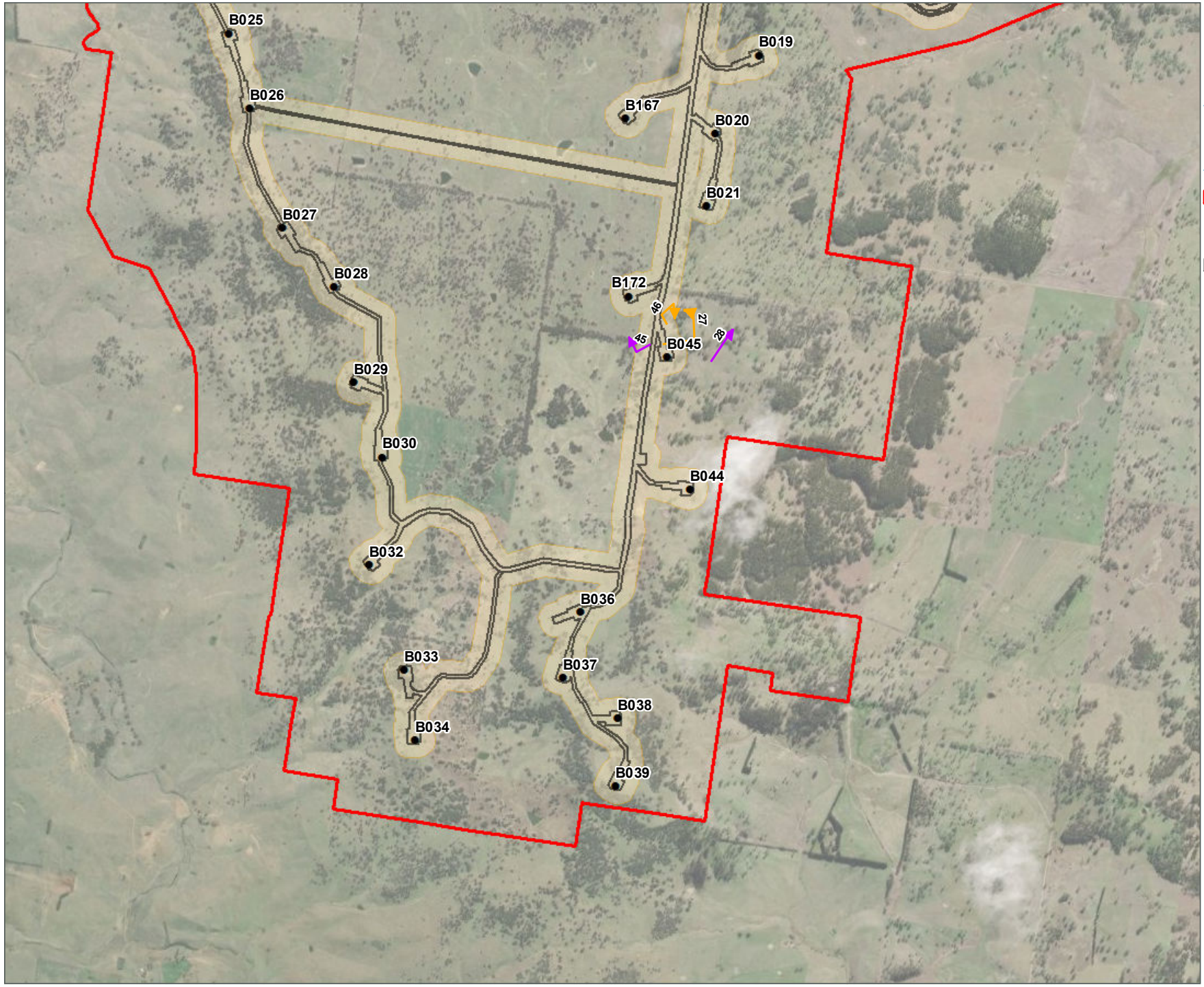

Figure 5-9: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Nankeen Kestrel
- Wedge-tailed Eagle

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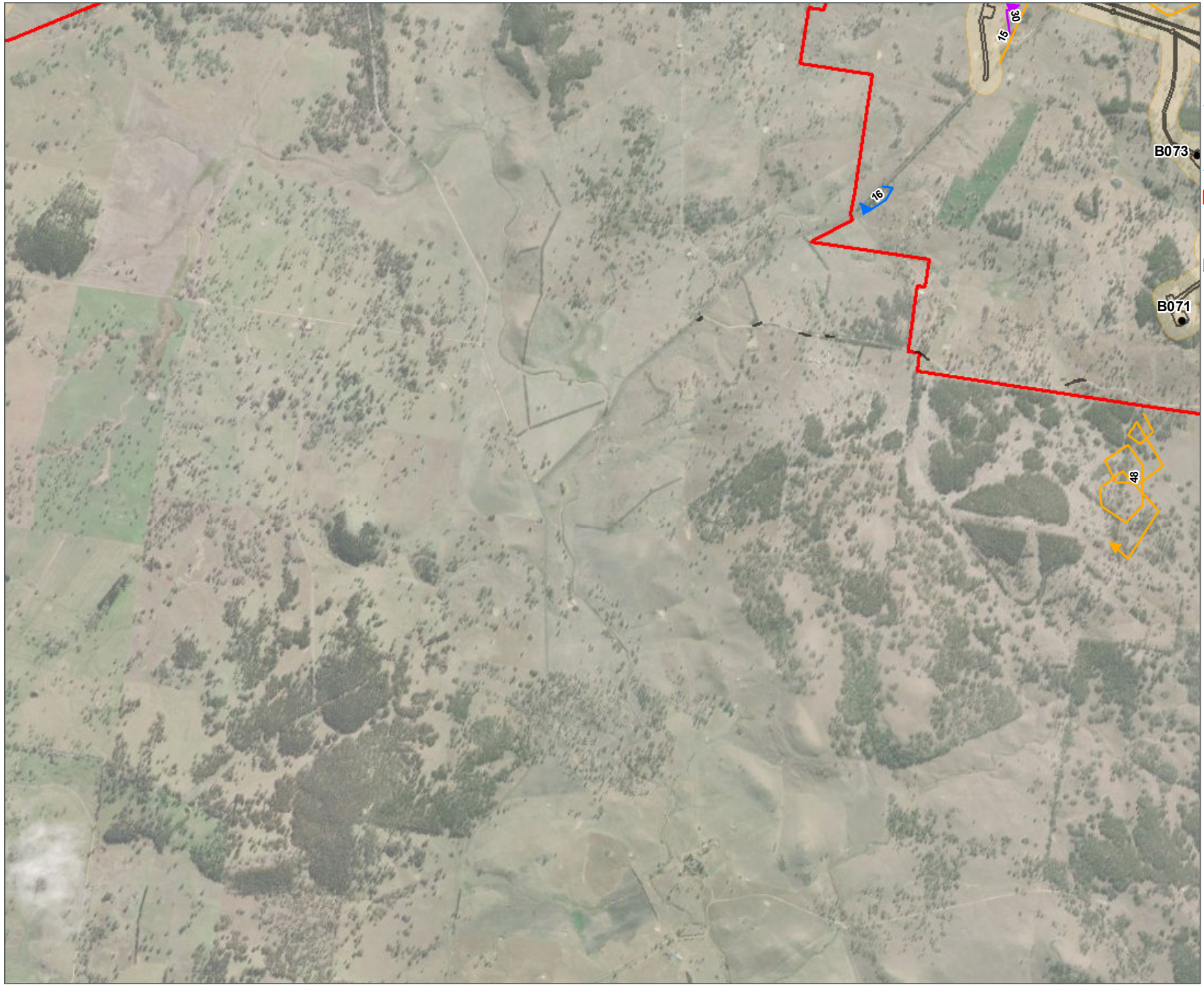

Figure 5-10: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

Winterbourne wind farm boundary
Development site
Development footprint
Turbines

Species

Brown Goshawk
Nankeen Kestrel
Wedge-tailed Eagle

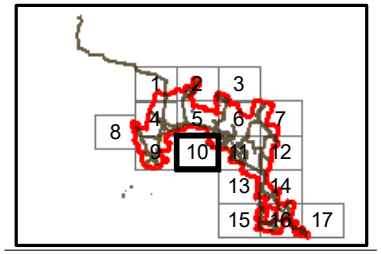

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Figure 5-11: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Perched

- Wedge-tailed Eagle

Species

- Brown Goshawk
- Nankeen Kestrel
- Wedge-tailed Eagle

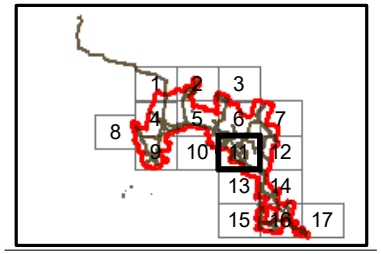

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Figure 5-12: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

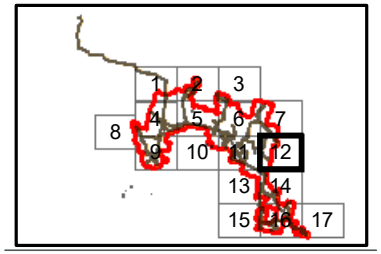

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Figure 5-13: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

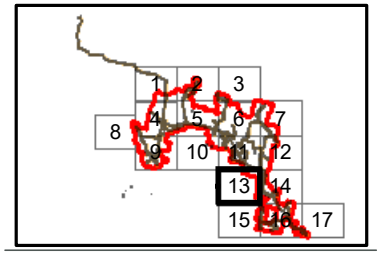

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Figure 5-14: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

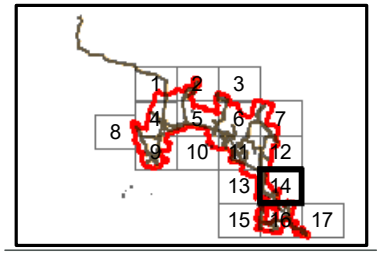

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Figure 5-15: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Species

- Brown Falcon
- Nankeen Kestrel
- Wedge-tailed Eagle

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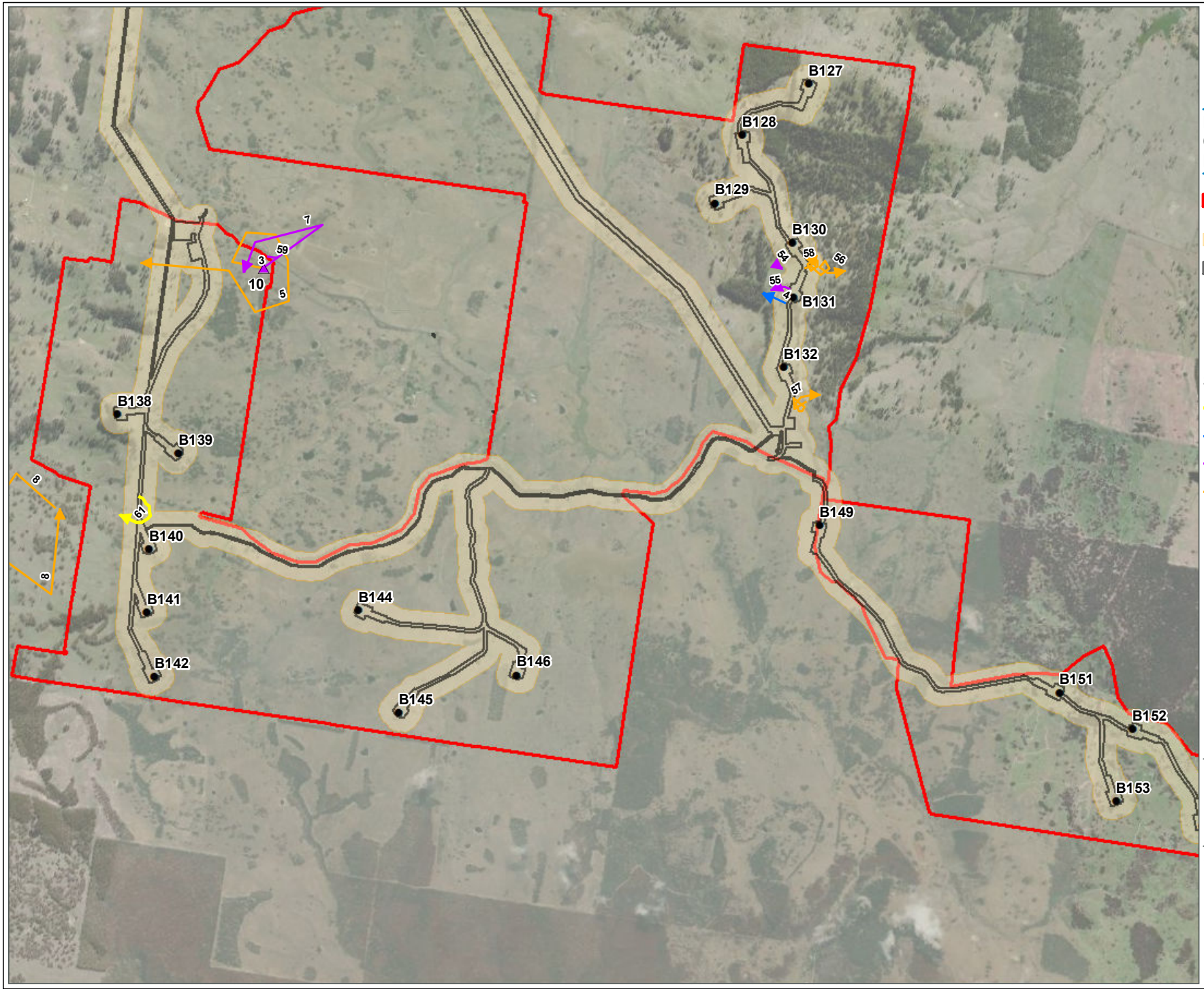

Figure 5-16: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines

Perched

- Nankeen Kestrel

Species

- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Wedge-tailed Eagle

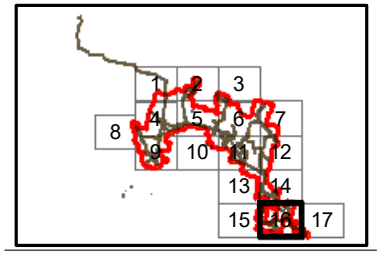

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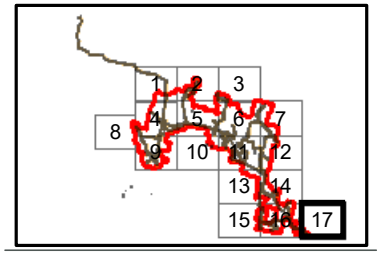
Figure 5-17: Raptor Flight Paths at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines



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4. Conclusions

The conclusions from the Spring 2020 and Autumn 2021 BUS at WWF are presented below.

- The proposed site is a mosaic of farmland and scattered woodland remnants, supporting predominantly farmland and woodland birds.
- During three seasonal BUS, a total of 4,656 individual birds were recorded, 2,609 of these from the impact points at WWF.
- Over 90 species of birds were recorded during the seasonal BUS, of which 65 species were recorded during spring and autumn, and 72 species during summer. At impact and reference points, 64 and 35, and 67 and 29 species were recorded during spring and autumn, and summer, respectively.
- Birds numbers were highest in spring (1,320 individuals), and lowest in summer (979), with autumn numbers (1,310) similar to spring.
- The five most common species (Percent of total birds recorded during the three seasons) at the impact points were; Australian Magpie (12.5%), Torresian Crow (8.9%), Yellow-rumped Thornbill (8,3%), Eastern Rosella (7.3%), and Superb Fairywren (5.8%). At reference points they were: Eastern Rosella (16.3%), Torresian Crow (14.5%), Noisy Miner (13,2%), Australian Magpie (10.5%), and Galah (8.8%). These five species comprised 42.5% of all birds recorded at the impact survey points and 63.3% at the reference survey points.
- A combined average of the distribution of bird flight heights revealed that a significant majority of 95.7% flew below, 3.4% at, and 0.9% over RSA heights. Three raptors, one raven and one cockatoo dominated bird species flying at RSA heights.
- Wedge-tailed Eagle was the most abundant raptor species at WWF during the three seasons of BUS. Numbers observed were high during autumn (64 Observations), lower in spring (41) and lowest in summer (28). Of the total number of eagles seen (133), 62.4% were observed flying at RSA heights. They made up 74.3% of all raptors.
- At the WWF, the number of Wedge-tailed Eagles were exceptionally high compared with other wind farms with similar settings. The utilisation rate of eagles was estimated as 0.66 eagles per hectare per hour, higher than the range (0.01 – 0.44) calculated for other wind farms in south-eastern Australia (Nature Advisory data).
- The Wedge-tailed Eagle and Nankeen Kestrel were both observed regularly flying at RSA height which will lead to interactions with turbines and may result in collisions.
- Waterbirds were found to be largely confined to some small farm dams and were mainly very common farmland species. One individual was seen flying at RSA during the three seasonal surveys.
- Four species of threated birds were recorded on the WWF site during BUS, namely Varied Sitella, Speckled Warbler, Diamond Firetail and Glossy Black-Cockatoo. None of these behave in a manner that puts them at risk of collision with operating wind turbines. One additional threatened species, Little Eagle, was identified incidentally flying over the wind farm site.
- Consideration should be given to mapping the habitat of the Glossy Black Cockatoo and assessing the availability of their favoured feed trees (i.e. *Allocasuarina and Casuarina*) and to identifying where Wedge-tailed Eagles are breeding to provide adequate (minimum 300m) buffers between nests and turbines.

5. References

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Appendix 1: Raw data for BUS spring 2020 survey impact points (BUS1-4) at WWF

Site	BUS1									BUS2													BUS3									BUS4								
Replicate	1	2	3	4	5		6	7	8	1		2	3		4		5		6		7		8	1	2	3	4		5	6	7	8	1		2	3	4	5	6	7		8
Species/height class	A	A	A	A	A	B	A	A	A	A	B	A	A	B	A	B	A	B	A	B	A	B	A	A	A	A	A	A	B	A	A	A	A	A	B	A	A	A	A	A	A	B	A
Australian Wood Duck																															4												
Australasian Darter																																											
Australian King Parrot			2														1											1				1									
Australian Magpie	2	4	2	1	5		3	1	1	1		6			2		2				2		1	2	4	2	2			1	1		5		1	2	3	2	1	2		1
Australian Raven														3										2					3												1
Black-chinned Honeyeater																																		3								
Black-faced Cuckoo-shrike				1						1			1		1				1		1										1			1	3	1		1	1		1
Black-shouldered Kite																															1											
Brown Falcon													1												1										1						
Brown Goshawk																																										
Crested Pigeon																									1																
Crimson Rosella					2								2												2																
Eastern Rosella	5	4	1	4	6			2				4											2	2			2			2			4			4	2		2			2
Eastern Yellow Robin																													1												
Fuscous Honeyeater																																		4		1						
Galah	2		6	5	3			3	3										1		1		3			2	2					1			2				1	1		
Grey Butcherbird	1			2			1			1		1			1						1				1						1			1				1	1		
Grey Shrike-thrush							1			1																								1				1				
Jacky Winter																																										
Laughing Kookaburra																																2										
Leaden Flycatcher		1																																								
Little Corella								2									3						2								2											
Little Friarbird																									1														1			
Magpie-lark			1																																							
Masked Lapwing																																										
Nankeen Kestrel	1					2		1	1	1		1											1					1			1						1				
Noisy Friarbird	3	1					1		2	1							2		1										1	1											
Noisy Miner	1	3	1		8		2	5	2	5		1			2		2		1				3	2		1	2				3					1					
Olive-backed Oriole																																										
Pied Butcherbird																																								2			
Pied Currawong				1	1								1		1									1			1											2				
Red Wattlebird																									1	3				1												
Red-rumped Parrot																																								1			
Restless Flycatcher																															3									1			
Rufous Songlark																															1	1											
Rufous Whistler																													1	1										1			3
Spotted Pardalote		1	1																																								
Straw-necked Ibis																																			10								
Striated Pardalote		1		4	1				1			1					1		2		2		2	3		1	1		2		2	2	1		1	3		1		2		2
Sulphur-crested Cockatoo								1	10														1																1			1
Superb Fairy-wren																			5		5			7					3	4		5			4		2	2	4	5		
Torresian Crow	3		2							3																2				4			4		1		1		5			
Tree Martin																									1											2						
Varied Sitella																																										
Wedge-tailed Eagle											2	3					2		3		2		2			1			1							2				2	
Weebill							3																			2															

Site	BUS1									BUS2														BUS3								BUS4								
Replicate	1	2	3	4	5		6	7	8	1		2	3		4		5		6		7		8	1	2	3	4		5	6	7	8	1		2	3	4	5	6	7		8
Species/height class	A	A	A	A	A	B	A	A	A	A	B	A	A	B	A	B	A	B	A	B	A	B	A	A	A	A	A	B	A	A	A	A	A	B	A	A	A	A	A	A	B	A
Welcome Swallow													1																													
Whistling Kite																																	1								
White-browed Scrubwren																								3	2	1	4			2		1				1					
White-throated Gerygone							1			1															2																
White-throated Treecreeper		2													1										1				1	1	1		1		1	1	1	1			
White-winged Chough													5																												
Willie Wagtail					1		1														1				1	1					1					1				
Yellow-rumped Thornbill		10	4				5	3							3		3		7		7		3						7	3	3	3			3		4	5	6	7		
Yellow-tailed Black Cockatoo																																									
Total	18	27	20	18	27	2	18	18	20	15	2	17	11	3	11	2	14	3	18	2	20	2	18	22	21	13	14	2	20	18	23	17	18	1	22	28	20	17	23	21	2	11

Notes: A = below RSA height, B = At RSA height.

Appendix 1 continued: Raw data for BUS spring 2020 survey impact points (BUS5-8) at WWF

Site	BUS5										BUS6													BUS7								BUS8								Total
Replicate	1	2	3	4	5		6		7	8	1		2	3	4		5		6		7	8		1	2	3	4	5	6	7	8	1	2	3	4		5	6	7	8	
Species/height class	A	A	A	A	A	A	B	A	A	B	A	B	A	A	A	B	A	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	
Australian Wood Duck																																									**4**
Australasian Darter										1																																**1**
Australian King Parrot						1																		1														2			**9**
Australian Magpie	2	4	2	7	1	2		3	1		1		4	3	1		1				1	2		6	4	2	1	5	1	3	2	2	4	1	1				3	2	**134**
Australian Raven																																									**9**
Black-chinned Honeyeater													2	2			2		1		2	4													3						**19**
Black-faced Cuckoo-shrike											1								1			1					1		1	1	1			1			1			**24**
Black-shouldered Kite																																									**1**
Brown Falcon																																									**3**
Brown Goshawk																									1																	**1**
Crested Pigeon													1																													**2**
Crimson Rosella													2											1	2	6		1		2				2								**22**
Eastern Rosella		2		3				2	2					2					2					4	4		7	2	2			2	4				2	2			**90**
Eastern Yellow Robin																																								1		**2**
Fuscous Honeyeater																																	3	4		2						**14**
Galah		6	2	10	2	2		4	3												1	1		2			2						1	2							**74**
Grey Butcherbird		1	1		1			1			1		1	1	1				1		1	1			1						1			1				1		**28**
Grey Shrike-thrush											1		1	1	1		1																								**8**
Jacky Winter	1																																								**1**
Laughing Kookaburra																								2			1	1						1							**7**
Leaden Flycatcher																																	2	1	1					1	1	**7**
Little Corella						3			2																																	**14**
Little Friarbird													1						1																							**4**
Magpie-lark		1	1	1	1									1																											**6**
Masked Lapwing								2	2																																	**4**
Nankeen Kestrel									1					1																												**13**
Noisy Friarbird													1		1						1													2	1	2			1	1	1		**24**
Noisy Miner		1			1				3						2																											**54**
Olive-backed Oriole																						1																		2		**4**
Pied Butcherbird																																										**2**

Site	BUS5										BUS6												BUS7								BUS8								Total
Replicate	1	2	3	4	5	6		7	8		1		2	3	4		5		6		7	8																	
Species/height class	A	A	A	A	A	A	B	A	A	B	A	B	A	A	A	B	A	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	
Pied Currawong											1													2	3		2	1		1	1	1		1						**21**
Red Wattlebird																																								**5**
Red-rumped Parrot		1											4		2																									**8**
Restless Flycatcher																												1												**5**
Rufous Songlark																																								**2**
Rufous Whistler																	1				1						1										1	1	1	**12**
Spotted Pardalote																																								**2**
Straw-necked Ibis		1			1			1						1																									**14**
Striated Pardalote	1	2	1	2	1	1		2	2				1						1		2	2		5	3	5	4	2	1	3	5	3	1	2	1		3	3	2	1	**98**
Sulphur-crested Cockatoo				1					1																														**16**
Superb Fairy-wren														4	7		4		3			5					4		3			7	6	7	4			6	5	4	**115**
Torresian Crow		2	2	1	5	2		2	5		3		7	7	11		4		5		5	2		4		5	2	2		2			4	1	1					**109**
Tree Martin								1					1																											**5**
Varied Sitella																																3								**3**
Wedge-tailed Eagle							1		1			4	1	1		4		2		2	1		2												2					**41**
Weebill	1										3		2		3											2														**16**
Welcome Swallow																													1											**2**
Whistling Kite																																								**1**
White-browed Scrubwren																																								**14**
White-throated Gerygone											1		1		1						1	1																		**9**
White-throated Treecreeper													1	1			1		1					1		1			1		1	2	1		1		1	2	1	1	**29**
White-winged Chough																																								**5**
Willie Wagtail			1								1		1	1	1		1		1		2	1																		**18**
Yellow-rumped Thornbill		3	3	3	5	3		2	3		8		3	4			3		6		4	7			3						3	5	4	4	3		2	4	7	5	**183**
Yellow-tailed Black Cockatoo																																		3							**3**
Total	5	24	13	28	18	14	1	20	26	1	21	4	35	30	31	4	18	2	23	2	22	28	2	28	21	21	25	14	10	13	16	29	26	29	23	2	12	21	25	15	**1321**

Notes: A = below RSA height, B = At RSA height.

Appendix 2: Raw data for BUS autumn 2021 survey impact points (BUS2-5) at WWF

Points	BUS2											BUS3												BUS4																BUS5															
Replicate	1		2	3		4	5	6		7	8	1	2	3		4		5		6	7	8		1		2	3	4		5		6		7	8					1	2		3		4	5		6	7		8	
Species/height class	A	B	A	A	B	A	A	A	B	A	A	A	A	A	B	A	B	A	B	A	A	A	B	A	B	A	A	A	B	A	B	A	B	A	A					A	A	B	A	B	A	A	B	A	A	B	A	B
Australian Wood Duck														4				1																								27						17	9			
Australian Magpie	5		1	4		2	5	2		9	5	3				4		2		4	4	2		5		6	3	3		12		10		4	9					2	5		1		3	1		3	5		5	
Australian Pipit			1															1				1																													
Black-faced Cuckoo-shrike											1	1																																							
Black-shouldered Kite																																																1		
Brown Falcon											1																					1														1				
Common Starling																																		2																
Crested Pigeon																										2																								
Crimson Rosella										5		2	4	1		1		2						1																				1							
Eastern Rosella	6						2	6		2	2	1	2											19		4		4		2		6		4		6			2		13			2					
Galah																												2				5		59			12							14				
Glossy Black Cockatoo																																																	
Grey Butcherbird	2			1		1							1																			1			1	1												
Grey Fantail																1																																		
Grey Shrike-thrush																																																	
Laughing Kookaburra						1				1		1																																						
Masked Lapwing																																2													2		3		
Nankeen Kestrel						1	1																																		1							1		
Noisy Friarbird																																																	
Noisy Miner	7		5	6		5	2	2		2	7															8	3	5		4		2				2			2		2			1	3			
Olive-backed Oriole																										1																								
Peregrine Falcon							1																				1																							
Pied Currawong																1								1			1																							
Rainbow Lorikeet																																																	
Red Wattlebird												1												1			1																							
Red-rumped Parrot																																2			9															
Red-winged Parrot																																																	
Rufous Whistler																											2																							
Speckled Warbler														4																																				
Striated Pardalote																								2																										
Striated Thornbill																								4			5																							
Sulphur-crested Cockatoo																																																	
Superb Fairy-wren												8	6	3		3								9																										
Torresian Crow	4			1			1			4	1	4	5			2				2	2				2	1	1	8		19		11		6	2	3	1		3		3			5	7		2	
Tree Martin											2																																						
Varied Sitella													12																																				
Wedge-tailed Eagle		1			1				2				3		2		3		3				1		1				8		5	3			1			8		1			2			5		2	
Welcome Swallow			2			1																																				1						
White-browed Scrubwren												2																																					
White-throated Gerygone																																																	
White-throated Treecreeper																			1					1		1						1																		
White-winged Chough																														7																		
Willie Wagtail																								1				1						1														
Yellow-rumped Thornbill																					5													8								3						
Total	24	1	9	12	1	11	12	10	2	23	19	23	33	12	2	12	3	6	3	7	6	8	1	44	3	21	16	25	8	44	5	43	1	75	31	14	46	8	8	1	22	5	2	28	41	6	11	2

Appendix 2 continued: Raw data for BUS atumn 2021 survey impact points (BUS6-9) at WWF

Points	BUS6											BUS7									BUS8									BUS9								Total
Replicate	1	2		3		4	5	6	7	8		1		2	3	4	5		6	7	8	1	2	3	4	5		6	7	8	1	2	3	4	5	6		7	8	
Species/height class	A	A	B	A	B	A	A	A	A	A	B	A	B	A	A	A	A	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	B	A	A	
Australian Wood Duck																																							58
Australian Magpie		1				2	2		5	1		2		6	2	2	3		3	4	6	4	2	1	1	3		1	1	2	5	5	1	5	2	6		3	3	213
Australian Pipit																																		1						4
Black-faced Cuckoo-shrike		1															1		1																					5
Black-shouldered Kite																																								1
Brown Falcon																																								3
Common Starling																																								2
Crested Pigeon																																								2
Crimson Rosella									5														1	3	1				4						5					36
Eastern Rosella						1	2		6			2										2												2		2		4	4	108
Galah		2							2																		3				5	2								106
Glossy Black Cockatoo														2																										2
Grey Butcherbird							1							1	2		1		1			1		1								1								17
Grey Fantail	1			2		1	1																																	6
Grey Shrike-thrush																						1																		1
Laughing Kookaburra				1				1	1													1						1	1			2			1					12
Masked Lapwing																																								7
Nankeen Kestrel													1								2																			7
Noisy Friarbird	1														1																									2
Noisy Miner				4					2													1									1	3	1		3	5		3	4	95
Olive-backed Oriole																																								1
Peregrine Falcon															1																									2
Pied Currawong														1	1					1				1	1				1		1						1			11
Rainbow Lorikeet																						13										2					2			17
Red Wattlebird																						1	1	3	1			14	1			1	1	1	1	1		1		30
Red-rumped Parrot		3		5																											2	4	3	11	13	2		6		60
Red-winged Parrot										2																														2
Rufous Whistler																																								2
Speckled Warbler																																								4
Striated Pardalote		2					2	2				2			2								3						1											16
Striated Thornbill																																								9
Sulphur-crested Cockatoo																			1													2								3
Superb Fairy-wren	3	6					5		5													4	5						2											59
Torresian Crow	5	1		2			1		3	4		3			18	11	5			3	5	3	2	9	4	5		1	7	8		2			2	1		2		207
Tree Martin				1																						1													4
Varied Sitella																						11																		23
Wedge-tailed Eagle			1		1		1		1		1			2		1		2														1					1		64
Welcome Swallow																																2								6
White-browed Scrubwren																																								2
White-throated Gerygone	1					1																																		2
White-throated Treecreeper		1					1	1	1			1		1					1			2	2	1		1		1	1				1		1				1	22
White-winged Chough				6																																				13
Willie Wagtail	1	5		1																															1					11
Yellow-rumped Thornbill	9	4																				7	7						3	7										53
Total	21	26	1	22	1	5	16	4	31	7	1	10	1	13	27	14	10	2	6	9	13	51	23	19	8	10	3	18	22	17	14	25	9	20	28	18	1	22	12	1310

Appendix 3: Raw data for BUS spring 2020 and autumn 2021 at reference points at WWF

Season	Autumn																					Spring																				
Reference points	RF1												RF2								Autumn Total	RF1								RF2									Spring Total
Replicate	1		2		3		4	5		6	7	8	1	2	3	4	5	6	7	8		1	2		3	4	5	6	7	8	1	2		3	4	5	6	7	8	
Species/height class	A	B	A	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A		A	A	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	
Australian Magpie	3		4		2		5	6		2	6		7	5	2	5	2	4	4	1	**58**	2	2		1	1	3	1	1	2	2	2		3	2	2	2	1	5	**32**
Australian Pipit													1								**1**																			
Australian Wood Duck																												2												**2**
Black-faced Cuckoo-shrike													1			1					**2**	2			5	1														**8**
Common Starling																									1															**1**
Crimson Rosella	2		2										2				9	4		2	**21**			2	6														2	**10**
Eastern Rosella			21		6		6	3		4	4	3	11		2	4	2	6	9		**81**	5	7		3	5	3		2		6	8		2	4	4	2		6	**57**
Eastern Yellow Robin																						1																			**1**
Galah					2		23	22			16		4							1	**68**		1			2	5		8	1	1			1	3	1				**23**
Grey Butcherbird	1				1		1	1		1			2		1	1	1	2	1		**13**							1		1	1			1	1	1			1	**7**
Laughing Kookaburra																																					1				**1**
Little Corella																											2		2	5											**9**
Magpie-lark													1			1	1	1		1	**5**						1	1												**2**
Masked Lapwing																													3												**3**
Nankeen Kestrel										1					1						**2**											1				1		1	1	2	**6**
Noisy Friarbird																						2			5	1				2					1					**11**
Noisy Miner	3		5		7		6	4		2	1		2	4	1	3	1	4	2	3	**48**	1	3		2	2		1	4	2	3	3		3	2	3			9	**38**
Olive-backed Oriole																	1				**1**																			
Pacific Black Duck										2											**2**																			
Pied Currawong																							1		1						1	1					1		1	**6**
Red Wattlebird																1	1				**2**																			
Red-rumped Parrot			13		4		19	17		8	3	19									**83**																		
Straw-necked Ibis																												5			2			9		13		1		**30**
Striated Pardalote																	2	2	1	1	**6**		3					1	2		2	3		2	4	3	1	2	3	**26**
Sulphur-crested Cockatoo						2	1						1								**4**						5		1	4									**10**
Torresian Crow	1		1		3		5	6		2	5		9	7	8	13	1	8	5	18	**92**		1		2		1	5	5	2	3	9		4	6	8	4	7	7	**64**
Tree Martin																																					2		1		**3**
Wedge-tailed Eagle		1		3	1		1		1	2				1							**10**												2							**2**
Weebill					3																**3**																			
Welcome Swallow					2																**2**																			
White-throated Gerygone																																			1						**1**
White-throated Treecreeper							1														**1**																			
Willie Wagtail																		1			**1**									1								1	**2**
Yellow-rumped Thornbill																										2	3	2	3	7											**17**
Total	10	1	46	3	31	2	68	59	1	24	35	22	41	17	15	29	21	32	22	27	**506**	13	18	2	26	14	23	19	31	27	21	27	2	26	24	38	11	13	37	**372**

Notes: A = below RSA height, B = At RSA height.

Appendix 4: Raw data for BUS summer 2022 survey impact points (BUS2-5) at WWF

| Season | Summer | | |

| Season | Summer | | |

Appendix 4 continued: Raw data for BUS summer 2022 survey impact points (BUS 7-8, 12-13) at WWF

Season	Summer																																Total all surveys
Reference points	BUS7									BUS8								BUS12								BUS13								
Replicate	1	2	3	4		5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
Species/height class	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	B	A	A	A	A	A	A	A	
Australasian Pipit																																			7
Australian Ibis																																			2
Australian Magpie		8					1	1		2	1	1	2	1	1	1		1	1	4	1			1		1		1	10	2	2	1	3	3	1	102
Australian Raven																																			10
Australian Wood Duck																																			7
Black-faced Cuckoo-shrike				1									1	1		1		1												1					14
Brown Falcon																				1															5
Brown Goshawk								1																											1
Brown Honeyeater																																			4
Brown Quail								1																											1
Brown-headed Honeyeater			1			3	1	1												1	2		1	3	1	2									16
Buff-rumped Thornbill																																			13
Common Starling																																			80
Crested Pigeon																																			1
Crimson Rosella			1									2	1	2	2	3	1											1	1		1	1			22
Diamond Firetail																																			9
Dusky Woodswallow																																			21
Eastern Rosella							2																			1					1				55
Eastern Spinebill			1	1		1	1	1	1										1	1	2		1		1										12
Fairy Martin																										1		3							4
Fan-tailed Cuckoo																																			4
Forest Raven													1		2										3	1			1						11
Fuscous Honeyeater																																			1
Galah									2																										18
Grey Butcherbird	1																												1						10
Grey Fantail	1	2	2	1		1	1	1	1																										10
Laughing Kookaburra																										2			1		2				7
Little Corella																																			26
Little Lorikeet																														1					1
Little Raven															2	4	1																		7
Magpie-lark																																			4
Masked Lapwing																																			2
Mistletoebird				1																															1
Musk Lorikeet			2																																2
Nankeen Kestrel											1																								8
Noisy Friarbird						2																							1						6
Noisy Miner																										1				1			1		54
Pacific Black Duck																																			1
Pallid Cuckoo																																			3
Pied Butcherbird																																			6
Pied Currawong					1									2																					5

Season	Summer																																	Total all surveys
Reference points	BUS7									BUS8								BUS12									BUS13								
Replicate	1	2	3	4		5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4		5	6	7	8		1	2	3	4	5	6	7	8	
Species/height class	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	B	A	A	A	A	A	A	A	A	
Rainbow Bee-eater																																				2
Raven/Crow sp.											2											1						1	1					1		6
Red Wattlebird																		2	2				1	1	2							1		2		16
Red-rumped Parrot																							2													8
Rufous Songlark																																				5
Rufous Whistler		1		1		2	1	1	1																											10
Striated Pardalote										2						1									2			1	2	1	2	1	1	1	1	32
Striated Thornbill						4																									2					15
Stubble Quail										1										1	1		1	1	2	1										8
Sulphur-crested Cockatoo																																				22
Superb Fairy-wren		1	1	1		1	1	1																				1	1	1	2	1	1			35
Torresian Crow																																				3
Tree Martin																																				5
Varied Sittella		3	3	2		2	2	2	2															1												17
Wedge-tailed Eagle																																				28
Welcome Swallow																																				20
White-browed Scrubwren																																				2
White-eared Honeyeater				1				1																												2
White-naped Honeyeater								1	1																											2
White-throated Treecreeper	1	1	1	1		1	1			1											1		1		1			1	1	1	1	1			1	27
White-winged Chough																																				30
Willie Wagtail		1	1			1	1		1											1	1	1		1		1	1									18
Yellow Thornbill																																				12
Yellow-faced Honeyeater	1	2	2	2		2	3	3	2																											17
Yellow-rumped Thornbill		4				1	1																		1											63
Total	4	23	15	12	1	21	16	15	11	6	4	3	5	6	7	10	2	4	5	9	8	1	7	7	10	10	1	11	16	9	14	8	8	7	4	979

Notes: A = below RSA height.

Appendix 5: Raw data for BUS summer 2022 at reference points at WWF

Season	Summer																Total
Reference site	REF1								REF2								
Replicate	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
Species/height class	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Australian King Parrot								1									1
Australian Magpie					3	3	3			2	1	1	3	1	5	1	23
Australian Raven			1			1											2
Black-faced Cuckoo-shrike		2	1		1								3				7
Common Starling				5													5
Crested Pigeon				1													1
Crimson Rosella	2	3		2													7
Dollarbird							1										1
Eastern Rosella	5	3	4	1			3	3	2	5	2	2		1	3	3	37
Forest Raven															1		1
Galah			2	2													4
Grey Butcherbird						3											3
Grey Shrike-thrush					1												1
Little Corella								9									9
Little Raven												3		2			5
Nankeen Kestrel	1						2		1								4
Noisy Friarbird						2											2
Noisy Miner	2	3	3	10	5	6	2	8	3	2	3	1	2	1	3	2	56
Pied Butcherbird		2															2
Pied Currawong									2		1						3
Red Wattlebird											2						2
Red-rumped Parrot								3			1						4
Striated Pardalote	2								1					1			4
Sulphur-crested Cockatoo						3		2			1				1		7
Torresian Crow					1												1
Willie Wagtail					1	2											3
Yellow-rumped Thornbill			3														3
Grand Total	12	13	14	21	12	20	11	26	9	9	11	7	8	6	13	6	198

Appendix 6: Raw data for the raptor surveys

Label	Species	Species count	Date	Start time	End time	Observer Initials	Distance (m)	Bearing	Location	Height first observed (m)	Height range of bird (m)	Elevation (m)	Landscape	Direction	Comments	Behaviour
2	Wedge-tailed Eagle	4	13/10/2020	12:30:25 PM	12:36:42 PM	CL		NW	Air		40 to 80				Two pairs - both displaying before heading north-west over Ridge	Displaying
3	Nankeen Kestrel	1	13/10/2020	1:12:09 PM	1:14:17 PM	CL		SE	Air		Oct-20			Away	Kestrel perched on arrival, hovered in flight and moved to another perched 20m away	Foraging (hunting)
4	Brown Goshawk	1	13/10/2020	2:16:58 PM	2:16:09 PM	CL		SE	Air		20 to 40		Ridge	Away	Bird flew from one woodland patch to another	
5	Wedge-tailed eagle	2	13/10/2020	1:14:37 PM	1:20:45 PM	CL		W	Air		60 to 100		Slope	Circling		Soaring
6	wedge-tailed eagle	1	14/10/2020	8:47:06 AM	8:50:18 AM	CL		W	Perched		10 to 30		Slope	Away	Bird was perched and flushed on arrival to another tree. It was mobbed by 2 Torresian crows until it flew off low just above the canopy	Resting
7	Nankeen kestrel	1	14/10/2020	9:25:58 AM	9:28:05 AM	CL		NE	Air		10 to 40		Slope	Toward	Bird hovering then flew to perch in tall Stringybark	
8	Wedge-tailed Eagle	2	14/10/2020	10:02:32 AM	10:03:39 AM	CL		S	Air		70 to 90		Ridge	Circling	Two birds circling above	Soaring
9	Brown Falcon	1	14/10/2020	12:35:02 PM	12:37:08 PM	CL		SE	Air		20 to 30		Valley	Circling	Brown Falcon circled then flew to perch	Foraging (hunting)
10	Nankeen Kestrel	1	14/10/2020	2:20:22 PM	2:23:24 PM	CL		NW	Perched		15		Slope		Kestrel perched on dying stringybark 50m from BUS point	
11	Nankeen Kestrel	1	15/10/2020	8:48:31 AM	8:51:34 AM	CL		S	Air		20		Valley	Circling		Soaring
12	Wedge-tailed Eagle	1	15/10/2020	4:38:47 PM	4:42:50 PM	CL		NW	Air		30 to 40		Ridge	Circling	Circling over lambing paddock	Soaring
13	Wedge-tailed Eagle	1	16/10/2020	9:57:44 AM	10:03:52 AM	CL	200	E	Air		30 to 40		Valley	Circling	Bird circled for several minutes then flew east	Soaring
14	Wedge-tailed Eagle	1	16/10/2020	9:57:44 AM	10:03:52 AM	CL	200	E	Air		30 to 40		Valley	Circling	Bird circled for several minutes then flew east	Soaring
15	Wedge-tailed Eagle	2	16/10/2020	10:25:41 AM	10:28:45 AM	CL	500	NE	Air		40 to 70		Slope	Circling	Two birds circling	
16	Brown Goshawk	1	16/10/2020	9:40:09 AM	9:42:15 AM	CL					15 to 25		Valley	Away	Brown Goshawk flushed then moved to another perch in the paddock	Gliding
17	Wedge-tailed Eagle	2	16/10/2020	10:35:10 AM	10:37:18 AM	CL		S	Perched		20			Away	Birds perched. flushed as I drove past. mobbed by several magpies and 2 kestrels	Gliding
18	Wedge-tailed Eagle	2	16/10/2020	10:46:24 AM	10:50:30 AM	CL		SE	Air		60 to 100			Circling	Two birds circling, headed back over woodland	Soaring
19	Nankeen Kestrel	2	16/10/2020	10:35:26 AM	10:37:31 AM	CL					20				Kestrels mobbed 1 Wedge-tailed Eagle then flew into woodland	
20	Wedge-tailed Eagle	1	8/03/2021	12:42:03 PM	12:44:13 PM	CL					40 to 70		Valley	Circling		Soaring
21	Wedge-tailed Eagle	2	4/01/2022	9:08:52 AM	9:12:11 AM	AB	200		Air		200 to 300		Slope	Circling		Soaring
22	Brown Falcon	2	4/01/2022	9:11:58 AM	9:16:11 AM	AB	200	E	Air		100 to 200		Slope	Away		Powered (flapping) flight
23	Wedge-tailed Eagle	2	4/01/2022	10:15:05 AM	10:16:17 AM	AB	600		Air		200 to 300		Slope	Away		Soaring
24	Nankeen Kestrel	2	4/01/2022	4:18:32 PM	4:20:43 PM	AB	200		Air		100 to 150		Slope	Circling		Hovering
25	Brown Falcon	2	5/01/2022	12:21:08 PM	12:23:18 PM	AB	50	W	Air		50 to 70		Slope	Away		Powered (flapping) flight
26	Wedge-tailed Eagle	1	7/01/2022	2:24:01 PM	2:26:16 PM	AB	400	NE			150 to 200		Slope	Circling		Soaring
27	Wedge-tailed Eagle	2	4/01/2022	3:26:47 PM	3:30:02 PM	AB	400		Air		300 to 400		Valley			Soaring
28	Nankeen Kestrel	2	5/01/2022	1:10:17 PM	1:15:31 PM	AB	200	E	Air		100 to 150		Valley			Hovering
29	Nankeen Kestrel	1	3/01/2022	1:01:51 PM	1:06:11 PM	AB	70	NE			50 to 70		Valley	Circling		Hovering
30	Nankeen Kestrel	2	5/01/2022	4:20:37 PM	4:27:57 PM	AB	80	W	Air		20 to 40		Valley			Hovering
31	Wedge-tailed Eagle	1	4/01/2022	1:35:35 PM	1:37:53 PM	AB	300	S			200 to 300		Slope	Toward		Soaring
32	Wedge-tailed Eagle	2	4/01/2022	11:51:43 AM	11:54:57 AM	AB	300	W	Air		200 to 300		Slope	Circling		Soaring
33	Nankeen Kestrel	2	5/01/2022	9:21:53 AM	9:28:06 AM	AB	200		Air		100 to 150		Slope	Away		Powered (flapping) flight
34	Wedge-tailed Eagle	2	5/01/2022	9:21:33 PM	9:25:49 PM	AB	400	E	Air		300 to 400		Slope			Soaring
35	Wedge-tailed Eagle	4	5/01/2022	3:41:41 AM	3:44:00 AM	AB	300	N	Air		200 to 300		Slope	Toward		Soaring

Label	Species	Species count	Date	Start time	End time	Observer Initials	Distance (m)	Bearing	Location	Height first observed (m)	Height range of bird (m)	Elevation (m)	Landscape	Direction	Comments	Behaviour
36	Wedge-tailed Eagle	2	6/01/2022	8:36:16 PM	8:38:27 PM	AB	300	E	Air		200 to 300		Slope	Circling		Soaring
37	Nankeen Kestrel	1	7/01/2022	11:00:02 PM	11:03:18 PM	AB	50	NE	Air		30 to 50		Slope	Away		Powered (flapping) flight
38	Wedge-tailed Eagle	3	8/01/2022	5:06:24 PM	5:13:37 PM	AB	400	N	Air		200 to 300		Slope	Circling		Soaring
39	Wedge-tailed Eagle	4	3/01/2022	3:00:22 PM	3:03:50 PM	AB	300	E	Air		100 to 300		Valley	Circling		Soaring
40	Wedge-tailed Eagle	2	6/01/2022	8:35:45 AM	8:38:01 AM	AB	400	S	Air		300 to 400		Slope	Circling		Soaring
41	Nankeen Kestrel	2	7/01/2022	11:06:27 AM	11:11:40 AM	AB	200	N	Air		100 to 150		Slope	Circling		Hovering
42	Wedge-tailed Eagle	1	7/01/2022	5:17:04 PM	5:19:46 PM	AB	400	N	Air		300 to 400		Slope	Circling		Soaring
43	Nankeen Kestrel	1	5/01/2022	10:27:13 AM	10:30:39 PM	AB	200	W	Air		50 to 100		Valley	Toward		Hovering
44	Wedge-tailed Eagle	1	5/01/2022	4:40:09 PM	4:43:39 PM	AB	200	N	Air		100 to 150		Valley	Circling		Gliding
45	Nankeen Kestrel	1	3/01/2022	11:25:23 AM	11:28:40 AM	AB	70	W	Air		30 to 50		Valley	Away		Powered (flapping) flight
46	Wedge-tailed Eagle	2	7/01/2022	1:48:19 PM	1:51:47 PM	AB	400	S	Air		200 to 300		Valley	Circling		Soaring
47	Wedge-tailed Eagle	2	5/01/2022	11:20:30 PM	11:22:44 AM	AB	400	NE	Air		300 to 400		Slope	Circling		Soaring
48	Wedge-tailed Eagle	1	4/01/2022	10:44:45 AM	10:45:02 AM	PSL	2000	W	Air	100	80,100	1170	Slope	Parallel to ridge		Soaring
49	Wedge-tailed Eagle	1	7/01/2022	2:24:06 PM	2:24:06 PM	PSL	2500	NE	Air	50	50 to 60	1170	Ridge	Parallel to ridge		Soaring
50	Wedge-tailed Eagle	1	5/01/2022	11:47:32 AM	11:47:49 AM	PSL	300	S	Air	40	40 to 40	1170	Ridge	Parallel to ridge	Adult male	Gliding
51	Wedge-tailed Eagle	1	5/01/2022	11:48:42 AM	11:49:53 AM	PSL	100	SE	Air	150	150,200	1170	Ridge	Parallel to ridge	Adult female	Soaring
52	Brown Goshawk	1	7/01/2022	9:21:22 AM	9:21:36 AM	PSL	100	NE	Air	10	10 to 15	1170	Slope	Away		Powered (flapping) flight
53	Wedge-tailed Eagle	1	7/01/2022	9:48:25 AM	9:49:36 AM	PSL	1500	NE	Air	30	30 to 60	1170	Ridge	Parallel to ridge		Gliding
54	Nankeen Kestrel	1	3/01/2022	10:54:16 AM	10:54:29 AM	PSL	300	NW	Air	40	30 to 40	1290	Ridge	Toward		Gliding
55	Nankeen Kestrel	1	4/01/2022	1:50:25 PM	1:50:39 PM	PSL	100	N	Air	35	15 to 35	1290	Ridge	Parallel to ridge		Gliding
56	Wedge-tailed Eagle	1	5/01/2022	10:41:21 AM	10:42:19 PM	PSL	300	NE	Air	30	30 to 60	1290	Ridge	Away	Adult male	Soaring
57	Wedge-tailed Eagle	2	7/01/2022	12:38:28 PM	12:41:48 PM	PSL	800	S	Air	60	60 to 200	1310	Valley	Away	Adult pair	Soaring
58	Wedge-tailed Eagle	2	7/01/2022	12:49:34 PM	12:50:49 PM	PSL	300	NE	Air	60	60 to 200	1310	Ridge	Parallel to ridge	Adult pair, probably same as seen @12:38 (11 minutes previously)	Soaring
59	Nankeen Kestrel	1	3/01/2022	2:49:13 PM	2:49:34 PM	PSL	100	NE	Air	30	20 to 30	1250	Slope	Away		Hovering
60	Wedge-tailed Eagle	3	3/01/2022	4:12:42 PM	4:13:57 PM	PSL	2000	W	Air	40	30 to 50	1210	Slope	Parallel to ridge	Three together over hill slope to west, probably family group	Soaring
61	Brown Falcon	1	4/01/2022	3:58:31 PM	4:02:24 PM	PSL	15	NW	Air	15	0 to 15	1210	Ridge	Away	Bird flew in, hovered close by, landed on ground then flew away around hillside - foraging	Powered (flapping) flight



Winterbourne Wind Farm

Autumn Bird Utilisation Surveys

30 March 2022

Project No.: 0526676

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Winterbourne Wind Farm

Autumn Bird Utilisation Surveys

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1. INTRODUCTION

WinterbourneWind Pty Ltd (WinterbourneWind) are proposing to develop the Winterbourne Wind Farm (the Project) in the Northern Tablelands of New South Wales 6 km north east from the town of Walcha (hereon referred to as the Project). The development site is approximately 24,100 hectares and falls into both the Walcha and Uralla Local Government Areas (LGA).

Three pre-construction bird utilisation surveys and raptor surveys have previously been undertaken by Nature Advisory Pty Ltd for the Project during three seasons:

- Spring: October 2020
- Autumn: March and April 2021
- Summer: January 2022

ERM was engaged to undertake a fourth season of surveys during Autumn, March 2022. These surveys were undertaken by two ERM Ecologists.

2. METHODOLOGY

Two ERM ecologists undertook Bird Utilisation Surveys (BUS) between the 14th and 16th of March 2022. The surveys were conducted in a method consistent with both the requirements of a 'Level One' bird risk assessment in accordance with 'Wind Farms and Birds - Interim Standards for Risk Assessment' issued by the Australian Wind Energy Association (AusWEA 2005) and previous BUS conducted for the Project by Nature Advisory Pty Ltd (Nature Advisory 2022).

The fixed-point bird count method used involved two observers stationed at a survey point for 15 minutes. During this period of observation, all bird species and numbers of individual birds observed within 200 metres were recorded. The species, the number of birds and the height of the bird when first observed were documented. For species of concern (threatened species, waterbirds and raptors), the minimum and maximum heights were recorded.

Flight height was recorded in 10 metre intervals up to 60 metres, 20 metre intervals up to 120 metres then as 'above 120 metres'. The data are presented as below, at or above rotor swept area (RSA) height.

A = Below RSA (< 40 meters above ground)

B = At RSA height (40 – 150 meters above ground)

C = Above RSA (> 150 meters above ground)

While undertaking the BUS, observations of raptors were recorded. When a raptor was observed the following data was documented:

- Species name
- Count of birds
- Time first observed
- Time the bird/s flew out of sight or landed
- Distance and bearing from observer
- The location of the bird (either Air, perched or ground)
- Height of the bird when first observed
- The height range of the bird (minimum and maximum heights)
- The landscape the bird was observed in (either valley, slope or ridge)

- Flight direction (either toward, away, parallel to ridge or circling), and
- Flight behaviour (either soaring, gliding, hovering, flapping, display, resting, mobbing or foraging).

During the survey effort opportunistic data was collected when species listed under the BC Act or EPBC Act were observed.

The location of the BUS surveys undertaken by ERM were replicated from the Nature Advisory sites as described in Table 2.1, and included the two pre-determined reference sites (Nature Advisory 2022). Table 2.1 described the weather conditions during the survey period, with the three days being cloudy and overcast, with a maximum of 19 degrees during the survey timing. During the autumn survey effort it was observed that recent clearing of a number of isolated trees had been undertaken at BUS2.

Table 2.1 BUS and Reference Points

Survey Point	Date/Time	Weather Conditions	Habitat Description
BUS1	14/03/2022 12:15	Cloudy, no wind, 19 degrees	Located on the top of the ridge, scattered stringybark with grass understory.
BUS2	14/03/2022 13:41	Slight breeze, cloudy, 19 degrees	Sheep pasture with a few paddock trees, and one riparian strip close by.
BUS3	14/03/2022 11:15	Cloudy, 17 degrees, no wind	Scrappy stringybark timbered ridge adjacent to pasture.
BUS4	15/03/2022 11:05	Overcast, cool, slight breeze, 17 degrees	Stringybark grassland ridge.
BUS5	15/03/2022 9:40	Overcast, cool, no wind 15 degrees	Sheep pasture with few, small scattered trees, approximately 500m away from woodland patch.
BUS6	15/03/2022 10:18	Overcast, slight breeze, cool, 16 degrees	Dirt road on side of sloped wooded paddock, with some shrub ground cover.
BUS7	15/03/2022 15:55	Overcast, no wind, 19 degrees	Mid-slope pasture surrounded by open woodland with mature New England Peppermint (Eucalyptus nova-anglica) and Blakely's Red Gum - adjacent to large ridge.
BUS8	16/03/2022 9:33	Cloudy, no wind, 14 degrees	Pasture surrounded by open woodland with mature New England Peppermint and small tree ferns.
BUS9	16/03/2022 12:21	Cloudy, no wind, 17 degrees	Top of ridge in cleared grassland paddock.
BUS12	16/03/2022 13:24	Cloudy, slight breeze, 18 degrees	Cleared mixed native and exotic pasture on a saddle between two hills, scattered paddock eucalypts and some bracken and little or no shrub cover with few fallen branches.
BUS13	16/03/2022 14:20	Cloudy, slight breeze, 18 degrees	Ridge line, with cleared pasture, mostly exotic grass and forest

Survey Point	Date/Time	Weather Conditions	Habitat Description
			block close by to the south-east and degraded understorey.
REF1	15/03/2022 12:15	Overcast, breeze, 17 degrees	Stringybark grassland gully with stream.
REF2	16/03/2022 10:30	Cloudy, slight breeze, 16 degrees	Open paddock near roadside with scattered mature New England Peppermint and stringy bark.

3. RESULTS

During the ERM survey effort, one (1) observation of a threatened species was made, the Scarlet Robin (*Petroica boodang*), listed as 'Vulnerable' under the BC Act. This species was observed opportunistically, 11m from the Project Boundary. Figure 3.1 conveys the Scarlet Robin observation, along with the 13 BUS survey locations,

Eleven (11) species were observed within the Rotor Swept Area (RSA) of 40 to 150 meters above ground during the survey effort, of these, only three (3) raptor species were recorded:

- Noisy Miner;
- Torresian Crow;
- Eastern Rosella;
- Pied Butcherbird;
- Red-rumped Parrot;
- Australian Magpie;
- Wedge-tailed Eagle;
- Sulphur-crested Cockatoo;
- Brown Falcon;
- Nankeen Kestrel; and
- Magpie-lark.

Results of the BUS surveys are presented in Table 3.1, with details of Raptor observations provided in Table 3.2.

Table 3.1 Bird Utilisation and Raptor Survey Results

SEASON	Autumn 2022											
Reference Points	**BUS01**		**BUS02**		**BUS03**		**BUS04**		**BUS05**		**BUS06**	
Timing	**14/03/2022 12:15**		**14/03/2022 13:41**		**14/03/2022 11:15**		**15/03/2022 11:05**		**15/03/2022 9:40**		**15/03/2022 10:18**	
Weather Conditions	**Cloudy, no wind, 19 degrees**		**Slight breeze, cloudy, 19 degrees**		**Cloudy, 17 degrees, no wind**		**Overcast, cool, slight breeze, 17 degrees**		**Overcast, cool, no wind 15 degrees**		**Overcast, slight breeze, cool, 16 degrees**	
Species/height class	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
Australian Magpie	4		2		2		8		6			2
Australian Wood Duck									3		30	
Black-faced Cuckoo-shrike					2							
Brown Falcon				1								
Crimson Rosella	1		2		1				2			
Eastern Rosella	1								3			
Grey Fantail					1							
Grey Shrike-Thrush												
Laughing Kookaburra												
Little Wattlebird												
Magpie-lark												
Masked Lapwing											5	

Nankeen Kestrel												1
Noisy Miner		2		3			4					
Pied Butcherbird												1
Pied Currawong					1		2					
Red-rumped Parrot												
Striated Thornbill							5					
Sulphur-crested Cockatoo												
Torresian Crow		3	8			2		4		2	3	
Wedge-tailed Eagle										2		3
White-throated Treecreeper							6					
Yellow-tailed Black-Cockatoo												

Season	Autumn 2022														
Reference Points	BUS07		BUS08		BUS09		BUS12		BUS13		RF01			RF02	
Timing	15/03/2022 15:55		16/03/2022 9:33		16/03/2022 12:21		16/03/2022 13:24		16/03/2022 14:20		15/03/2022 12:15			16/03/2022 10:30	
Weather Conditions	Overcast, no wind, 19 degrees		Cloudy, no wind, 14 degrees		Cloudy, no wind, 17 degrees		Cloudy, slight breeze, 18 degrees		Cloudy, slight breeze, 18 degrees		Overcast, breeze, 17 degrees			Cloudy, slight breeze, 16 degrees	
Species/height class	A	B	A	B	A	B	A	B	A	B	A	B	C	A	B
Australian Magpie	2			2	6		2		1		2			2	
Australian Wood Duck															
Black-faced Cuckoo-shrike			1												
Brown Falcon															
Crimson Rosella			4		5				6						
Eastern Rosella												1			
Grey Fantail	1														
Grey Shrike-Thrush					1										
Laughing Kookaburra					2				3						
Little Wattlebird									1						
Magpie-lark			2							5					
Masked Lapwing															

Season	Autumn 2022														
Reference Points	BUS07		BUS08		BUS09		BUS12		BUS13		RF01			RF02	
Timing	15/03/2022 15:55		16/03/2022 9:33		16/03/2022 12:21		16/03/2022 13:24		16/03/2022 14:20		15/03/2022 12:15			16/03/2022 10:30	
Weather Conditions	Overcast, no wind, 19 degrees		Cloudy, no wind, 14 degrees		Cloudy, no wind, 17 degrees		Cloudy, slight breeze, 18 degrees		Cloudy, slight breeze, 18 degrees		Overcast, breeze, 17 degrees			Cloudy, slight breeze, 16 degrees	
Species/height class	A	B	A	B	A	B	A	B	A	B	A	B	C	A	B
Nankeen Kestrel															
Noisy Miner						2			2		6			2	
Pied Butcherbird															
Pied Currawong									2					1	
Red-rumped Parrot		6													
Striated Thornbill															
Sulphur-crested Cockatoo															1
Torresian Crow		1	2												4
Wedge-tailed Eagle													1		
White-throated Treecreeper															
Yellow-tailed Black-Cockatoo				1											

Table 3.2 Raptor Surveys Results

Species	Count	Date	Start Time	End Time	Observer Initials	Distance	Bearing	Location	Height first observed	Height range of bird	Landscape	Direction	Comments	Behaviour
Brown Falcon	1	14/03/2022	13:51:26	13:53:15	LB & LS	50	SW 224	Air	100	80-150	Slope	Away		Soaring
Wedge-tailed Eagle	2	15/03/2022	9:40:15	9:50:15	LB & LS	150	W 300	Air	80	50-200	Valley	Away		Soaring
Wedge-tailed Eagle	5	15/03/2022	10:18:05	10:32:12	LB & LS	150	SE 142	Air	150	25-200	Ridge	Circling	Five individuals, at first sighting all in flight, three came down to perch between 80-100 m from BUS point	Hunting
Wedge-tailed Eagle	1	15/03/2022	12:27:01	12:30:00	LB & LS	200	NW 330	Air	250	200-250	Flat	Away		Soaring
Nankeen Kestrel	1	15/03/2022	10:25:33	10:28:45	LB & LS	100	SE 129	Air	100	0-120	Ridge	Cicling		Hunting

4. REFERENCES

AusWEA (Australian Wind Energy Association) 2005, *Wind Farms and Birds: Interim Standards for Risk Assessment,* Report prepared by Brett Lane and Associates and AIRA Professional Services; Report No. 2003.35 (2.2), July 2005.

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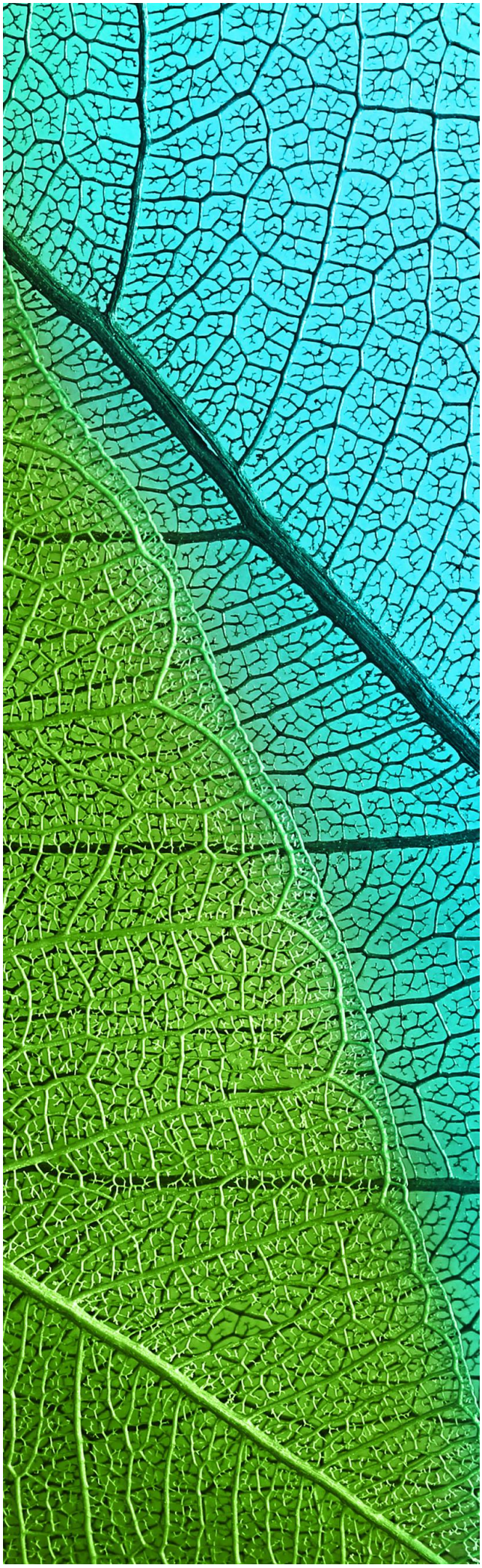
Appendix D Bat survey report



Winterbourne Wind Farm

Bat assessment 2020 to 2021

Prepared for NGH Consulting

January 2022
Report No. 19180.02 (2.1)

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1. Introduction

NGH Consulting Pty Ltd (NGH) engaged Nature Advisory Pty Ltd to conduct the two bat surveys for the Winterbourne Wind Farm (WWF), 30 kilometres east of Walcha. This investigation was commissioned to provide baseline data on the activity of bats on the wind farm site.

Two seasonal surveys were undertaken for a minimum of one month each in:

- Spring 2020; and
- Summer/Autumn 2021.

These two survey periods were targeted as this is the time of year when the threatened Large Bent-winged Bat *Miniopterus orianae oceanensis* moves about the landscape and covers larger distances than when it is confined to maternity caves and non-maternity caves. The Large Bent-winged Bat was expected to occur.

This report is divided into the following sections.

Section 3 describes the methods of the bat assessment.

Section 4 presents the results of the bat assessment.

Section 5 provides the conclusions.

This investigation was undertaken by a team from Nature Advisory comprising Candice Larkin (Zoologist), Ahmad Barati (Zoologist), Clinton Schipper (zoologist) Curtis Doughty (Senior Zoologist) and Bernard O'Callaghan (Director). Bat call analysis was undertaken by Greg Ford (Director and Principal Consultant) Balance! Environmental.

2. Methods

2.1. Introduction

The bat assessments were undertaken to collect baseline and species data in spring 2020 and autumn 2021, to coincide with the dispersal period of the Large Bent–winged Bat. No winter surveys were undertaken as bat activity is minimal on most nights at this time of year. Observations also indicate that bat fatalities at wind farm sites are confined to the warm months from October to April (Nature Advisory data), indicating that most bat activity is seasonal.

The aim of the surveys was to collect information on the presence and absence of bat species across the wind farm site, including any threatened species listed under the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or state *Biodiversity Conservation Act 2016* (BC Act). This information was collected using ultrasonic bat detectors that record the high-pitched echolocation calls of bats. The frequency of recording calls (activity levels) of species at each site is used as a surrogate for relative abundance. The spring 2020 and autumn 2021 surveys were particularly focused on gathering data on the presence or absence of Large Bent-winged Bat (LBB) that was expected to occur on the WWF site. Large Bent-winged Bat is listed as Vulnerable in NSW under the BC Act.

Ultrasonic detectors (Songmeters) that detect and record echo-location calls emitted by micro-bat species were deployed across eight sites (Figure 1) to identify the species of bats present at the proposed WWF.

The surveys for bats considered in this report were undertaken on the site during the following time periods.

- Spring 2020 – 5th October to 20th November 2020
- Autumn 2021 – 8th March to 22nd April 2021.

The habitat descriptions and duration of each survey is presented below in Table 1.

Table 1: Duration (number of nights) of each survey and site description

Site	Duration of spring 2020 survey	Duration of autumn 2021 survey	Habitat description
1	23	30	Gully bottom of steep wooded hill, with dense understorey, near farm dam
2	55	41	Grazed hilltop with scattered trees
3	21	44	Pasture with scattered remnant vegetation
4	4	44	Woodland with some dieback on hilltop
5	55	13	Open pasture near farm dam, surrounded by remnant woodland
6	55	44	Open pasture near farm dam on mid slope
7	54	0	Woodland with dense understorey bordering escarpment & creekline
8	20	15	Woodland surrounded by agriculture near farm dam

The spring 2020 survey was undertaken in October and November using Songmeter detectors distributed at eight locations across the proposed wind farm site. Bat recordings were undertaken for between four and 55 detector nights (Table 1)

The autumn 2021 survey was undertaken in March and April at the same eight locations, bat recordings were undertaken for between 13 and 44 detector nights. The bat detector at site seven failed to record any data and therefore the autumn data is from seven and not eight sites (Table 1).

A total of 518 detector nights were surveyed.

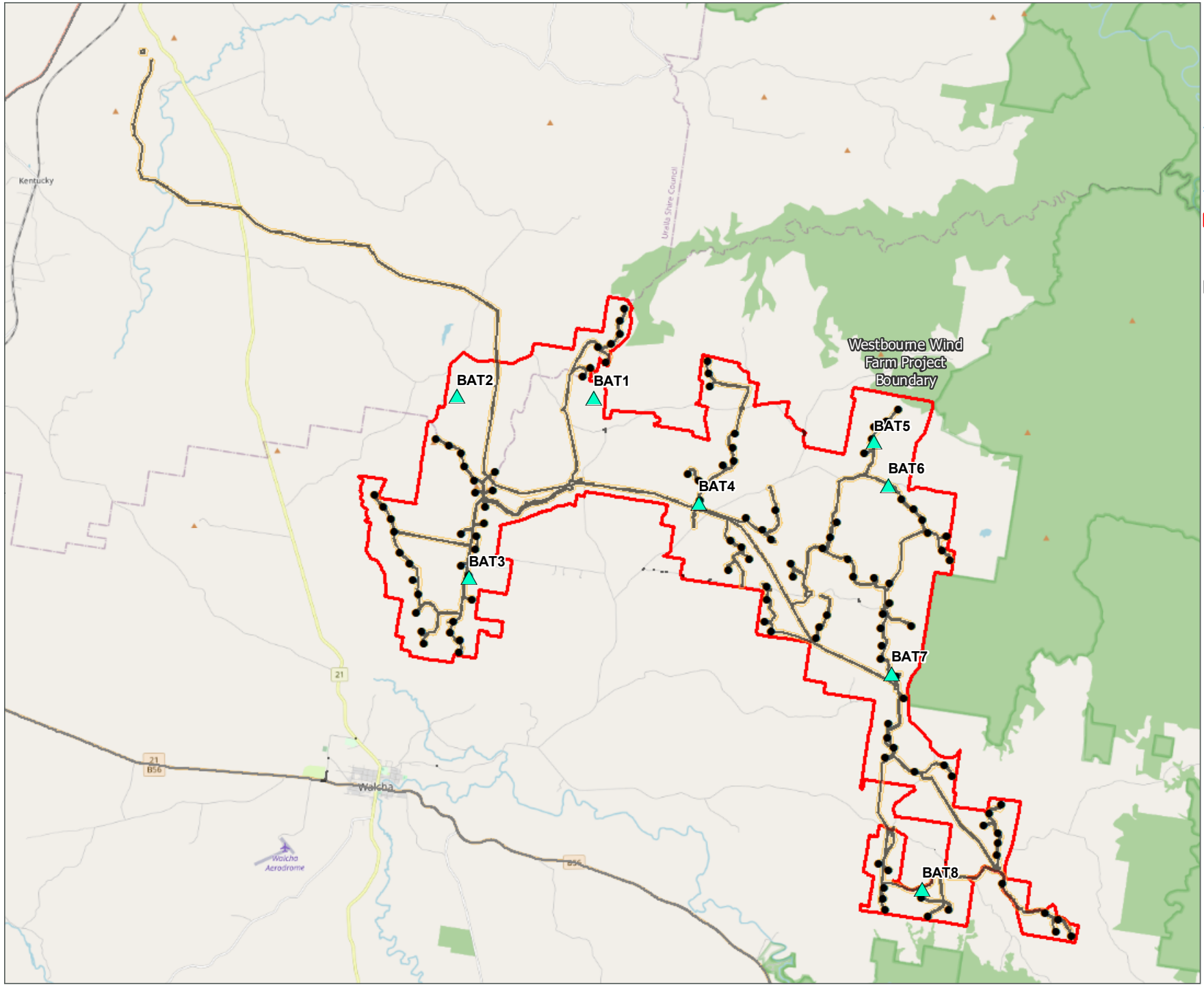

Figure 1: Location of bat detectors at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- Locations of bat detectors

N

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2.2. Detectors and analysis

Bat surveys were undertaken to collect information on bat species, including any listed threatened species, using the site and the relative call frequency (activity levels) of these species. The surveys were undertaken using automated SongMeter® detectors (SM4BAT; Wildlife Acoustics) distributed across all habitat types on the proposed wind farm site located near proposed wind turbine sites.

The bat detectors were secured to trees or fence posts approximately 1.5-2 metres above ground. The detectors were programmed to commence operation approximately 30 minutes before dusk and to cease approximately 30 minutes after dawn. Each SongMeter unit used a 64GB SD card that recorded bat echolocation calls, along with the date and time of each call.

Calls from the units were downloaded and sent to Greg Ford (Balance! Environmental, Toowoomba, Queensland) for identification. The recoded call files were viewed in Kaleidoscope Pro analysis software (Wildlife Acoustics, USA), which provides a sonogram display of frequency versus time.

Call identification was based on a key developed by comparing the characteristics of bat calls with reference calls from known species recorded across Australia. Identification is largely based on changes to frequency patterns over time, especially as the characteristic frequency changes.

Only those recordings that contained at least three definite and discrete pulses were classified as bat calls. For most species, a call sequence of several seconds in duration is required before identification can be made confidently.

2.2.1. Limitations

The identification of echolocation calls from microbats in south-eastern Australia is facilitated by the fact that many calls are species-specific. Calls that could not be identified definitively were allocated to species complexes.

A further limitation in the use of this technique is that it is not possible to census bat numbers. For example, ten calls of a species may be recorded but it is not known if this represents ten individuals of that species or one individual of that species flying past the bat recorder ten times. Therefore, it is not possible to determine utilisation rates, only activity levels.

The bat detectors used during this survey sample a limited airspace of approximately 20 to 30 metres from the recorder microphone.

Weather conditions, including severe storms during the recording period, may affect bat activity levels, which vary in response to variables such as air temperature, relative humidity, barometric pressure, wind speed, direction and gusts, rain and moonlight. Typically, bats are found to be less active during the circumstances listed below.

- During periods of full moon, and when the moon is high in the sky
- At wind speeds of over ten metres per second
- During moderate to heavy rainfall.

The identification of echolocation calls from microbats in south-eastern Australia is facilitated by the fact that many calls are species-specific; however, not all species can be consistently or reliably identified using this technique. The identification of Large Bent–winged Bat calls using ultrasonic bat detectors can be challenging and often key, salient call characters may not feature prominently in all recordings to allow for a confirmed identification or confirmed exclusion of this species.

Such calls were attributed to the Large Bent-winged Bat/Forest Bat species complex as it is sometimes not possible to distinguish the call as belonging to any of these species, which have calls within the same frequency range.

Similar call complexes were made for the Eastern False Pipistrelle as its calls are sometimes not distinguishable from other bat species. Eastern False Pipistrelle call complexes that were reported at the Winterbourne Wind Farm include the following:

- Eastern False Pipistrelle/Lesser Long-eared Bat
- Eastern False Pipistrelle/Western Broad-nosed Bat
- Eastern False Pipistrelle/Little Broad-nosed Bat

Additionally, 12 species complexes were made for bats reported at the Winterbourne Wind Farm although none were attributed to threatened species, they included the following:

- Lesser Long-eared Bat / Gould's Long-eared Bat
- Gould's Wattled Bat / Western Broad-nosed Bat
- Chocolate Wattled Bat / Little Bent-winged Bat
- Large Forest Bat / Southern Forest Bat
- Southern Forest Bat / Little Forest Bat
- Eastern Freetail Bat / Gould's Wattled Bat
- Eastern Freetail Bat / Southern Freetail Bat
- Chocolate Wattled Bat / Forest Bat sp.
- Little Broad-nosed Bat / Greater Broad-nosed Bat
- Little Forest Bat / Eastern Cave Bat
- Freetail Bat sp. / Gould's Wattled Bat

3. Results

The bat calls recorded from the two survey periods at Winterbourne Wind Farm were analysed by Balance! Environmental and are detailed below.

3.1. Overview of results

This sub-section presents a summary of results of the bat studies undertaken at the proposed WWF ite.

The bat studies at the site identified 14 species of bat and 16 species complexes in the study area. The season and site they were recorded at is presented in Table 2 below.

Table 2: Compilation of species recorded during the two survey periods at Winterbourne Wind Farm.

Scientific name	Common name	Conservation status	Sites of occurrence Spring 2020	Sites of occurrence Autumn 2021
Chalinolobus morio	Chocolate Wattled Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable, BC Act		3,4,6,8
Ozimops ridei	Eastern Freetail-Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6,8
Chalinolobus gouldii	Gould's Wattled Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6,8
Scoteanax rueppelli	Greater Broad-nosed Bat	Vulnerable, BC Act		2,3,4,5,6,8
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable, BC Act	2 & 5	1,2,3,4,5,6,8
Vespadelus darlingtoni	Large Forest Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6,8
Miniopterus australis	Little Bent-winged Bat	Vulnerable, BC Act		2,6,8
Scotorepens orion	Little Broad-nosed Bat	Common, secure	Nil	2,3,4,5,6
Vespadelus vulturnus	Little Forest Bat	Common, secure	All	1,2,3,4,5,6,8
Vespadelus regulus	Southern Forest Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6,8
Ozimops planiceps	Southern Freetail-Bat	Common, secure		3 & 6
Austonomus australis	White-striped Freetail Bat	Common, secure	1,2,3,5,6,7,8	2,3,4,5,6,8
Saccolaimus flaviventris	Yellow-bellied Sheathtail-Bat	Vulnerable, BC Act	Nil	3,4,6
	Species complexes			
Nyctophilus geoffroyi / N.gouldi	Lesser/Goulds Long-eared Bat	Common, secure	All	2,3,4,5,6,8
C. gouldii / Scotorepens balstoni	Gould's Wattled Bat / Western Broad-nosed Bat	Common, secure	5	Nil
C. morio / Miniopterus australis	Chocolate Wattled Bat / Little Bent-winged Bat	Common/vulnerable	5	Nil
Falsistrellus tasmaniensis / Nyctophilus sp.	Eastern False Pipistrelle / Lesser Long-eared Bat	Vulnerable BC Act/common	2 & 5	Nil
F.tasmaniensis / Scotorepens sp.	Eastern False Pipistrelle / Western Broad-nosed Bat	Vulnerable BC Act/common	2	Nil
V. darlingtoni / V. regulus	Large Forest Bat / Southern Forest Bat	Common, secure	1,2,3,5,6,7,8	2,3,5,6,8
V. regulus / V. vulturnus	Southern Forest Bat / Little Forest Bat	Common, secure	1,2,3,5,6,7,8	1,2,3,4,5,6,8
V. vulturnus / C. morio	Little Forest Bat / Chocolate Wattled Bat	Common, secure	All	Nil
Vespadelus sp. / M. orianae australis	Forest Bat sp. / Large Bent-winged Bat	Common/vulnerable BC Act	All	1,2,3,4,5,6,8
O. ridei / C. gouldii	Eastern Freetail Bat / Gould's Wattled Bat	Common, secure	1,2,3,5,6,7,8	Nil

Scientific name	Common name	Conservation status	Sites of occurrence Spring 2020	Sites of occurrence Autumn 2021
O. ridei / O. planiceps	Eastern Freetail Bat / Southern Freetail Bat	Common, secure	1,2,3,6,7	3,5,6,8
C.morio / Vespadelus sp.	Chocolate Wattled Bat / Forest Bat sp.	Common, secure	1,2,3,4,5,6,8	1,2,3,4,5,6,8
F. tasmaniensis / S. orion	Eastern False Pipistrelle / Little Broad-nosed Bat	Vulnerable BC Act/common	Nil	3,4,6,8
S. orion / S. rueppellii	Little Broad-nosed Bat / Greater Broad-nosed Bat	Common, secure	Nil	2,3,4,5,6,8
V. vulturnus / V. troughtoni	Little Forest Bat / Eastern Cave Bat	Common, secure	Nil	2,3,4,5,6
Ozimops sp. / C.gouldii	Freetail Bat sp / Gould's Wattled Bat	Common, secure	Nil	1,2,3,4,5,6,8

A total of five bat species listed as vulnerable under the NSW BC Act were recoded and they are listed below.

- Eastern False Pipistrelle
- Greater Broad-nosed Bat
- Large Bent-winged Bat
- Little Bent-winged Bat
- Yellow Bellied Sheathtail Bat.

There were also four species complex that may be attributed to two of these listed threatened species, including the following.

- Eastern False Pipistrelle/Lesser Long-eared Bat
- Eastern False Pipistrelle/Western Broad-nosed Bat
- Eastern False Pipistrelle/Little Broad-nosed Bat
- Large Bent-winged Bat/Forest bats.

In addition, it is also noted that in the autumn 2021 survey, half of the unresolved calls were recorded at sites 6, which, is located beside two isolated paddock trees, about 80m downstream of a small farm dam. Most (17,082) of these unresolved calls were probably from Vespadelus vulturnus and/or V. regulus but were labelled either V. vulturnus/C. morio or Vespadelus sp./M. orianae. The calls were largely of a type associated with bats flying in “cluttered” airspace (e.g., in dense vegetation, near a roost or over water) and many files contained calls from multiple individuals. This suggests that the trees next to the detector perhaps contained a maternity roost or that some sort of communal behaviour (e.g., swarming) was occurring at the site.

3.2. Threatened bat species recorded on the WWF site

Five threatened bat species were recorded from the WWF site. The survey sites they were recorded from and the mean number of calls per night are presented in Table 3.

The Eastern False Pipistrelle was positively recorded from four sites and potentially from two additional sites where the call complex containing it was recorded. The Greater Broad-nosed Bat was positively

recorded from six sites. The Large Bent-winged Bat was positively recorded from seven sites and the Large Bent-winged Bat/Forest Bats complex was recorded across all sites. The Little Bent-winged Bat was recorded from three sites. The Yellow-bellied Sheathtail Bat was recorded from three sites.

Table 3: Mean number of calls per night of threatened bat species recorded at Winterbourne Wind Farm

Species	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Average calls per night
Spring 2020 survey									
Large Bent-winged Bat	0.00	0.05	0.00	0.00	0.29	0.00	0.00	0.00	0.07
Call complexes									
Eastern False Pipistrelle/ Lesser Long-eared Bat	0.00	0.04	0.00	0.00	0.36	0.00	0.02	0.00	0.08
Eastern False Pipistrelle/ Western Broad-nosed Bat	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Autumn 2021 survey									
Eastern False Pipistrelle	0.00	0.00	0.32	0.07	0.00	0.11	0.00	0.13	0.10
Greater Broad-nosed Bat	0.00	0.02	0.75	0.23	0.08	0.14	0.00	0.13	0.23
Large Bent-winged Bat	0.23	1.12	3.00	0.41	1.69	1.68	0.00	0.33	1.32
Little Bent-winged Bat	0.00	0.10	0.00	0.00	0.00	0.14	0.00	0.07	0.05
Yellow-bellied Sheathtail Bat	0.00	0.00	0.18	0.11	0.00	0.07	0.00	0.00	0.07
Species complexes									
Eastern False Pipistrelle/ Little Broad-nosed Bat	0.00	0.00	0.07	0.09	0.00	0.09	0.00	0.67	0.09
Large Bent-winged Bat/ Forest bats.	0.50	6.49	12.66	141.80	19.15	27.82	0.00	60.93	40.97

3.2.1. Eastern False Pipistrelle

No calls during the spring 2020 survey could be attributed to the Eastern False Pipistrelle (EFP), however two species complexes that may contain calls from this species were detected. With an average of only 0.08 calls per night this species was very infrequently detected during the spring 2020 survey.

The autumn 2021 survey followed a similar pattern of activity as the spring 2020 surveys. No greater than 0.3 EFP's were detected on average per night, when its species complexes were added to confirmed calls (Figure 2) this increased to a maximum of 0.8 per night at site 8.

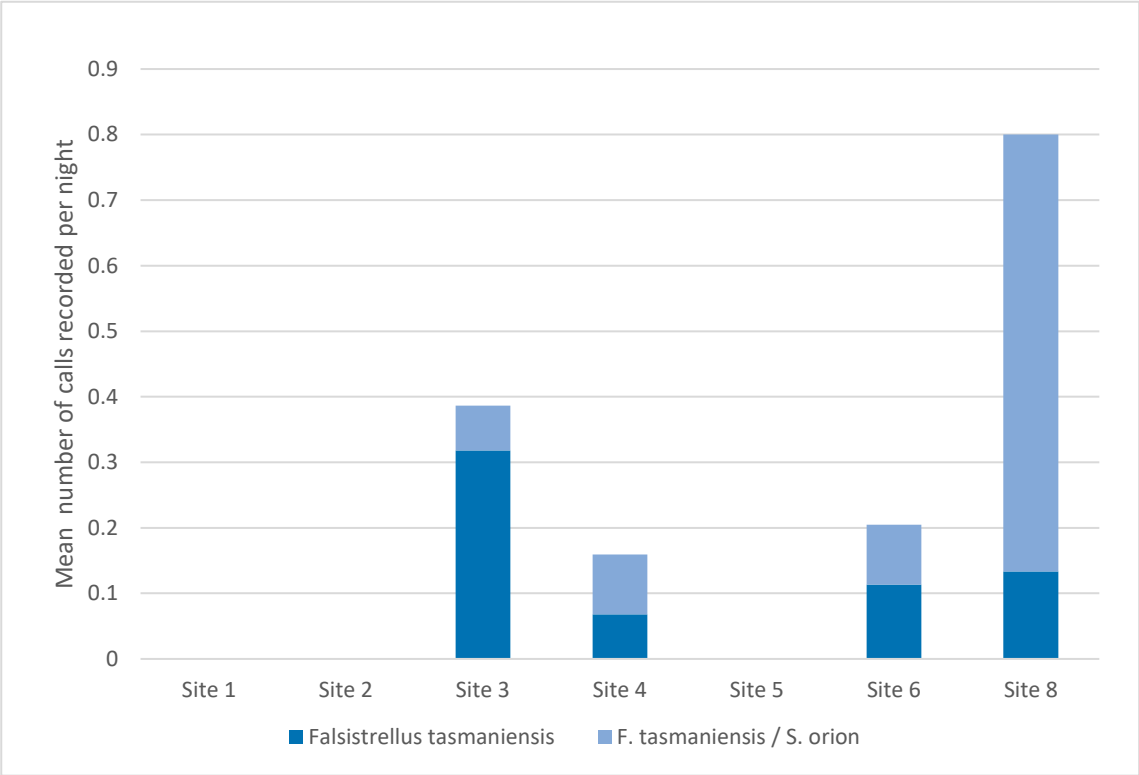

Figure 2 Eastern False Pipistrelle detection rates during the autumn 2021 survey

3.2.2. Greater Broad-nosed Bat

No Greater Broad-nosed Bats (GBNB) were detected during the spring 2020 surveys but they were recorded at every site except one in the autumn 2021 survey. The highest rate of calls per night was detected at site 3 with 0.75 calls per night and an overall total of 0.23 calls per night across all sites. Site 3 while having the highest rates of GBNB calls had no discernible landscape features that would make this area attractive to bats and it is typical habitat within the WWF site.

3.2.3. Large Bent-winged Bat

Very low numbers of Large Bent-winged Bat were recorded in Spring (Table 3). The proportion of positively identified calls allocated to *M. orianae* for each site was used to calculate the likely representation of *M. orianae* in the unresolved call group. That portion of the unresolved calls were then added to the positively identified calls to determine the likely total activity level for *M. orianae* at each site (Figure 3). Overall *M. orianae* activity level was low, with less than three calls detected per night at all sites except site 3 (c. 5 calls/night).

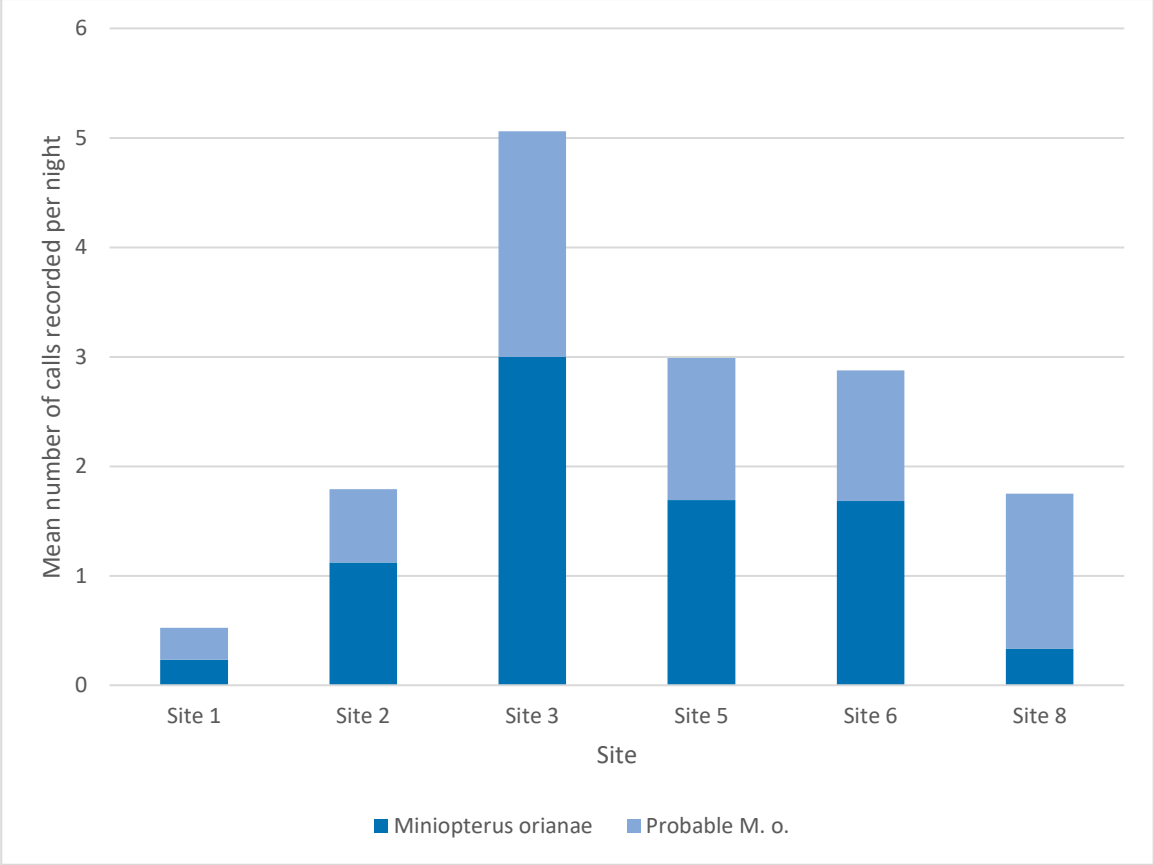

Figure 3 Detection rate per site of Miniopterus orianae during the autumn 2021 surveys

Relative activity levels of M.orianae and Vespadelus spp. during spring 2021 based on positively identified calls.

Given the low detection rate for *M. orianae* at most sites, it is not possible to obtain a reliable indication of temporal variation in activity levels on a site-by-site basis; however, when data from all sites is aggregated, there appears to be no distinct trend in *M. orianae* activity from the start to finish of the autumn survey.

Out of 10,767 potential LBB calls filtered, more than 90% consisted of one of three FB species (*V. darlingtoni, V. regulus, V. vulturnus*). A total of 32 calls (<1%) were positively identified as LBB and the 933 remaining calls (9%) that could not be reliably differentiated were allocated to the LBB/FB group. Due to the variation in detector nights between sites the mean number of calls per detector-night were calculated (Table 4).

Table 4: Number of calls per site, of LBB, LBB/FB complex, and FB group (spring survey period)

Site	Large Bent-winged Bat	Forest Bat spp.	LBB / Forest Bat Complex	Probable LBB	Probable Forest
Site1	0.23	0.17	0.50	0.29	0.21
Site 2	1.12	9.76	6.49	0.67	5.82
Site 3	3.00	15.43	12.66	2.06	10.60
Site 4	0.41	2.95	142.57	17.34	125.23
Site 5	1.69	23.31	19.15	1.30	17.86
Site 6	1.68	37.52	27.82	1.19	26.62
Site 8	0.33	14.00	60.93	1.42	59.52
Total/site	**1.32**	**14.62**	**41.12**	**3.39**	**37.72**

Notes: LBB = Large Bent–winged Bat; FB = Forest Bat.

3.2.4. Little Bent-wing Bat

The Little Bent-wing Bat was not detected during the spring 2020 survey. During the autumn 2021 survey it was detected at three sites (Table 3). The highest rate of activity was detected at site 6 with 0.14 calls per night. This site is located near two trees and a farm dam which in general bats will utilise to forage and drink, however with such low rates of activity it is not possible to determine patterns of utilisation across the WWF site.

3.2.5. Yellow-bellied Sheathtail Bat

The Yellow-bellied Sheathtail Bat (YBSB) was not detected during the spring 2020 surveys. It was at three sites (Table 3) during the autumn 2021 survey. The highest rate of calls per night was detected at site 3 with 0.18 calls per night compared with an overall total of 0.07 calls per night across all sites. Site 3, while having the highest rates of YBSB calls, had no discernible landscape features that would make this area attractive to bats. This site is typical of habitat within the WWF site.

3.3. Bat activity

Bat activity (mean calls per night) showed substantial variation between the spring 2020 and autumn 2021 surveys. During the spring 2020 survey, a high degree of variation was observed between the sites with site 6 having twice the number (of detected bats calls as the next highest site (Figure 4). In autumn 2021, activity levels across sites 4 to 8 only varied by approximately 50 calls per night (Figure 5).

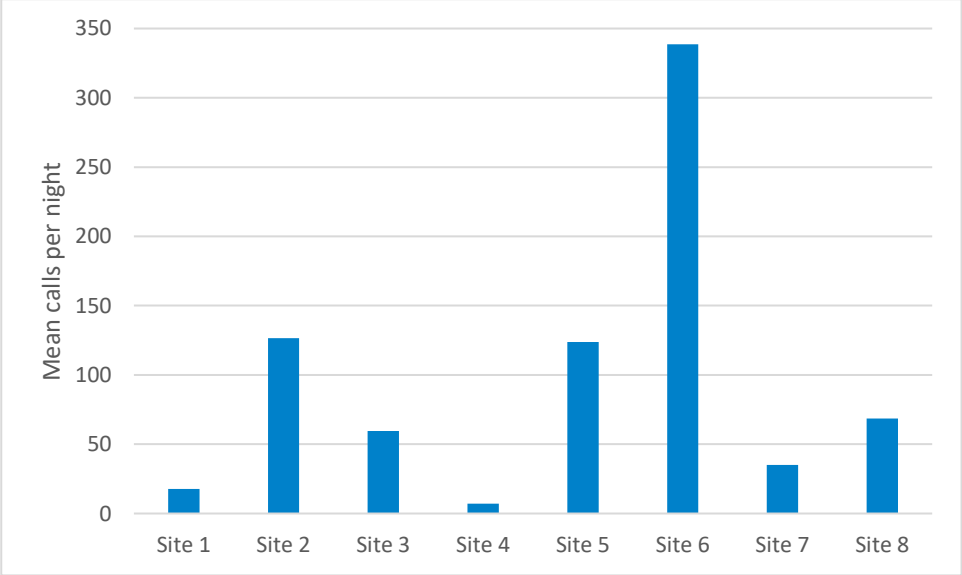

Figure 4: Mean bat activity across the Spring 2020 survey

Across both survey periods, site 6 consistently had the highest rates of bat activity, with an average of 339 and 304 calls per night in spring 2020 and autumn 2021 respectively. Site 6 was located in open pasture halfway up the slope of a ridge and located near a farm dam (Figure 1). Water bodies are often areas of high bat utilisation and bats will often visit a water body immediately after emerging from a roost to drink then periodically throughout the night to forage for insects.

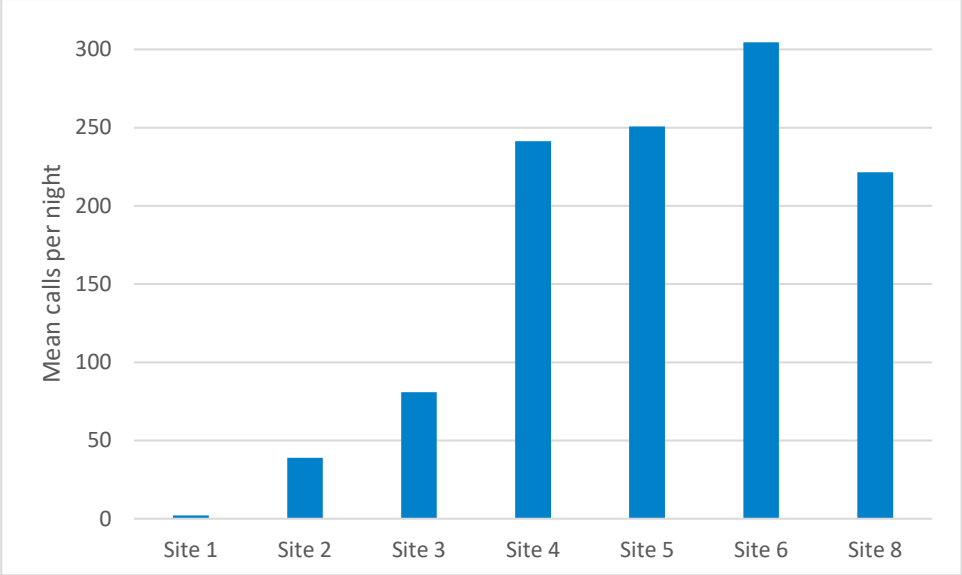

Figure 5: Mean bat activity across the Autumn 2021 Survey

3.4. Threatened species

All threatened species except the LBB were recorded on average at an activity level of less than 0.25 calls per night. Given this, only the LBB can be reported in greater detail as much more information on activity was generated for this species on the WWF site than any other.

3.4.1. Large Bent-winged Bat – existing information

Large Bent-winged Bat pregnant females migrate from their wintering areas on the coast to their staging and maternity caves inland in spring. Maternity caves, supporting maternity colonies, are characterized by the spring and summer presence of thousands of individuals and by total winter absence (Dwyer 1965). The closest maternity cave to Winterbourne Wind Farm is Willi Will Cave, 60 kilometres east (Figure 6).

Migration and dispersal events can be detected by ultrasonic bat recorders, usually as one or two nights recording a large number of calls, as if many bats are passing a survey point in succession. Previous bat studies carried out by the Nature Advisory team in 2014 recorded LBB migration between Church Cave and the coast, in a proposed windfarm 65 kilometres east of the caves. The spikes were recorded over two separate nights, being 617 and 331 calls in two recording sites on 8th Mar and 2,463 calls on one site on 13th March 2020. On the same nights at other recording sites within five kilometres, very low activity levels were recorded for this species. Given that the population increases significantly after breeding, large spikes are only expected in February–March. A pilot study in 2015-17 at a site 20km west of Church Cave showed large spikes of bat activity in summer-autumn, and smaller but significant peaks in November

Based on monitoring of the Large Bent-winged Bats in Church Cave (Wee Jasper, NSW) for the last nine years by Doug Mills and Michael Pennay (NSW BCD), a seasonal lifecycle pattern has been proposed comprising the following four distinct phases:

- Staging
- Movement from staging to maternity site
- Birth and lactation

- Weaning.

Staging

Groups of pregnant female LBBs start to gather in a number of 'staging caves' *en route* to the maternity cave from early October until mid-December.

Movement from staging to maternity site

From mid- December, the pregnant bats move from staging caves to the main maternity cave at Wee Jasper over approximately three weeks. Typically, by late December most of the bats have arrived.

Birth and lactation

Once gathered at the maternity cave, most bats give birth to a single pup, the young are left in the warmth and high humidity of the cave each night while the mothers forage for insects near the cave so they can return several times a night to feed the young. During this phase, the adult population at the maternity cave is relatively stable from early January until mid-February.

Weaning

From mid-February onwards, the young are weaned and start to fly from the maternity cave to feed independently, almost doubling the number of bats foraging in the area.



Figure 2: Location of Winterbourne WF and known Large Bent winged Bat roosting and maternity caves in Northern NSW

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 19/10/2021

- Winterbourne wind farm boundary
- Maternity caves
- Large Bent winged Bat roosting

N

Metres
0 22,400

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
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03 9815 2111 - info@natureadvisory.com.au

RENAME TO PROJECT NUMBER - Created by: nm - \\Nat-naw-dt04\e\GIS\2019 Jobs\19180\19180 FIG1 Bent winged bat 211013.mxd

3.5. Discussion

The following is noted from the compilation of data from the baseline bat surveys.

- The survey confirmed the presence of Large Bent-winged Bats in both in spring 2020 and autumn 2021.
- The closest known maternity cave to the Winterbourne Wind Farm site is locate 60km to the east
- There was a low detection rates of Large Bent-winged Bats, with fewer than three calls detected per night at all sites except Site 3 (c. 5 calls/night).
- Due the low detection rate of Large Bent-winged Bats, it is not possible to obtain a reliable indication of temporal variation in activity levels on a site-by-site basis; however, when data from all sites is aggregated, there appears to be no distinct pattern in Large Bent-winged Bats activity during the two surveys.
- Survey site 6 had the highest level of bat activity suggesting that water bodies on the WWF site are being utilised by local bats.
- High variation in activity between sites was observed in the spring 2020 survey while the autumn 2021 survey showed far more consistent patterns of activity across the site.
- No spikes in activity from the Large Bent-winged Bat were observed, suggesting that no migration was detected across the WWF site.
- The overall low detection rate of Large Bent-winged Bat calls in the February - May period (Table 3), which covers the dates when they are expected to migrate to the coast, suggests that WWF is not located within the post-breeding migration route.

4. Discussion and recommendations

This section presents the conclusion of these interim baseline assessments. The data collected from these studies is to be used as baseline data pre-construction. The results can be compared with future studies to determine if there has been any change or impact due to construction and operation of the WWF.

The conclusions from the bat surveys of the WWF are presented below.

- A total of 14 bat species and 16 species complexes have been recorded at the WWF
- Five threatened bat species listed as vulnerable under the BC Act have been recorded at the WWF, including:
    - Eastern False Pipistrelle
    - Greater Broad-nosed Bat
    - Large Bent-winged Bat
    - Little Bent-winged Bat
    - Yellow Bellied Sheathtail Bat.
- The closest known maternity cave for the Large Bent-wing Bat (Willi Will Cave) is located 60km to the east, the Southern Bent-winged Bat (a closely related species with a very similar breading migration, although slightly smaller) can travel up to 70km per night to forage between roosting caves. It is unlikely that the Large Bent-winged Bat would be able to travel the 120km return flight from this maternity cave to and from the WWF site.
- Surveys were undertaken at the WWF site during the spring and autumn migratory periods for the Large Bent-wing Bat:
    - Higher activity levels of Large Bent–winged Bat were recorded during the Autumn surveys.
    - Lower activity levels were recorded in the spring 2020 surveys, suggesting that WWF was not highly utilised in the migration from the coast to breeding caves from the non-breeding areas in the eastern coastal lowlands of NSW.
    - No spike in activity indicates that no migration was recorded at the WWF site.
- Low levels of activity of the four other detected threatened bat species indicate that they are not common around the WWF are not utilising any particular resources onsite.
- The results gathered by this investigation suggest that the WWF is not highly utilised by threatened bats.

4.1. Discussion on impacts on threatened bat species

In relation to the impact of wind farm on bats, the following is noted:

- Wind farms impact on the higher flying species of bat. These species include species such as the White-striped freetail Bat, Gould's Wattled bat and Cholate Wattled Bat;
- The two years of monitoring of wind turbines at a wind farm in the New England Region north of Winterbourne wind farm only recorded higher numbers of White-striped Freetail Bat (7) and single carcasses of Chocolate Wattled Bat and Little Forest Bat. Interestingly this wind farm had turbines

with a minimum lower swept area of 70 metres. It is known at wind farms mortality of bats decreases as wind turbines are placed higher above the ground.

- Higher levels of mortality of bats of known for turbines between 20 and 37 metres in height from wind farm monitoring in NSW (Nature Advisory unpublished)
- Many of the threatened and list bat species recorded on site are not known to be regularly higher-flying species of bat. Thus, it is recommended to minimise impacts on these species a lower RSA is established at 60 metres and above.
- Although there are few studies on gradients of bat of forest bat use from forests into open paddocks it is prudent to establish buffers between forests and wind turbines. At a minimum it is proposed that 120 metres is established as a buffer between forested areas and the tips of wind turbine blades.

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Appendix 1: Balance! Environmental report for the spring 2020 bat call analysis

Microbat Call Identification Report

Prepared for ("Client"):	Nature Advisory
Survey location/project name:	Winterbourne Wind Farm, NSW
Survey dates:	October-November 2020
Client project reference:	
Job no.:	NAD-2102
Report date:	11 March 2021

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Methods

Data received

Balance! Environmental received 234,887 zero-crossing analysis bat-call sequence files (ZC files), recorded with Song Meter detectors (Wildlife Acoustics, Maynard MA, USA) deployed at eight separate sites in the Winterbourne Wind Farm study area between 5th October and 28th November 2020. Deployment details and detector outputs are summarised in **Table 1.**

Call analysis and identification

Call analyses were performed in *Anabat Insight* (Titley Scientific, Brisbane), with all files passed first through a generic noise filter to exclude files containing only non-bat background noise. Noise filter parameters used in this process are described in **Appendix 1**.

Files that passed the noise filter (i.e., contained bat calls) were then processed with a Decision Tree analysis to group and label detected bat-calls based on a combination of call characteristics derived from zero-crossing analysis metrics, such as characteristic frequency (Fc), time between calls (TBC), and pulse curvature. The preliminary call identities applied by the Decision Tree process were then confirmed or adjusted manually by comparing the call spectrograms and derived metrics with those of regionally relevant reference calls and/or with published call descriptions (e.g., Reinhold et al. 2001; Pennay *et al.* 2004). Consideration was also given to the probability of species' occurrence based on published distribution information (e.g. Churchill 2008; van Dyck et al. 2013) and on-line database records (e.g. **http://www.ala.org.au**).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/. Species nomenclature follows Armstrong *et al.* (2020).

Table 1 Bat-detector deployment summary for the Spring 2020 survey at Winterbourne WF.

Detector	Position		Sampling period		Number of detector-nights		No. ZC files recorded	
	Lat	Long	Date installed	Date Collected	Stated total	Nights with bat calls	Total	No. with calls
Bat Recorder (BR) #1	-30.8420	151.6882	5/10	29/11	56	23	840	405
Bat Recorder (BR) #2	-30.8408	151.6295	5/10	29/11	56	55	66759	6892
Bat Recorder (BR) #3	-30.9079	151.6336	6/10	29/11	55	21	2027	1241
Bat Recorder (BR) #4	-30.8814	151.7329	5/10	29/11	56	4	80	28
Bat Recorder (BR) #5	-30.8594	151.8080	5/10	29/11	56	55	42548	6773
Bat Recorder (BR) #6	-30.8756	151.8140	5/10	29/11	56	55	75505	18608
Bat Recorder (BR) #7	-30.9450	151.8148	6/10	29/11	55	54	41537	1869
Bat Recorder (BR) #8	-31.0249	151.8269	6/10	29/11	55	20	5591	1355

Results

The noise filtration process excluded 84% of the recorded files (see **Table 1**). The remaining 37,171 files contained at least 37,327 individual bat calls, 16% (5999) of which were positively identified. The other 31,328 "unresolved" calls each potentially represented two or more species and were allocated to multi-species groups.

Appendix 2 provides a breakdown of call numbers allocated to each species and unresolved group for each site, while **Appendix 3** contains representative call spectrograms for each identified species.

Species detected

At least 10 and up to 15 species were detected across the study area (see **Table 2**). The positively identified calls were allocated to nine individual species plus the undifferentiated species pair of *Nyctophilus geoffroyi/N. gouldi*. Almost half of the positively identified calls were contributed by just two species: *Chalinolobus gouldii*; and *Austronomus australis* (see **Appendix 2**).

Over 99% of the unresolved calls represented seven species that were otherwise positively identified: *Chalinolobus gouldii*; *C. morio*; three *Vespadelus* spp.; *Miniopterus orianae*; and *Ozimops ridei*. The other 84 unresolved calls potentially represented up to five additional species: *Falsistrellus tasmaniensis*; *Scotorepens balstoni*; *S. orion*; and *Ozimops planiceps*.

Figure 1 gives an overview comparison of the species composition at each site based on call detection rates for each positively identified species an unresolved species group.

Almost half of the unresolved calls were recorded by BR #6, which, based on Google Earth imagery, appears to have been located beside two isolated paddock trees, about 80m downstream of a small farm dam. Most (17,082) of these unresolved calls were probably from *Vespadelus vulturnus* and/or *V. regulus* but were labelled either *V. vulturnus/C. morio* or *Vespadelus* sp./*M. orianae*. The calls were largely of a type associated with bats flying in "cluttered" airspace (e.g., in dense vegetation, near a roost or over water) and many files contained calls from multiple individuals. This suggests that the trees next to the detector perhaps contained a maternity roost or that some sort of communal behaviour (e.g., swarming) was occurring at the site.

Where "unresolved" species groups were identified and one or more group members were not also positively identified for a site, those group members are listed as "Possible" in **Table 2**.

Table 2. Bat species recorded during the Winterbourne spring survey, October-November 2020.
♦ = 'definite' - at least one call was attributed unequivocally to the species
□ = 'possible' - calls like those of the species were recorded, but not reliably identified

Detector/site:	BR #1	BR #2	BR #3	BR #4	BR #5	BR #6	BR #7	BR #8
Chalinolobus gouldii	♦	♦	♦		♦	♦	♦	♦
Chalinolobus morio	♦	♦	♦	□	♦	♦	♦	♦
Falsistrellus tasmaniensis		□			□		□	
Nyctophilus geoffroyi / N. gouldi	♦	♦	♦	♦	♦	♦	♦	♦
Scoteanax rueppellii	♦	♦	♦		♦		♦	
Scotorepens balstoni					□			
Vespadelus darlingtoni	♦	♦	♦		♦	♦	♦	♦
Vespadelus regulus	♦	♦	♦		♦	♦	♦	♦
Vespadelus vulturnus	♦	♦	♦	♦	♦	♦	♦	♦
Miniopterus australis					□			
Miniopterus orianae	□	♦	□	□	♦	□	□	□
Austronomus australis	♦	♦	♦		♦	♦	♦	♦
Ozimops ridei	♦	♦	♦		♦	♦	♦	♦
Ozimops planiceps	□	□	□			□	□	

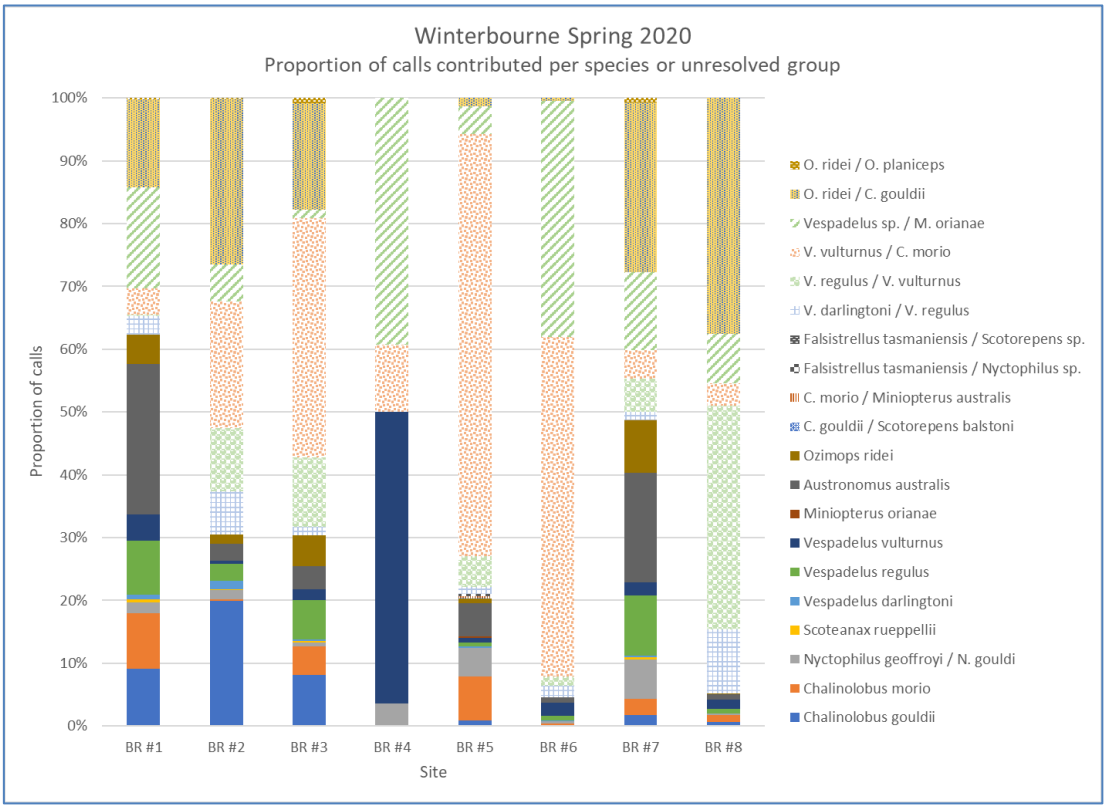

Figure 1. Comparison of bat species composition at eight sites during the spring 2020 survey at Winterbourne Wind Farm.

Call detection rates

Bat activity levels varied considerably at spatial and temporal scales during the spring 2020 survey at Winterbourne.

At site level, the mean bat detection rate ranged from fewer than 10 calls per detector-night (d-n) on BR #4 to over 300 calls/d-n on BR #6, with an overall detection rate across the entire study area of ~130 calls/d-n (see **Figure 2**). As noted above, the relatively high detection rate on BR #6 (more than double the overall mean) was likely due to a single species (probably *V. vulturnus*) congregating around a roost site or other communally significant landscape feature.

Nightly activity levels across the whole study area varied largely in response to daily fluctuations in maximum and minimum temperatures, with greater bat activity following warmer days and on warmer nights (see **Figure 3**). The high detection rate for the unresolved (probable *V. vulturnus*) calls at BR #6 remained relatively constant throughout the survey period (see **Figure 4**) and was sustained throughout the night (see **Figure 5**). These activity patterns recorded on BR #6 further support to the notion that the detector may have been placed near a maternity roost.

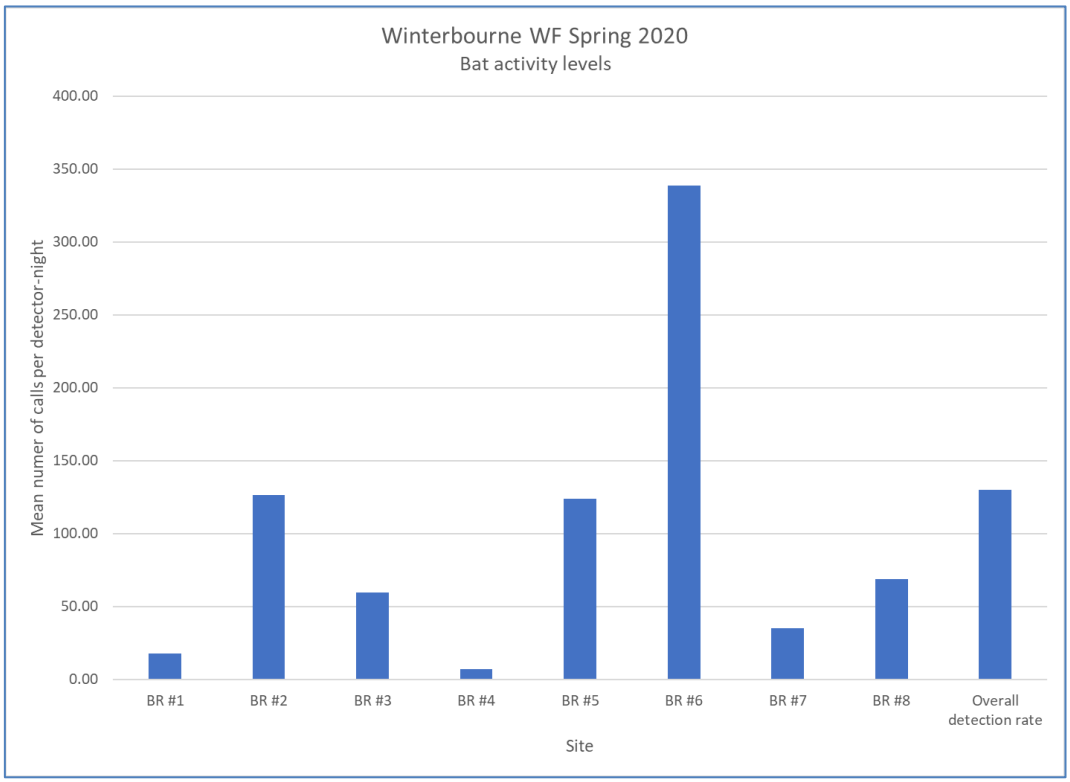

Figure 2. Comparison of bat activity levels at eight sites during the spring 2020 survey at Winterbourne Wind Farm.

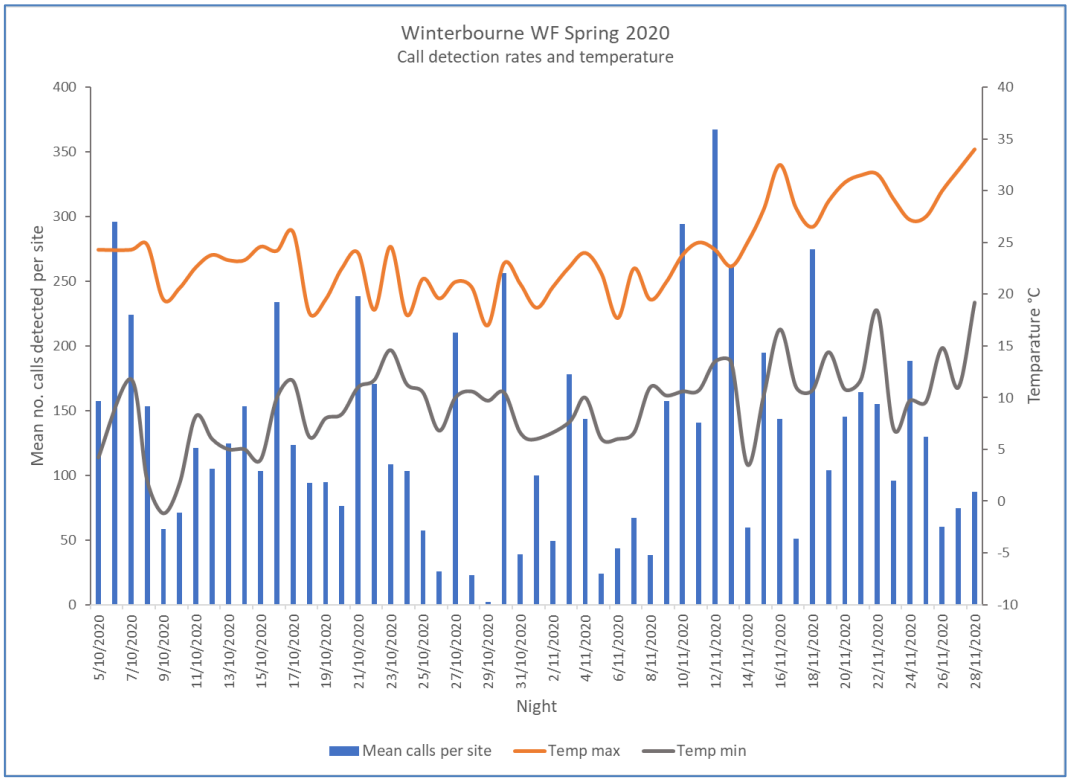

Figure 3. Nightly bat detection rates (mean number of calls per site) during the spring 2020 survey at Winterbourne Wind Farm. Climate data for Woolbrook Road (BoM Station 055136) (http://www.bom.gov.au/climate/data/).

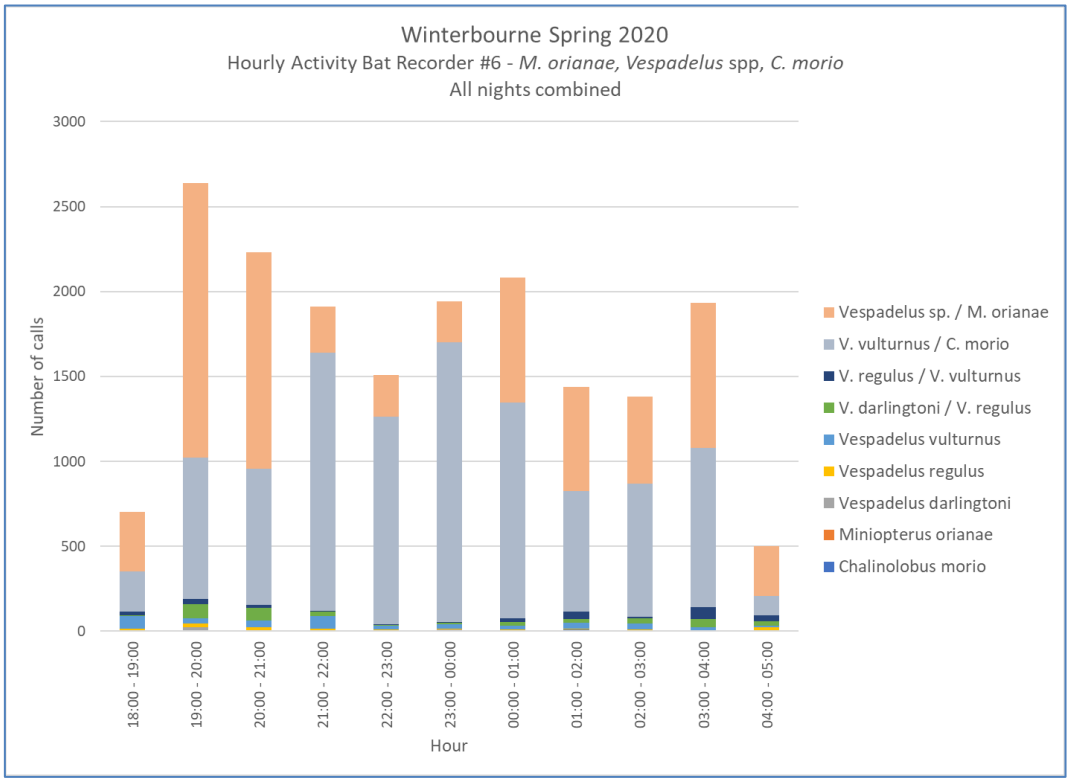

Figure 4. Cumulative hourly detection levels for *Vespadelus* spp., *Miniopterus orianae* and *Chalinolobus morio* on Bat Recorder #6.

Threatened species

Two threatened species were positively identified, albeit from very few calls. *Scoteanax rueppellii* was recorded at five sites, being absent only on BR #4, BR #6 and BR #8. *Miniopterus orianae* calls were reliably identified from only two sites (BR #2 and BR #5), although some of the unresolved calls recorded at the other seven sites could have represented this species.

Another two threatened species – *Falsistrellus tasmaniensis* and *Miniopterus australis* – may also have been present, but none of the relevant calls could be unequivocally allocated to either species.

Miniopterus orianae

Only a small proportion of calls in the frequency range relevant to *M. orianae* (~42-47 kHz) were reliably identified, with *Vespadelus* spp. contributing most of the positively identified calls (see **Figure 5**). As discussed above, in relation to site BR #6, it is highly probable that the majority of the unresolved calls at all sites also belonged to *Vespadelus* spp. (notably *V. vulturnus*).

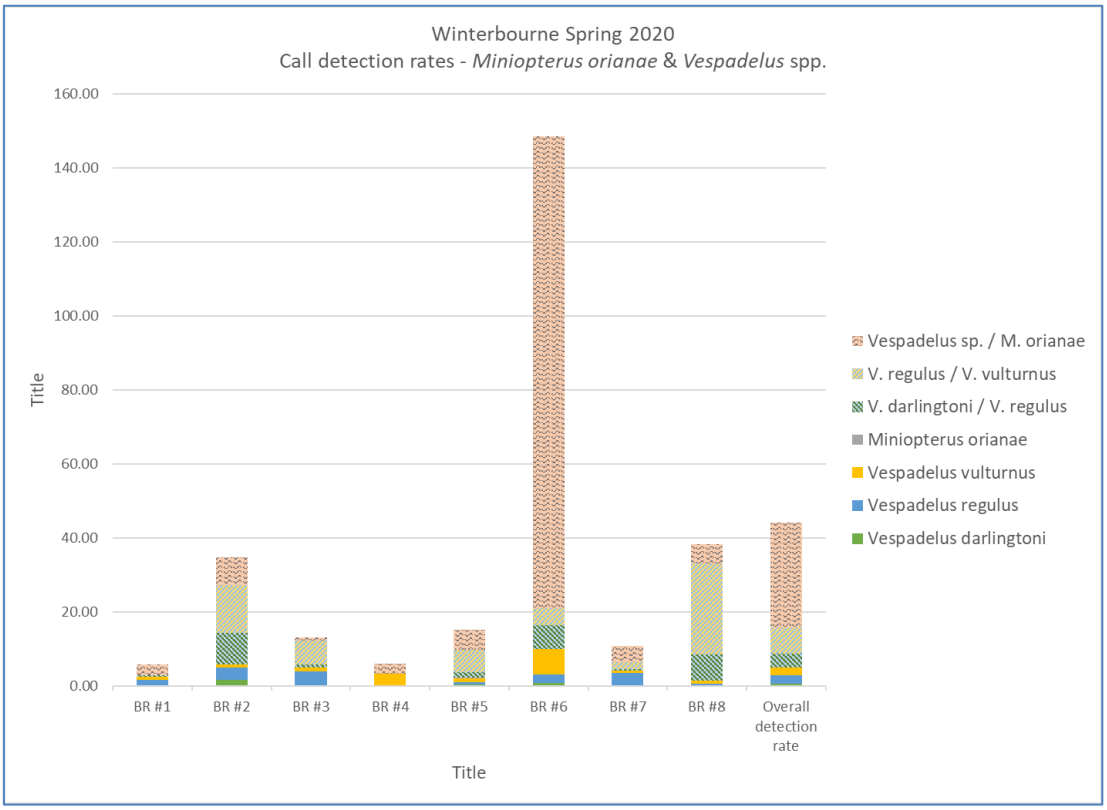

Figure 5. Relative activity levels of *M. orianae* and *Vespadelus* spp. at eight bat-detection sites sampled during spring 2020 in Winterbourne Wind Farm study area.

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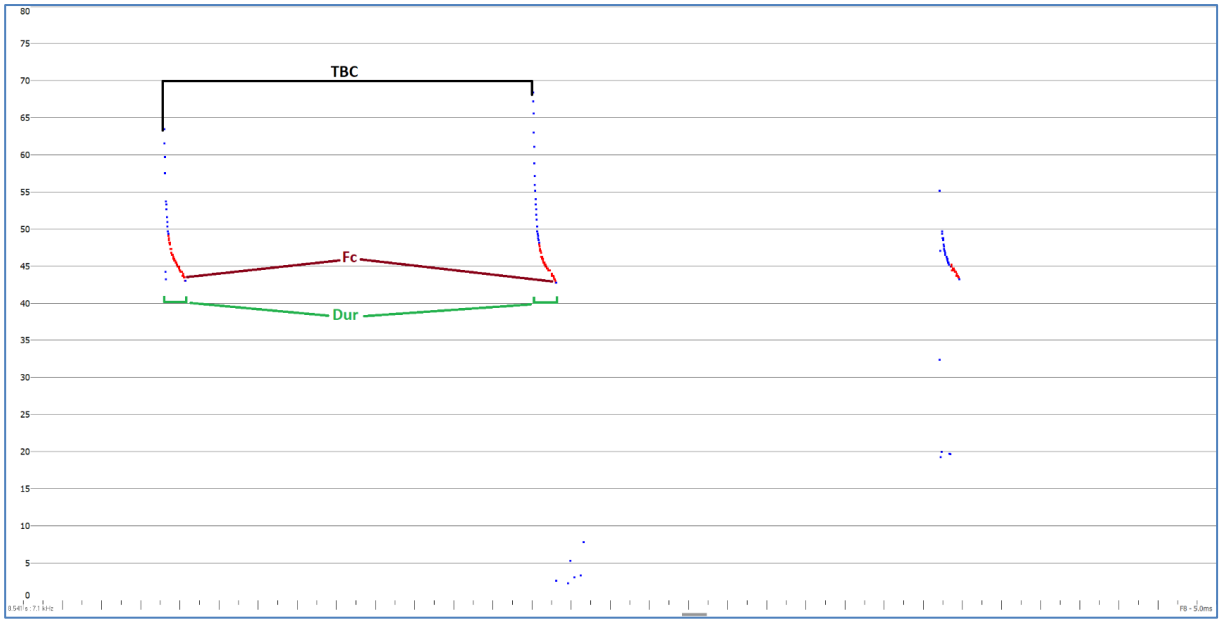
Appendix 1 Noise filter parameters used to filter the raw data to extract files containing bat calls.

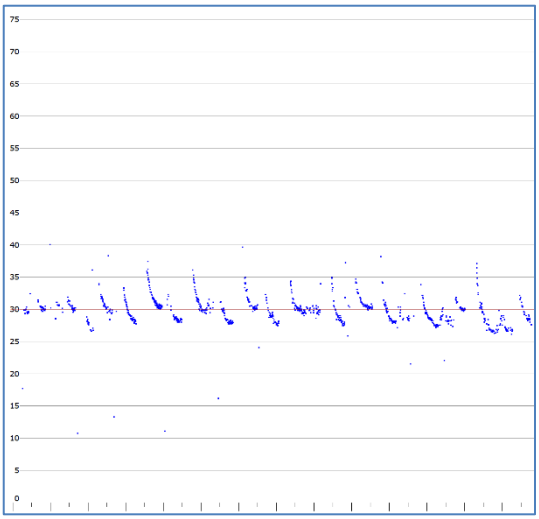
Metric	Description	Filter boundary values	
		Minimum	Maximum
Fc	Characteristic frequency (= frequency at the end of flattest part of a call pulse)	10 kHz	165 kHz
Dur	Call duration (= total time from first dot to last dot in pulse zero-crossing)	2 ms	120 ms
TBC	Time between calls (time between first dot in pulse and first dot in previous pulse)	5 ms	1500 ms



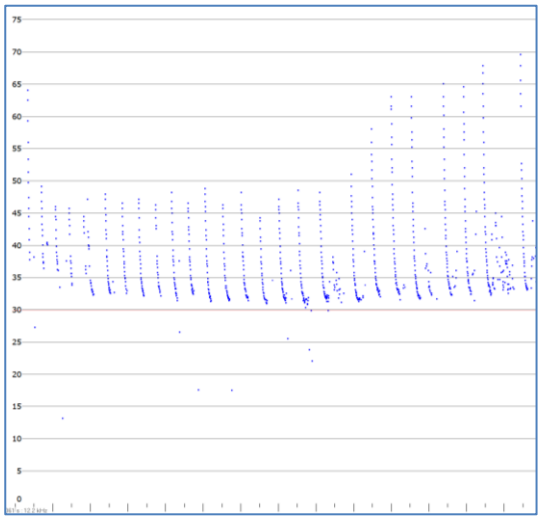
Appendix 2 Number of calls allocated per species and unresolved species group for the Winterbourne spring survey, October-November 2020.

Detector/site:	BR #1	BR #2	BR #3	BR #4	BR #5	BR #6	BR #7	BR #8	Species Total
Positively identified calls									
Chalinolobus gouldii	37	1386	102		58	40	33	9	1665
Chalinolobus morio	36	22	56		478	27	48	15	682
Nyctophilus geoffroyi / N. gouldi	7	95	8	1	309	67	119	4	610
Scoteanax rueppellii	2	15	3		1		8		29
Vespadelus darlingtoni	3	91	4		21	44	4	3	170
Vespadelus regulus	35	185	77		35	123	181	10	646
Vespadelus vulturnus	17	39	23	13	57	387	38	20	594
Miniopterus orianae		3			16				19
Austronomus australis	97	188	45		359	160	329	12	1190
Ozimops ridei	19	95	62		49	9	159	1	394
Unresolved calls									
C. gouldii / Scotorepens balstoni					6				6
C. morio / Miniopterus australis					19				19
Falsistrellus tasmaniensis / Nyctophilus sp.		2			20		1		23
Falsistrellus tasmaniensis / Scotorepens sp.		2							2
V. darlingtoni / V. regulus	12	476	17		80	348	23	137	1093
V. regulus / V. vulturnus	1	705	138		329	259	100	490	2022
V. vulturnus / C. morio	17	1398	476	3	4576	10071	87	49	16677
Vespadelus sp. */ M. orianae*	65	412	16	11	295	7011	233	108	8151
O. ridei / C. gouldii	57	1836	213		93	76	511	515	3301
O. ridei / O. planiceps	1	9	10			1	13		34
Site Total	406	6959	1250	28	6801	18623	1887	1373	37327

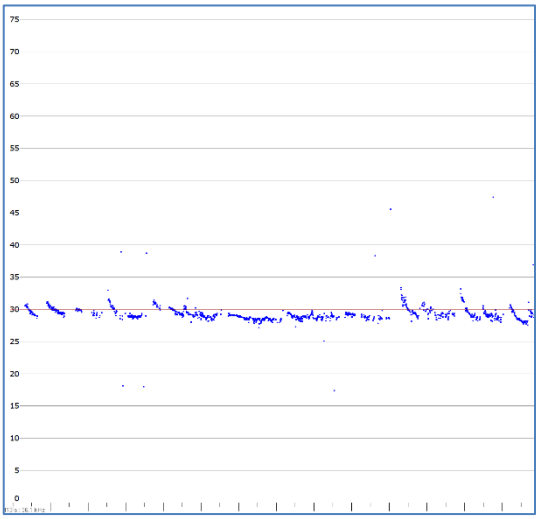
Appendix 3 Representative bat-calls recorded at Winterbourne Wind Farm, Spring 2020. Time between pulses removed; time-scale (*x*-axis) 10ms per tick



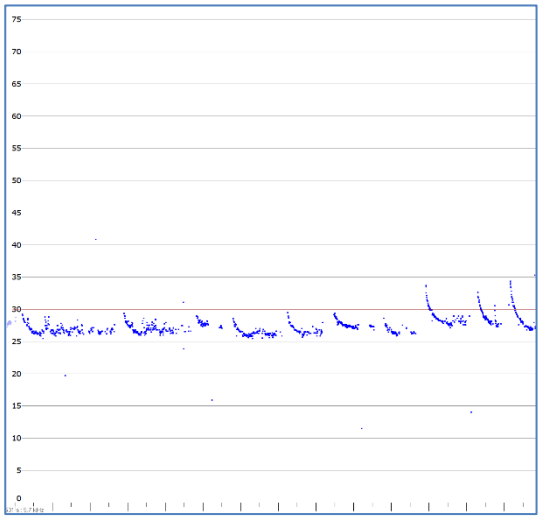
Chalinolobus gouldii



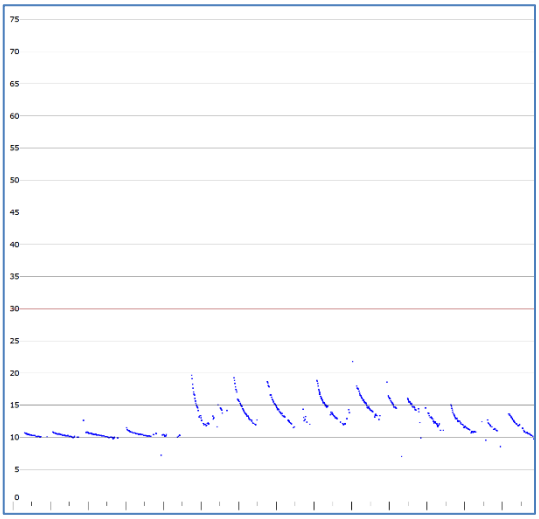
C. gouldii / Scotorepens balstoni



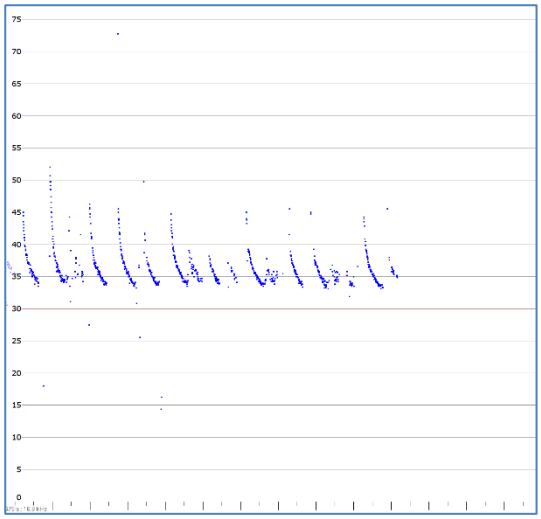
Ozimops ridei



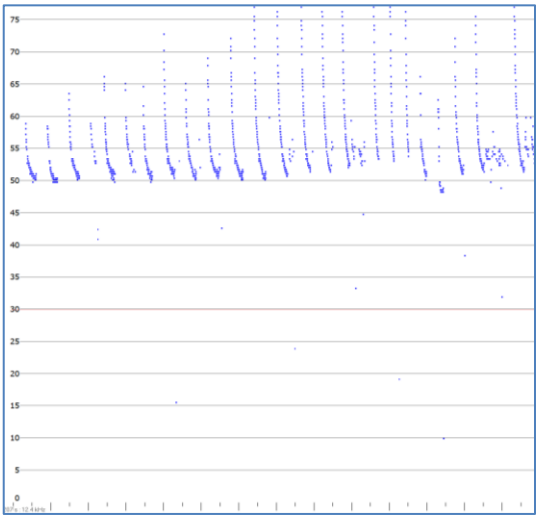
O. ridei / O. planiceps



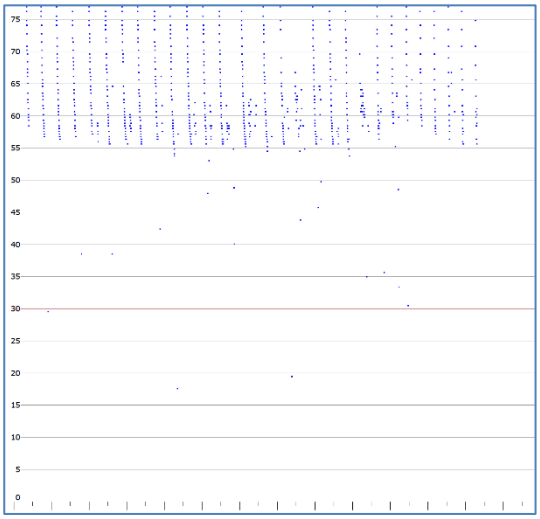
Austronomus australis



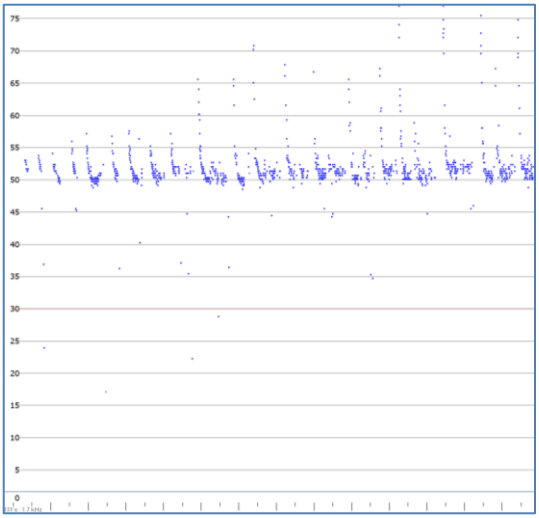
Scoteanax rueppellii



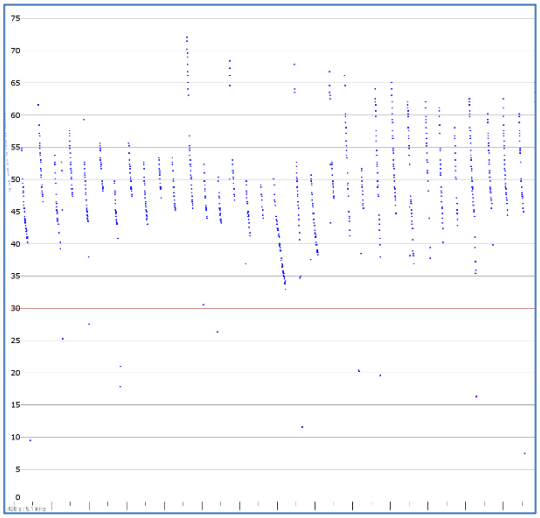
Chalinolobus morio



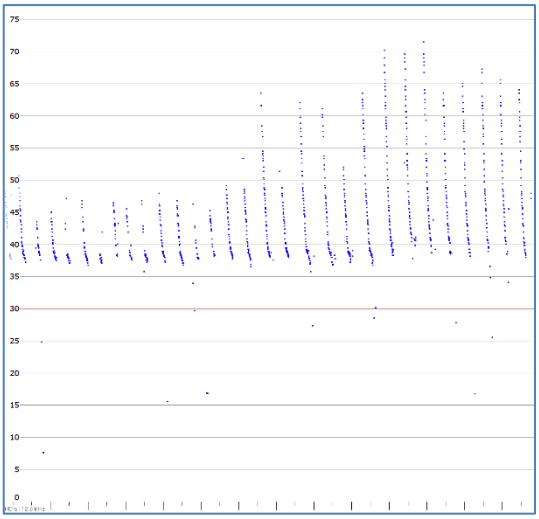
C. morio / Miniopterus australis



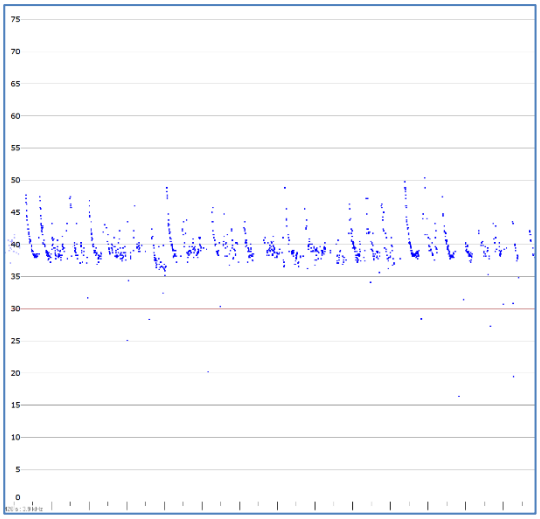
V. vulturnus / C. morio



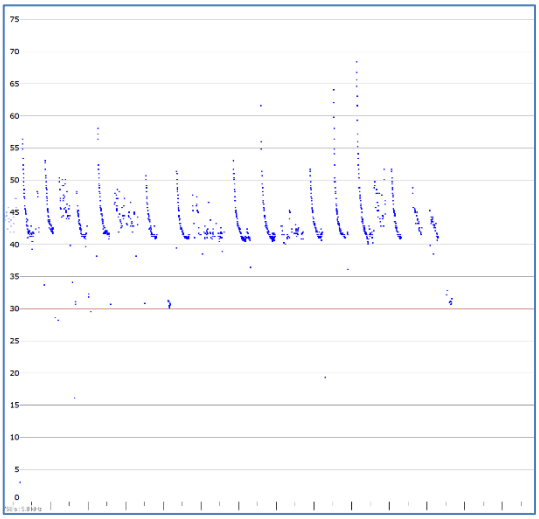
Nyctophilus geoffroyi / N. gouldi



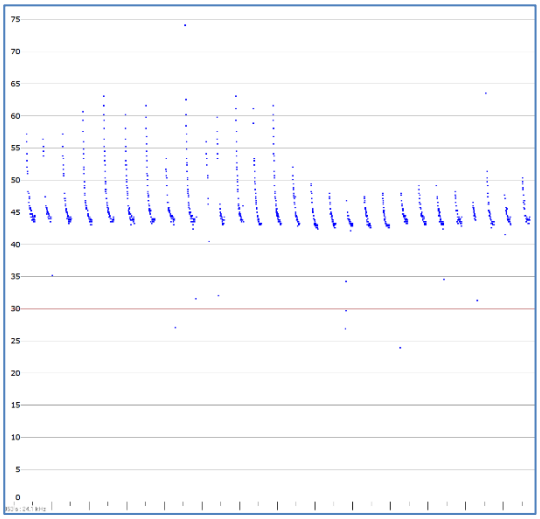
Falsistrellus tasmaniensis / Nyctophilus sp.



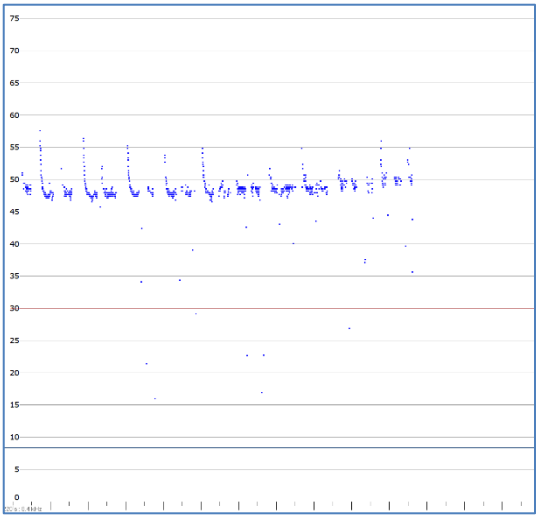
Falsistrellus tasmaniensis / Scotorepens sp.



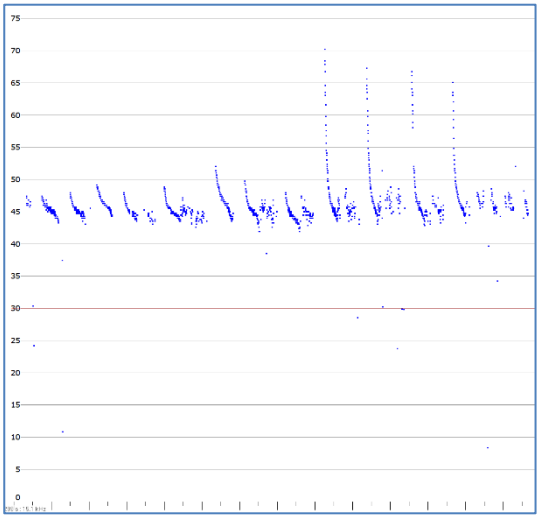
Vespadelus darlingtoni



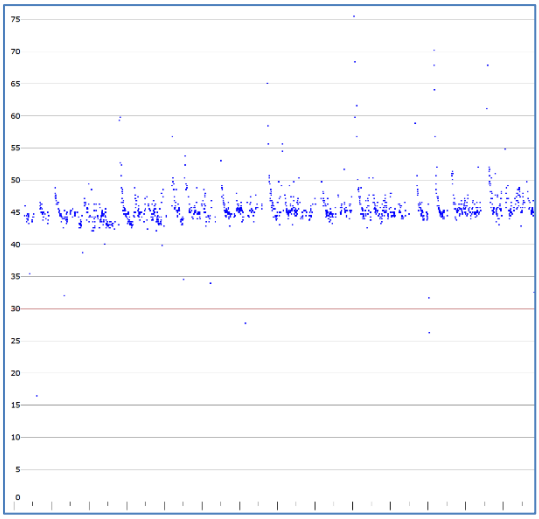
Vespadelus regulus



Vespadelus vulturnus



Miniopterus orianae



Vespadelus sp. / M. orianae

Appendix 2: Balance! Environmental report for the autumn 2021 bat call analysis

Microbat Call Identification Report

Prepared for ("Client"):	Nature Advisory
Survey location/project name:	Winterbourne Wind Farm, NSW
Survey dates:	March-April 2021
Client project reference:	19180
Job no.:	NAD-2111
Report date:	11 August 2021

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Methods

Data received

Balance! Environmental received over 249,000 ultrasonic acoustic files in a mix of WAV (full-spectrum) and ZC (zero-crossing analysis) formats. Data were organised into eight folders, presumably representing eight separate sites. Date-stamps in the filenames and other metadata reveal the autumn survey period extended from 8th March until 22nd April 2021.

Post-processing

A review of file metadata, summary text files from the detectors, and *Kaleidoscope* post-processing output files that came with the data shows that the client had used *Kaleidoscope* to convert the original detector-generated ZC files to produce WAV files in all folders. This is an unnecessary step as it produces inferior WAV files.

Six folders (Bat 1, Bat 2, Bat 5, Bat 6, Bat 7 & Bat 8) included both processed WAV and original ZC files, so only the ZC files were used in the analysis. However, the Bat 3 and Bat 4 folders included only two (duplicate) sets of derived WAV files, which had to be backwards converted to ZC format prior to analysis. Consequently, the ZC data for those two folders was of inferior quality compared with the original ZC data from the other sites.

Folder "Bat 7" contained just one ZC file (plus it's WAV duplicate), which was recorded on 11th April, but which contained only background noise. The detector summary text file in this folder included operational log entries for every night between 8th and 21st April.

Once a complete set of ZC files had been generated for all sites, the files were passed through a noise-filtering process using *Anabat Insight* software, to further refine the dataset by removing non-bat sounds. This filtering, along with additional manual filtering during later analyses also removed any files that contained only short-duration (<3 pulses) and poor-quality bat calls that were of no use for species identification.

Call analysis and identification

Files that passed the noise filter (i.e., contained bat calls) were processed with a Decision Tree analysis to group and label detected bat-calls based on a combination of call characteristics derived from zero-crossing analysis metrics, such as characteristic frequency (Fc), time between calls (TBC), and pulse curvature. The preliminary call identities applied by the Decision Tree process were then confirmed or adjusted manually by comparing the call spectrograms and derived metrics with those of regionally relevant reference calls and/or with published call descriptions (e.g., Reinhold et al. 2001; Pennay *et al.* 2004).

The likelihood of species' occurrence in the study area was confirmed by referring to the Australasian Bat Society's *BatMap* application (ABS 2021) and other published distribution information (*e.g.,* Churchill 2008; van Dyck *et al.* 2013).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/. Species nomenclature follows Armstrong *et al.* (2020).

Results

Post-processing to eliminate noise and useless (short & poor-quality) bat calls yielded an analysis dataset of 35,585 ZC files across the eight sites. Those files contained at least 35,811 individual bat calls, 20% of which (7002 calls) were positively identified. The other 28,809 "unresolved" calls each potentially represented two or more species and were allocated to multi-species groups.

Table 1 lists the species identified for each site, while **Appendix 1** provides a breakdown of call numbers allocated to each species and unresolved group for each site. Representative call spectrograms for each identified species are shown in **Appendix 2**.

No identifiable bat calls were recorded at site "Bat 7".

Species detected

At least 15 and up to 17 species were detected across the study area (see **Table 1**). The positively identified calls were allocated to fourteen individual species plus the undifferentiated species pair of *Nyctophilus geoffroyi/N. gouldi*.

Over 99.7% of the unresolved calls represented species that were otherwise positively identified, with the majority belonging to *Vespadelus* species and/or *Chalinolobus morio* (see **Appendix 1**). Some 63 unresolved calls potentially represented one additional species – *Vespadelus troughtoni* – but it is highly probable these calls were from *V. vulturnus*, which was positively identified from numerous other calls.

Where "unresolved" species groups were identified and one or more group members were not also positively identified for a site, those group members are listed as "Possible" in **Table 1**.

Table 1. Bat species recorded during the Winterbourne autumn survey, March-April 2021.
♦ = 'definite' - at least one call was attributed unequivocally to the species
□ = 'possible' - calls like those of the species were recorded, but not reliably identified

Site:	Bat1	Bat2	Bat3	Bat4	Bat5	Bat6	Bat7	Bat8
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦		♦
Chalinolobus morio	♦	♦	♦	♦	♦	♦		
Falsistrellus tasmaniensis †			♦	♦		♦		♦
Nyctophilus geoffroyi / N. gouldi		♦	♦	♦	♦	♦		♦
Scoteanax rueppellii †		♦	♦	♦	♦	♦		♦
Scotorepens orion		♦	♦	♦	♦	♦		□
Vespadelus darlingtoni	♦	♦	♦	♦	♦	♦		♦
Vespadelus regulus	♦	♦	♦	♦	♦	♦		♦
Vespadelus troughtoni †		□	□	□	□	□		
Vespadelus vulturnus	♦	♦	♦	♦	♦	♦		♦
Miniopterus australis †		♦				♦		♦
Miniopterus orianae †	♦	♦	♦	♦	♦	♦		♦
Austronomus australis		♦	♦	♦	♦	♦		♦
Ozimops planiceps			♦		□	♦		□
Ozimops ridei	♦	♦	♦	♦	♦	♦		♦
Saccolaimus flaviventris †			♦	♦		♦		

† indicates threatened species

Call detection rates

Bat activity levels during the autumn 2021 survey at Winterbourne varied considerably between sites. The standardised call detection rate (mean number of calls recorded per night per site) ranged from two calls per detector-night (d-n) for Bat 1 to 304 calls/d-n for Bat 6, with an overall detection rate across the entire study area of ~155 calls/d-n (see **Figure 1**).

More than 67% of the recorded calls came Bat 4 and Bat 6 (see **Appendix 1**); however, the standardised detection rate shows that bat activity levels at Bat 5 and Bat 8 were similar to those at Bat 4.

Nightly activity levels across the whole study area varied largely in response to daily fluctuations in maximum and minimum temperatures, with greater bat activity following warmer days and on warmer nights (see **Figure 3**). The high detection rate for the unresolved (probable *V. vulturnus*) calls at BR #6 remained relatively constant throughout the survey period (see **Figure 4**) and was sustained throughout the night (see **Figure 5**). These activity patterns recorded on BR #6 further support to the notion that the detector may have been placed near a maternity roost.

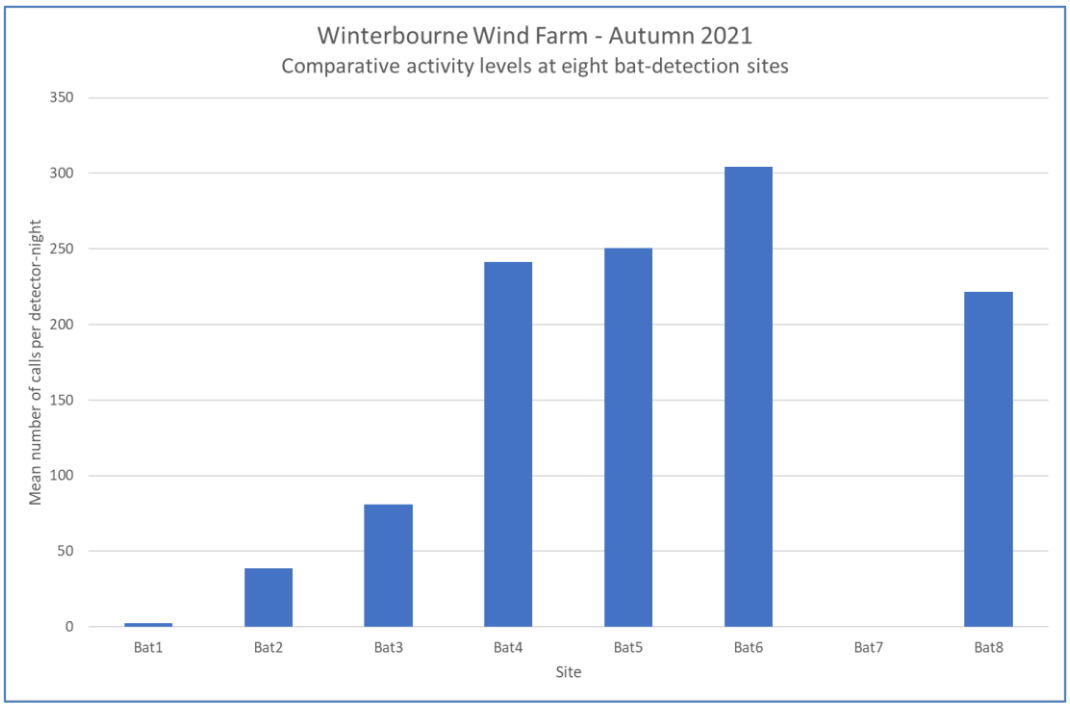

Figure 1. Comparison of bat activity levels at eight sites during the Autumn 2021 survey at Winterbourne Wind Farm.

Threatened species

Five threatened species were positively identified, including:

- *Falsistrellus tasmaniensis*
- *Scoteanax rueppellii*
- *Miniopterus australis*
- *Miniopterus orianae*
- *Saccolaimus flaviventris*

One additional threatened species – *Vespadelus troughtoni* – may also have been present, but its calls are similar to some calls from *V. vulturnus,* and its identity could not be confirmed from the data recorded during this survey.

While these species were all recorded at multiple sites (see **Table 1**), detection rates for all except *M. orianae* were too low to provide meaningful data on spatial and temporal activity patterns.

Miniopterus orianae

Only 27.9% of calls in the frequency range relevant to *M. orianae* (~42-47 kHz) could be positively identified, with 304 calls (2.3% of total) allocated to *M. orianae* and 3378 calls (25.6%) attributed to *Vespadelus* species. The high proportion of unresolved calls in this frequency range was attributable primarily to the poor-quality ZC data generated for Bat 4 (see explanation in Methods section), which produced 6273 of the 9498 calls allocated to the *M. orianae/Vespadelus* sp. unresolved group (see **Appendix 1**).

Given the data quality issue and high degree of uncertainty with call identification for Bat 4, that site has been omitted from the following analysis and discussion. Whilst Bat 3 had similar data conversion issues to Bat 4, it had a lower overall call count and much higher proportion of positive identifications, so can be included with the other results pertaining to *M. orianae*.

The relative proportions of positively identified calls allocated to each taxon (*i.e., M. orianae* and *Vespadelus* sp.) varied considerably between sites, although *Vespadelus* spp. dominated the recordings at all sites (see **Figure 2**).

The proportion of positively identified calls allocated to *M. orianae* for each site was used to calculate the likely representation of *M. orianae* in the unresolved call group. That portion of the unresolved calls was then added to the positively identified calls to determine the likely total activity level for *M. orianae* at each site (see **Figure 3**). Overall *M. orianae* activity level was low, with fewer than three calls detected per night at all sites except Bat 3 (~5 calls/night).

Given the low detection rate for *M. orianae* at most sites, it is not possible to obtain a reliable indication of temporal variation in activity levels on a site-by-site basis; however, when data from all sites is aggregated, there appears to be no distinct trend in *M. orianae* activity from the start to finish of the autumn survey (see **Figure 4**).

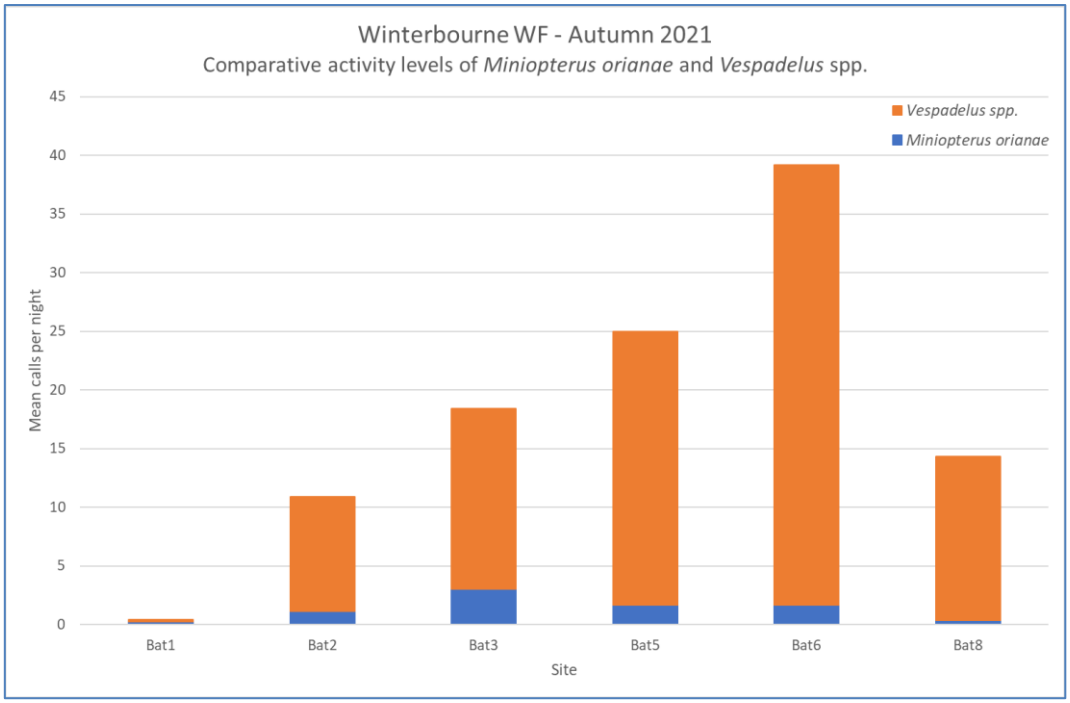

Figure 2. Relative activity levels of *M. orianae* and *Vespadelus* spp. during Autumn 2021, based on positively identified calls only.

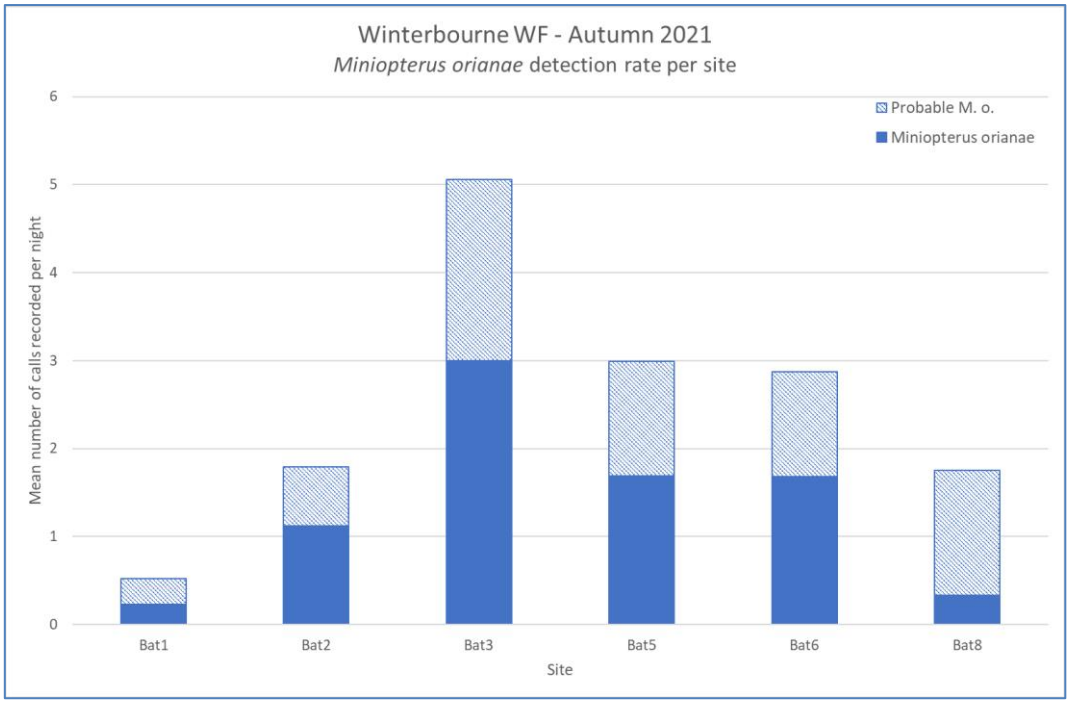

Figure 3. Comparison of likely total activity levels of *M. orianae* during Autumn 2021.

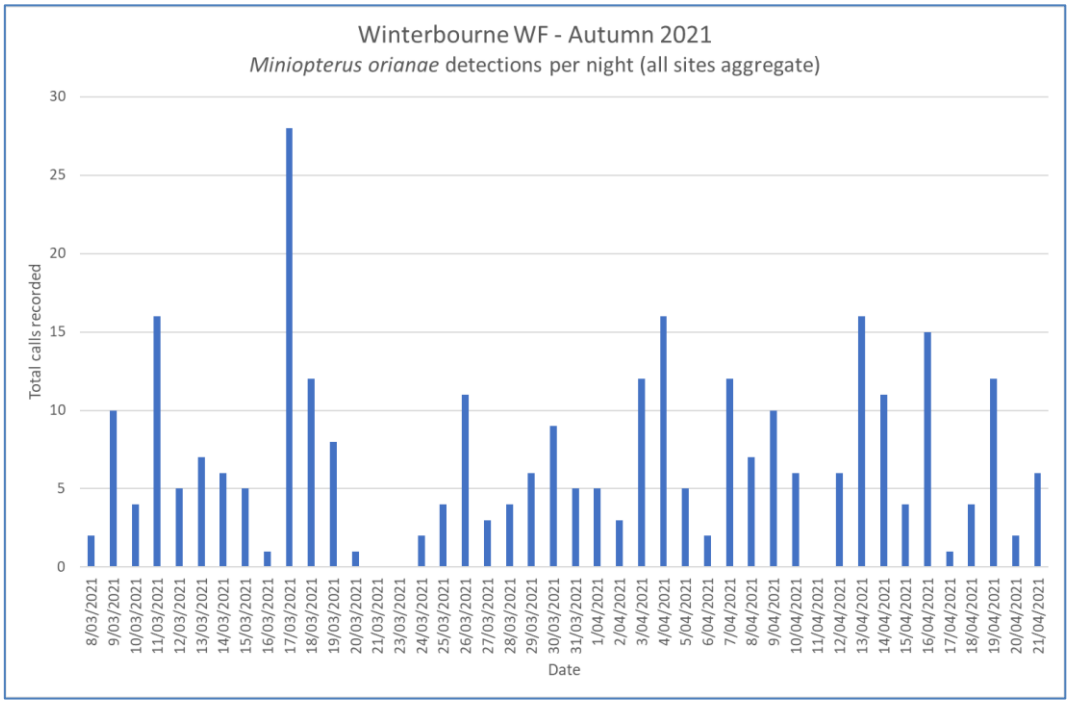

Figure 4. Comparison of nightly activity levels of *M. orianae* (positively identified calls only) during the Winterbourne Wind Farm survey, Autumn 2021.

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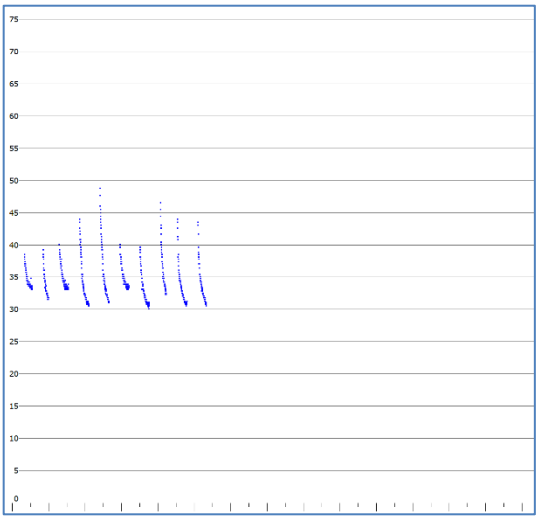
Appendix 1 Number of calls allocated per species and unresolved species group for the Winterbourne autumn survey, March-April 2021.

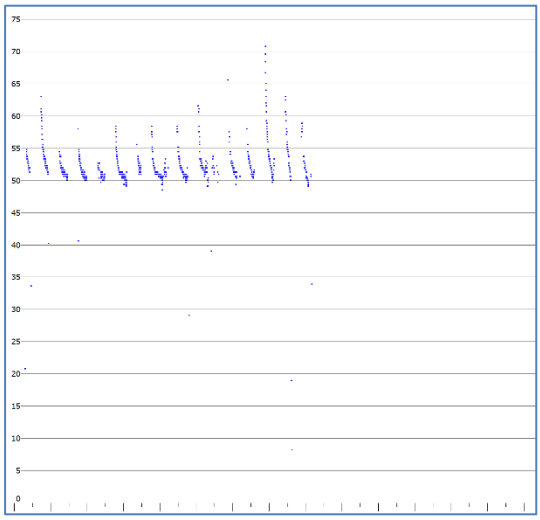
Site	Bat1	Bat2	Bat3	Bat4	Bat5	Bat6	Bat7	Bat8	Species Total
Positively identified calls									
Chalinolobus gouldii	16	124	210	94	53	34		8	539
Chalinolobus morio	1	38	177	607	6	14			843
Falsistrellus tasmaniensis †			14	3		5		2	24
Nyctophilus sp.		75	173	184	70	493		329	1324
Scoteanax rueppellii †		1	33	10	1	6		2	53
Scotorepens orion		29	4	1	2	1			37
Vespadelus darlingtoni	2	97	424	125	70	225		20	963
Vespadelus regulus	2	153	115	2	104	441		31	848
Vespadelus vulturnus	2	7	5	30	79	25		15	163
Miniopterus australis †		4				6		1	11
Miniopterus orianae †	7	46	132	18	22	74		5	304
Austronomus australis		87	743	475	19	172		116	1612
Ozimops planiceps			3			1			4
Ozimops ridei	3	69	125	24	18	16		6	261
Saccolaimus flaviventris †			8	5		3			16
Unresolved calls									
C. morio / Vespadelus sp.	7	152	252	1180	2346	8857		1473	14267
F. tasmaniensis / S. orion			3	4		4		10	21
S. orion / S. rueppellii		3	7	19	2	5		5	41
V. darlingtoni / V. regulus		114	116		27	44		130	431
V. regulus / V. vulturnus	1	36	24	3	102	941		29	1136
V. vulturnus / V. troughtoni †		7	30	11	5	10			63
Vespadelus sp. / M. orianae	15	266	557	6239	249	1224		914	9464
O. planiceps / O. ridei			10		1	15		3	29
Ozimops sp. / *C. gouldii*	9	287	391	1584	84	780		222	3357
Site Total	65	1595	3556	10618	3260	13396	0	3321	35811

† indicates threatened species

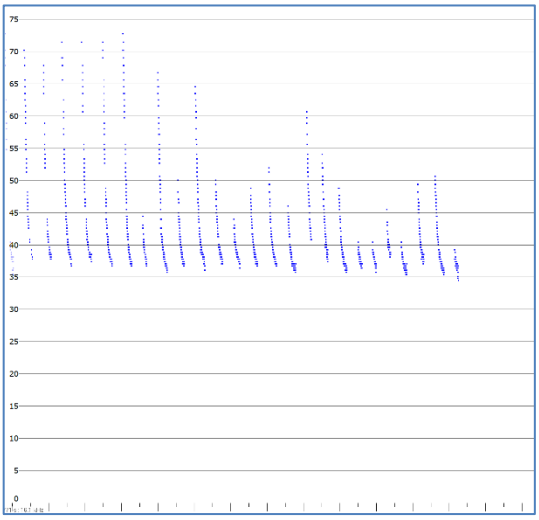
Appendix 2 Representative bat-calls recorded at Winterbourne Wind Farm, Autumn 2021. Time between pulses removed; time-scale (*x*-axis) 10ms per tick



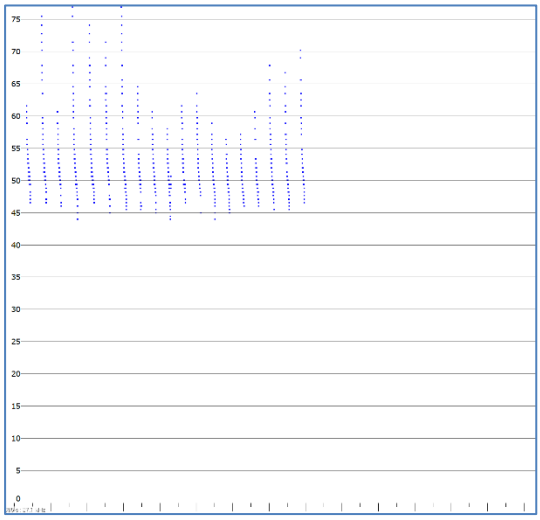
Chalinolobus gouldii



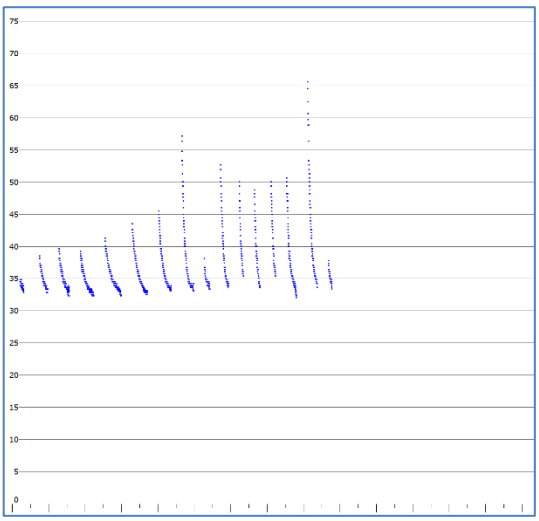
Chalinolobus morio



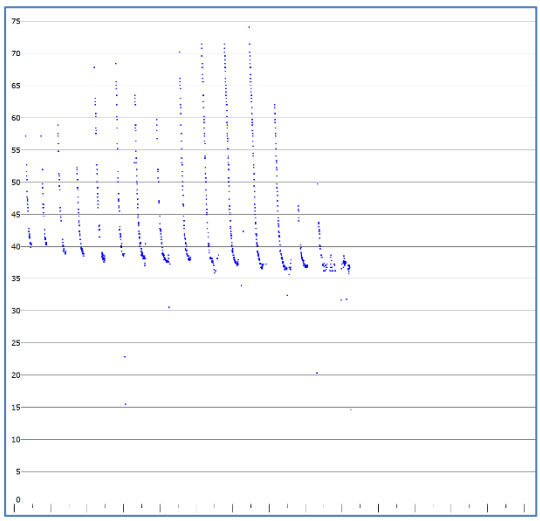
Falsistrellus tasmaniensis



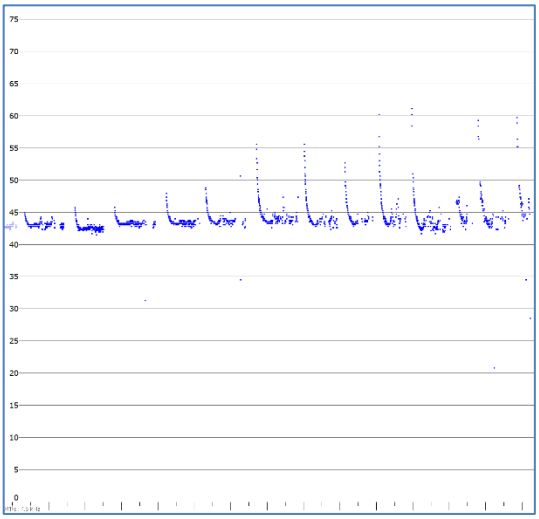
Nyctophilus sp.



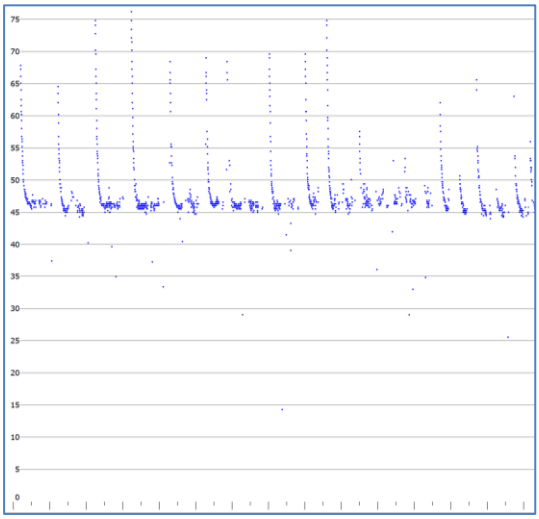
Scoteanax rueppellii



Scotorepens orion



Vespadelus darlingtoni



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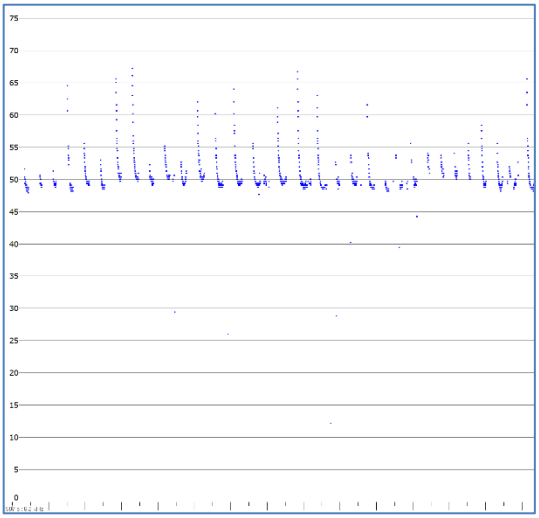

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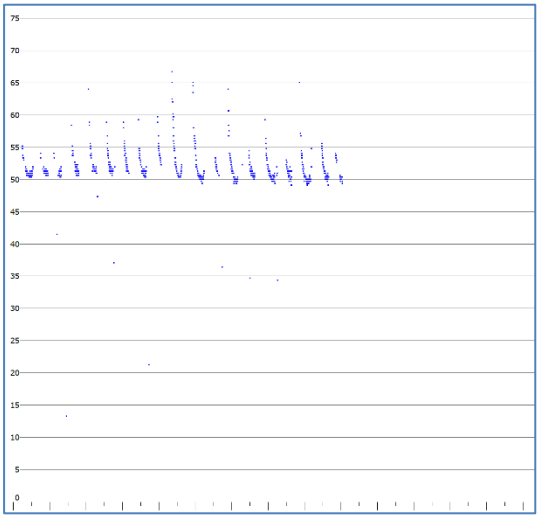
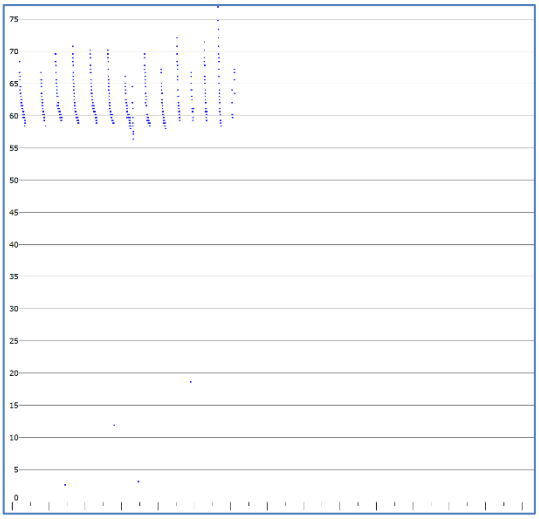


V. vulturnus / V. troughtoni



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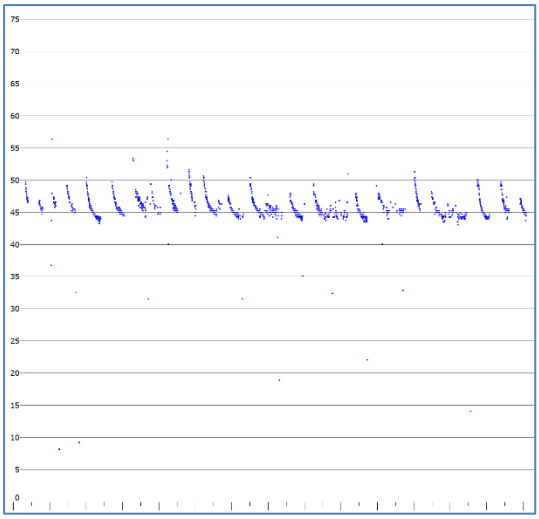

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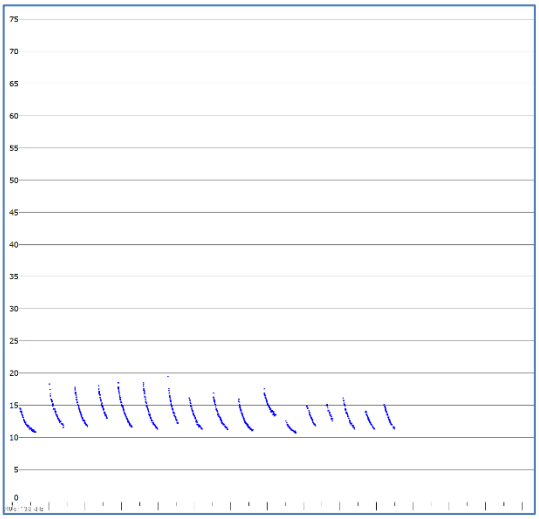

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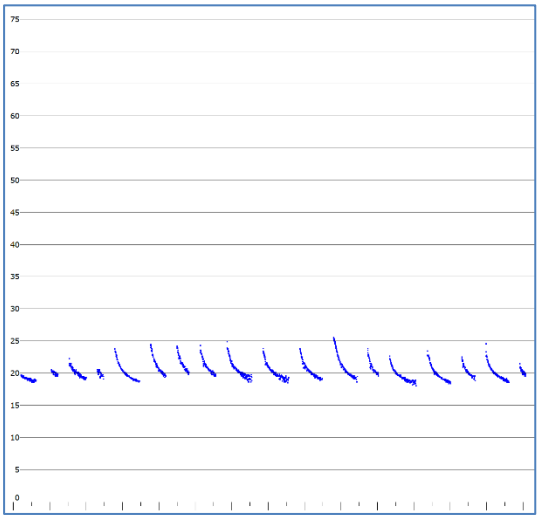

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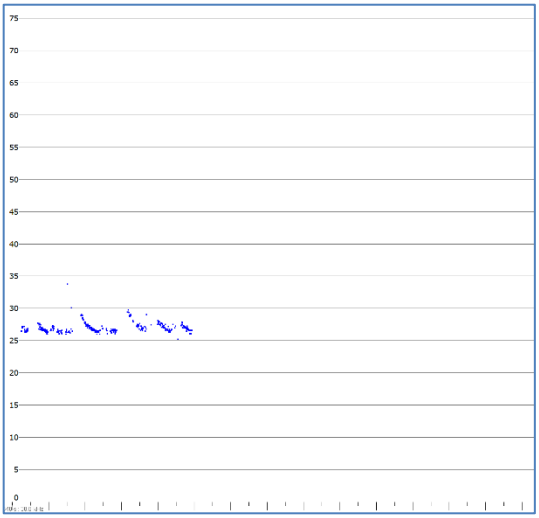

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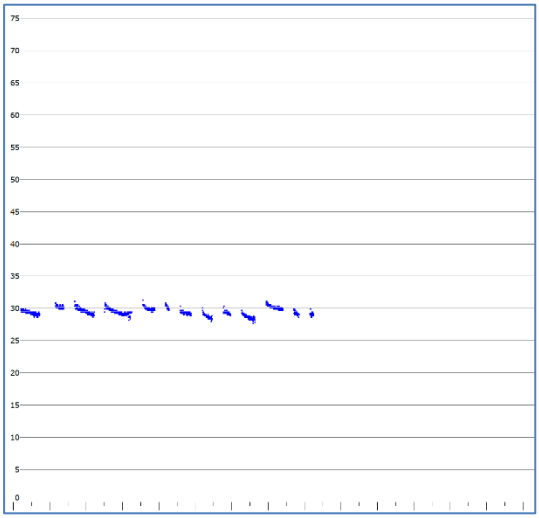
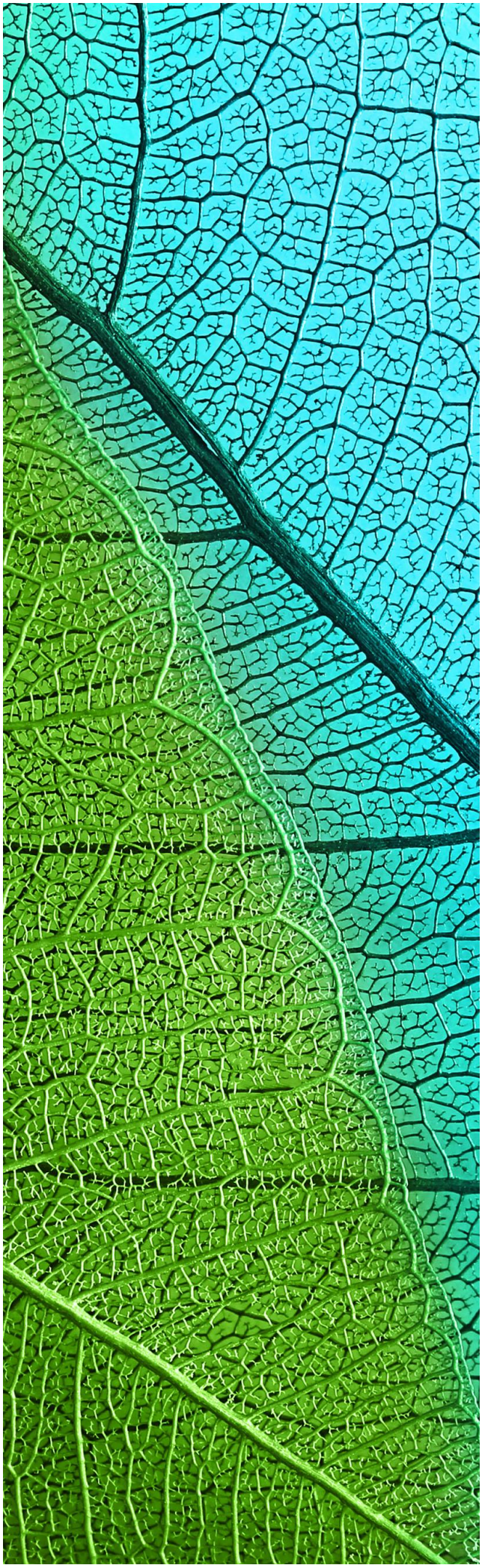


Ozimops ridei

Appendix E Bird and bat collision risk assessment



Winterbourne Wind Farm

Bird and Bat Risk Assessment

Prepared for NGH Consulting Pty Ltd

February 2022
Report No. 19180.03 (1.5)

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1. Introduction

The proposed Winterbourne Wind Farm (WWF) is located approximately 30 km east of Walcha in the northern tablelands of NSW. The aim of this risk assessment is to inform the bird and bat impact assessment for the project by identifying those species or groups considered potentially at risk from either collision with or disturbance from operating wind turbines. The risk assessment identified species and groups of concern for targeted monitoring in the preparation of the impact assessment.

In addition to the threat of direct loss of habitat from windfarm construction, wind farm impacts on birds and bats can arise from three potential pathways listed below:

- Direct collision of birds and bats with operating wind turbine blades or towers at rotor swept area (RSA) heights;
- Disturbance effects that exclude birds and bats from habitat; and
- Barrier effects that limit bird and bat movements between essential resources, such as foraging and roosting areas.

The risk assessment has followed the procedure for risk assessment of AS ISO 31000:2018. The assessment has been undertaken as follows:

- Species or groups of concern have been short-listed based on their likelihood of occurrence at the site;
- Two impact pathways have been assessed: a) collision with turbines; and b) indirect effects (including both disturbance and barrier effects);
- Impact likelihood criteria have been developed and applied to each impact pathway for each species or group of concern;
- Impact consequence criteria have been developed and applied to each impact pathway for each species or group of concern; and
- The risk level for each species or group of concern from the two impact pathways has been determined consistent with a risk matrix.

This report presents the results of this risk assessment under the headings below.

Section 2 summarises the sources of information used to understand the likelihood of occurrence of each species or group on the WWF site and their likely behaviour on the site.

Section 3 lists the species of concern that have been subject to this risk assessment.

Section 4 provides an overview of the risk assessment method adopted, including the likelihood and consequence criteria and the risk matrix.

Section 5 presents the results of the risk assessment and identifies the focus for the BBAMP for WWF.

This report was prepared by a team from Nature Advisory Pty Ltd including; Peter Lansley (Senior Zoologist), Curtis Doughty (Senior Zoologist) and Bernard O'Callaghan (Senior Ecologist and Project Manager) and Brett Lane (Principal Consultant).

2. Sources of Information

2.1. Sources of information on bird and bats

To ascertain the species of concern that may occur on the WWF site the following sources were used:

- The NSW Bionet Atlas Search tool (BCD 2021a), using a search region up to 10-kilometre from the boundary of the WWF site, with limits being -30.75° to -30.96°S, 151.53° to 151.91°E (searched in October 2021);
- The EPBC Act Protected Matters Search Tool (PMST) using the same search region, i.e. -30.748846° to 30.96164°S, 151.53132° to 151.90554°E (Department of the Agriculture Water and the Environment 2020); and
- The bird utilisation survey and bat survey data that were collected by Nature Advisory in spring 2020, autumn 2021 and summer 2022.

This initial risk assessment is based only on the above surveys as sources of information. Additional surveys may be required of some species to provide further information to assist in a more detailed assessment of the impacts on the proposed Winterbourne Wind Farm. Where required, this is indicated in Section 5.

2.2. Proposed turbines

It is understood that the proposed size of the turbines for the WWF is based on the turbine number and dimension outlined in Table 1 below and this risk assessment is based on these specifications.

Table 1: Summary of turbine number and dimensions for the WWF

	Representative turbine
No of turbines	119 turbines
Rotor radius	55 metres
Max upper RSA (tip)	150 metres
Hub Height	95 metres
Lower Minimum RSA	40 m
Total Rotor Swept Area / turbine (m^2)	9,504m^2

3. Species and groups of concern

Species of concern are those that are known, likely or have the potential to occur on the wind farm site that are listed as threatened or migratory under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), as threatened under the NSW *Biodiversity Conservation Act 2016* (BC Act) or are known to be particularly vulnerable to wind turbine impacts.

Most listed threatened and migratory waterbirds have been assessed and considered unlikely to occur because of a lack of suitable habitat and/or lack of frequent occurrence or recent records nearby or on the WWF site. Excluded birds comprised:

- Migratory shorebirds and threatened waterbirds that occur along open coastal shorelines or inland lakes, habitats are absent from the WWF site;
- Threatened and migratory species from the PMST for which there are not recent records nearby and no habitat on the WWF site (e.g. Eastern Osprey, Black-breasted Button-quail, Red Goshawk, Yellow Wagtail, Oriental Cuckoo).

The short-listed species and groups are presented in Table 2.

Table 2: Risk assessment - Assessed bird and bat species

EPBC Act Listed Migratory Species
▪ Black-faced Monarch ▪ Fork-tailed Swift ▪ Rufous Fantail ▪ Satin Flycatcher ▪ Spectacled Monarch ▪ White-throated Needletail
EPBC Act and BC Act listed threatened birds
▪ Painted Honeyeater (Vulnerable – EPBC Act & BC Act) ▪ Regent Honeyeater (Critically Endangered – EPBC Act & Endangered – BC Act) ▪ Superb Parrot (Vulnerable – EPBC Act & BC Act) ▪ Swift Parrot (Critically Endangered – EPBC Act & Endangered – BC Act).
EPBC Act and BC Act listed threatened bats
▪ Corben's Long-eared Bat (Vulnerable – EPBC Act & BC Act) ▪ Grey-headed Flying-Fox (Vulnerable – EPBC Act & BC Act) ▪ Large–eared Pied Bat (Vulnerable – EPBC Act & BC Act)
BC Act listed threatened birds
▪ Barking Owl (Vulnerable) ▪ Diamond Firetail (Vulnerable) ▪ Dusky Woodswallow (Vulnerable) ▪ Flame Robin (Vulnerable) ▪ Glossy Black-Cockatoo (Vulnerable) ▪ Little Eagle (Vulnerable) ▪ Little Lorikeet (Vulnerable) ▪ Powerful Owl (Vulnerable) ▪ Scarlet Robin (Vulnerable) ▪ Speckled Warbler (Vulnerable) ▪ Varied Sittella (Vulnerable)
BC Act listed threatened bats
▪ Eastern False Pipistrelle (Vulnerable) ▪ Greater Broad-nosed Bat (Vulnerable) ▪ Large Bent-winged Bat (Vulnerable)

▪ Little Bent-winged Bat (Vulnerable) ▪ Yellow-bellied Sheathtail Bat (Vulnerable)
Bird species (NSW *National Parks and Wildlife Act 1967*)
▪ Raptors – includes Black-shouldered Kite, Brown Falcon, Brown Goshawk, Nankeen Kestrel, Peregrine Falcon, Wedge–tailed Eagle, Whistling Kite
Bat species (NSW *National Parks and Wildlife Act 1967*)
▪ Gould's Wattled Bat ▪ White-striped Freetail Bat

A risk assessment was undertaken for each of the foregoing species and groups and presented in Section 5.

4. Risk Assessment Process

The risk assessment process was based on the Risk Evaluation Matrix Model used to measure the overall risk of a potential impact event on the local population of the species of concern (i.e. within and adjacent to the wind turbines, where monitoring is undertaken), in this case birds or bats striking wind turbine blades or being deterred from using part of the wind farm due to disturbance or barrier effects. The assessment is based on the likelihood of that event, and should it occur, its consequences. This model is currently used across a wide range of industry sectors for assessing environmental risk.

The Risk Evaluation Matrix Model also complies with the AS ISO 31000 Risk Management Guidelines 2018. The risk assessment will continue to be reviewed and updated following the completion of the baseline reports, as well as following the completion of each annual monitoring report, to ensure that the monitoring and mitigation measures are adaptive.

The assessment requires criteria to be developed for likelihood and consequence. These criteria are provided respectively in Table 3 and Table 4. Table 5 shows the risk levels used and how they are determined from the assessed likelihood and consequence levels.

Table 3: Likelihood criteria for a risk event to occur

Likelihood	Description
Certain	It is very probable that the risk event could occur in any year (>95%)
Almost Certain	It is more probable than not that the risk event could occur in any year (>50%)
Likely	It is equally probable that the risk event could or could not occur in any year (50%)
Unlikely	It is less probable than not that the risk event could occur in any year (<50%)
Rare	It is improbable that the risk event could occur in any year. (<5%) The risk event is only theoretically possible, or would require exceptional circumstances to occur.

Table 4: Consequence Criteria

Negligible	Low	Moderate	High	Severe
Occasional individuals lost but no reduction in population viability.	Repeated loss of small numbers of individuals but no reduction in population viability.	Moderate loss in numbers of individuals, leading to minor reduction in population viability for between one and five years.	Major loss in numbers of individuals, leading to reduction in population viability for between five and ten years.	Extreme loss in numbers of individuals, leading to reduction in population viability for a period of at least 10 years

Table 5: Risk matrix defining risk level based on likelihood and consequence

		Consequence				
		Negligible	Low	Moderate	High	Severe
Likelihood	Certain	Negligible	Low	High	Severe	Severe
	Almost Certain	Negligible	Low	Moderate	High	Severe
	Likely	Negligible	Low	Moderate	High	High
	Unlikely	Negligible	Negligible	Low	Moderate	High
	Rare	Negligible	Negligible	Negligible	Low	Low

The relevant likelihood and consequence levels were determined by using data recorded from the wind farm site and with reference to any available information on the population and distribution of the species and bird groups concerned.

5. Risk Assessment Results

Table 6 provides the detailed results of the initial risk assessment, including evaluation of the impacts of the project on each species against the foregoing likelihood and consequence criteria. It includes the following information as part of the risk assessment process:

- Environmental value to be protected;
- Reasons for inclusion;
- Threatened species status;
- Hazard (i.e. turbine collision or indirect disturbance);
- Consequence and likelihood scores for each hazard;
- Risk rating; and
- Comments relating to risk rating scores.

The risk associated with wind turbine collision and indirect effects at the WWF for most assessed bird and bat species was rated as **negligible**. The exceptions are described below.

The **Barking Owl** is rare in the WWF search region with only one record listed in BioNet (DPIE 2021a). Thus, the likelihood of interaction is rare. Should the species' behaviour place it at risk, the consequences would be high. Therefore the overall risk to Barking Owl from WWF is considered **low**.

The **Glossy Black-Cockatoo** occurs in forests and woodlands with casuarinas, upon which they are dependent as a food source. The species was recorded during bird utilisation surveys in the WWF footprint, so are likely to occur in and between areas of high casuarina density around WWF. Their behaviour may place them at risk from turbine collisions and since the Black Summer fires of 2019-20, some have been displaced from their more traditional sites in NSW and Victoria. Given this species is long-lived and has a low recruitment rate, a casualty would have high consequences for the population. The species is therefore considered at **moderate** risk from WWF.

The **Little Eagle** was recorded at the WWF site during the bird utilisation surveys conducted by Nature Advisory. This raptor species has shown a 50% decline in numbers in NSW over three generations and is considered to have a low recruitment rate (Debus 2017). It may occur at Winterbourne WF at low frequency and/or density, but should a collision occur this would have moderate consequences. The risk to the Little Eagle was therefore considered to be **low**.

The **Powerful Owl** is uncommon in the WWF search region with two records listed in BioNet (DPIE 2021a). It prefers dense forests of the Great Dividing Range. Should the species' behaviour place it at risk, there would be moderate consequences to its regional population. Therefore the overall risk to Powerful Owl from WWF is considered **low**.

The **White-throated Needletail** migrates from north-east Asia and flies regularly at turbine height. Flocks may pass over the WWF site during the warmer months of November to April. Collisions have been recorded at wind farms elsewhere in NSW and eastern Australia. The risk to this species from the WWF is considered to be **moderate** as the species is considered almost certain to collide with operating turbines resulting in a moderate loss of individuals, leading to minor reduction in population viability for between one and five years.

Given the occurrence of collisions involving **Wedge-tailed Eagle** (WTE) at many wind farms, this raptor species is addressed in this risk assessment. There is a low incidence of disturbance of WTE at most wind farms, successful breeding within 200 metres of operating turbines has been observed (Nature Advisory,

unpublished data). Thus, risks to this species arise from likely collisions but not indirect disturbance. The risk to the Wedge-tailed Eagle was therefore considered to be **moderate**.

Based on experience at other wind farms in eastern Australia, collisions of more commonly occurring **raptor species** are likely. Commonly occurring raptor species recorded to collide with turbines include Nankeen Kestrel, Brown Falcon and Black-shouldered Kite (Nature Advisory, unpubl. data). The Brown Goshawk, Whistling Kite and Peregrine Falcon are also recorded at the Winterbourne WF site and may collide with turbines infrequently. Raptors appear not to be deterred by the presence of operating wind turbines and occur regularly at other wind farms in NSW (Nature Advisory, unpubl. data). Overall, the risk from collision with turbines to these raptors is considered to be **low** as these species are widespread and common, making local population impacts unlikely as affected individuals would be readily replaced.

The **Eastern False Pipistrelle** inhabits tall and wet forests with dense understoreys, in south-eastern Australia including Tasmania (Churchill 2008). There are many records from the search region of WWF and calls possibly pertaining to this species were recorded during the bat surveys at WWF in spring 2020 and definite calls identified in autumn 2021. The species is known to occasionally collide with wind turbines, although consequences at the population level would be low. It is therefore considered at **low** risk from WWF.

The **Grey-headed Flying-Fox** disperses widely in south-eastern Australia from numerous camps that are often now located in cities and country towns as well as natural habitats. The WWF is not in an area of regular occurrence (DPIE 2021a) but it cannot be discounted that groups of the species may pass through the area or set up temporary camps, so that consequences of collisions would be moderate and its overall risk rating is considered **low.**

The **Large Bent-winged Bat** is listed as vulnerable under the BC Act and has been recorded from the WWF site. This species is known sometimes to fly above the canopy which puts it at risk of collision with turbines. However, few impacts to this species have been recorded. There was activity of Large Bent-winged Bat from the bat survey in autumn 2021. Therefore, the Large Bent-winged Bat is indicated as having a precautionary likely risk of collision with turbines, with a low consequence rating resulting in a **low** population risk.

The **Little Bent-winged Bat** is listed as vulnerable under the BC Act and has been recorded from the WWF site. This species can associate with Large Bent-winged Bat, so may be subject to the same pressures. It hibernates in winter in NSW and may fly above the canopy which puts it at risk of collision with turbines. Few impacts to this species have been recorded. There was activity of Little Bent-winged Bat from the bat survey in autumn 2021. Therefore, the species is assessed as having a potential risk of collision with turbines, with a low consequence rating resulting in a **low** population risk.

The **White-striped Freetail Bat** is common and widespread across southern Australia and is not listed as threatened. It has been recorded flying at height at the site and has been regularly recorded colliding with turbines at other wind farms in south-eastern Australia. It is expected that there will be regular collisions with turbines and therefore is at **low** risk, with minor impacts on the local population.

The **Yellow-bellied Sheathtail Bat** is widespread across northern and eastern Australia but becomes rarer in the south of this range in NSW and Victoria (Churchill 2008). It was recorded at WWF during bat surveys in autumn 2021 and likely to fly at RSA height. It is expected that collisions of this species would occur, but given it is widespread and relatively common, consequences would be low. Therefore its risk rating is considered **low.**

Further investigations of activity, habitat and status on the WWF site are recommended for species assessed as being at **moderate** risk of collision or disturbance form the WWF.

Table 6: Bird and Bat Risk Assessment – Winterbourne Wind Farm

frank	Reason for inclusion	Threatened species status			Hazard or source event	Likelihood of risk event	Consequence	Risk Rating	Comments
		BC Act	EPBC Act	Records - BioNet NSW					
Birds									
Australasian Bittern *Rostratula australis*	Species or species habitat may occur in area	E1, P	M	0	Collision with operating turbine	Rare	Moderate	Negligible	Waterbird. Unlikely to occur on habitats available at wind farm.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Barking Owl *Ninox connivens*	Recorded in BioNet search region	V, P, 3		1	Collision with operating turbine	Unlikely	Moderate	Low	Woodland species. Risk of collision poorly known but expected to be very infrequent.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Black-faced Monarch *Monarchus melanopsis*	Recorded in BioNet search region	P	M	1	Collision with operating turbine	Rare	Negligible	Negligible	Arboreal forest species. Unlikely to fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Diamond Firetail *Stagonopleura guttata*	Recorded in BioNet search region	V, P		6	Collision with operating turbine	Rare	Negligible	Negligible	Ground-foraging granivore. Unlikely to fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	Recorded in BioNet search region	V, P		6	Collision with operating turbine	Likely	Negligible	Negligible	Soaring woodland species likely to collide with turbines, but remain moderately common.
					Indirect disturbance including barrier effects	Unlikely	Negligible	Negligible	
Flame Robin *Petroica phoenicea*	Recorded in BioNet search region	V, P		3	Collision with operating turbine	Rare	Low	Negligible	Perch and pounce forager. Unlikely to regularly fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Fork-tailed Swift *Apus pacificus*	Recorded in BioNet search region	P	C, J, K	1	Collision with operating turbine	Likely	Negligible	Negligible	Aerial forager. Very small proportion of population likely to be impacted.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Glossy Black-Cockatoo *Calyptorhynchus lathami*	Recorded in BioNet search region	V, P		13	Collision with operating turbine	Unlikely	High	Moderate	Dependent on Casuarinas (Higgins 1999).
					Indirect disturbance including barrier effects	Unlikely	Negligible	Negligible	
Little Eagle *Hieraaetus morphnoides*	Recorded in BioNet search region	V, P		2	Collision with operating turbine	Unlikely	Moderate	Low	A few casualties recorded in NSW.
					Indirect disturbance including barrier effects	Rare	Low	Negligible	
Little Lorikeet *Glossopsitta pusilla*	Recorded in BioNet search region	V, P		1	Collision with operating turbine	Unlikely	Low	Negligible	Arboreal species. Not expected to fly at turbine height regularly.
					Indirect disturbance including barrier effects	Rare	Low	Negligible	
Oriental Cuckoo *Cuculus optatus*	Species or species habitat may occur in area	P	C, J, K	0	Collision with operating turbine	Rare	Negligible	Negligible	Migratory species of subtropical lowlands – unlikely to occur regularly.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Painted Honeyeater *Grantiella picta*	Species or species habitat likely to occur in area	V, P	V	0	Collision with operating turbine	Unlikely	Negligible	Negligible	Dependent on mistletoe in woodland.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Powerful Owl		V, P		2	Collision with operating turbine	Unlikely	Moderate	Low	

frank	Reason for inclusion	Threatened species status			Hazard or source event	Likelihood of risk event	Consequence	Risk Rating	Comments
		BC Act	EPBC Act	Records - BioNet NSW					
Ninox strenua	Recorded in BioNet search region				Indirect disturbance including barrier effects	Rare	Moderate	Negligible	Forest species. Risk of collision poorly known but expected to be very infrequent.
Red Goshawk *Erythrotriorchis radiatus*	Species or species habitat likely to occur in area	E4A, P	V	0	Collision with operating turbine	Rare	Moderate	Negligible	Population in local area likely to be minimal if not extinct (DPIE 2021b).
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Regent Honeyeater *Anthochaera phrygia*	Foraging, feeding or related behaviour may occur within area	E4A, P	CE	0	Collision with operating turbine	Rare	Moderate	Negligible	Very small remaining population overall.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Rufous Fantail *Rhipidura rufifrons*	Recorded in BioNet search region	P	M	2	Collision with operating turbine	Rare	Negligible	Negligible	Forest dweller. Unlikely to fly regularly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Satin Flycatcher *Myiagra cyanoleuca*	Recorded in BioNet search region	P	M	8	Collision with operating turbine	Rare	Negligible	Negligible	Arboreal forest species. Unlikely to fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Scarlet Robin *Petroica boodang*	Recorded in BioNet search region	V, P		15	Collision with operating turbine	Rare	Negligible	Negligible	Perch and pounce forager. Unlikely to regularly fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Speckled Warbler *Chthonicola sagittata*	Recorded in BioNet search region	V, P		1	Collision with operating turbine	Rare	Negligible	Negligible	Insectivore of shrub and ground layer; unlikely to fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Spectacled Monarch *Monarchus trivirgatus*	Species or species habitat likely to occur in area	P	M	0	Collision with operating turbine	Rare	Negligible	Negligible	Forest dweller. Unlikely to fly at turbine height.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Swift Parrot *Lathamus discolor*	Species or species habitat may occur in area	E1, P	CE	0	Collision with operating turbine	Rare	Moderate	Negligible	Site is not regularly visited by this species but the occasional small flock may pass through.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Varied Sittella *Daphoenositta chrysoptera*	Recorded in BioNet search region	V, P		13	Collision with operating turbine	Rare	Negligible	Negligible	Arboreal species. Unlikely to fly at turbine height regularly.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Wedge-tailed Eagle *Aquila audax*	Recorded in BioNet search region	P		60	Collision with operating turbine	Almost certain	Moderate	Moderate	Known casualty of wind farms in NSW.
					Indirect disturbance including barrier effects	Unlikely	Negligible	Negligible	
White-throated Needletail *Hirundapus caudacutus*	Recorded in BioNet search region	P	V, C, J, K	4	Collision with operating turbine	Almost certain	Moderate	Moderate	Casualties recorded in NSW.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	

frank	Reason for inclusion	Threatened species status			Hazard or source event	Likelihood of risk event	Consequence	Risk Rating	Comments
		BC Act	EPBC Act	Records - BioNet NSW					
Other raptors	Several species recorded at WWF	P		Not applicable	Collision with operating turbine	Almost certain	Low	Low	Other raptor species recorded at WWF include Black-shouldered Kite, Brown Falcon, Brown Goshawk, Nankeen Kestrel, Peregrine Falcon and Whistling Kite.
					Indirect disturbance including barrier effects	Unlikely	Negligible	Negligible	
Mammals									
Corben's Long-eared Bat *Nyctophilus corbeni*	Species or species habitat may occur in area	V, P	V	0	Collision with operating turbine	Unlikely	Low	Negligible	Dry woodland species as yet unknown in vicinity of WWF. Unlikely to fly at turbine height and therefore unlikely to collide with turbines.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Recorded in BioNet search region	V, P		58	Collision with operating turbine	Almost certain	Low	Low	Forest species. Likely casualty but remains common in area
					Indirect disturbance including barrier effects	Unlikely	Low	Negligible	
Gould's Wattled Bat *Chalinolobus gouldii*	Recorded in BioNet search region; known to be at risk	P		4	Collision with operating turbine	Almost certain	Negligible	Negligible	A common and widespread species. Juveniles disperse from December or January which may result in higher rates of collision. It nests in tree hollows or buildings and flies within canopy and sub canopy but will pass over open areas and can forage up to 15km from roosts (Churchill 2008). It has been recorded colliding with turbines at other wind farms. As a common and widespread species population impacts are unlikely.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Greater Broad-nosed Bat *Scoteanax ruepellii*	Recorded at WWF during bat detector survey	V, P		0	Collision with operating turbine	Rare	Low	Negligible	This bat has limited manoeuvrability and mostly forage about 5 metres from vegetation (Churchill 2008), or 3 to 6 metres above ground (OEH 2017a).
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Grey-headed Flying-fox *Pteropus poliocephalus*	Foraging, feeding or related behaviour may occur within area	V, P	V	0	Collision with operating turbine	Rare	Low	Negligible	Do not regularly occur at WWF. Occasional bat may be susceptible but species is likely to remain patchily common.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Large Bent-winged Bat *Miniopterus orianae oceanensis*	Recorded in BioNet search region	V, P		1	Collision with operating turbine	Unlikely	Moderate	Low	May pass through area on migration. Occasional casualty is unlikely to affect overall population.
					Indirect disturbance including barrier effects	Rare	Moderate	Negligible	
Large-eared Pied Bat *Chalinolobus dwyeri*	Species or species habitat likely to occur in area	V, P	V	0	Collision with operating turbine	Unlikely	Low	Negligible	As yet unknown in area of wind farm.
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Little Bent-winged Bat *Miniopterus australis*	Recorded at WWF during bat detector survey	V, P		0	Collision with operating turbine	Unlikely	Moderate	Low	Known to associate with Large Bent-winged Bat at roosting sites (Churchill 2008). Only five maternity caves known in Australia (OEH 2020).
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
White-striped Freetail Bat	Recorded in BioNet search region; known to be at risk	P		1	Collision with operating turbine	Almost certain	Low	Low	High-flying bat species. Casualties recorded in NSW.

frank	Reason for inclusion	Threatened species status			Hazard or source event	Likelihood of risk event	Consequence	Risk Rating	Comments
		BC Act	EPBC Act	Records - BioNet NSW					
Austronomus australis					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	Recorded at WWF during bat detector survey	V, P		0	Collision with operating turbine	Likely	Low	Low	Known to fly above the canopy; southward migratory movement in summer (Churchill 2008). Scattered records from New England Tablelands (OEH 2017b).
					Indirect disturbance including barrier effects	Rare	Negligible	Negligible	

Notes: BC Act (Biodiversity Conservation Act 2016) status; EPBC Act (Environment and Protection of Biodiversity and Conservation Act 1999) status; P= Protected, V = Vulnerable; E, E1= Endangered, E4A, CE = Critically Endangered, M = Migratory (Bonn Convention); C = China-Australia Migratory Bird Agreement; J= Japan-Australia Migratory Bird Agreement; K = Republic of Korea--Australia Migratory Bird Agreement.

6. Recommendations

6.1. Baseline data for WWF prior to construction

Commonwealth Department of Agriculture, Water and the Environment (DAWE) are now recommending 24 months (two years) of bird utilisation surveys (BUS) to provide baseline data prior to construction commencing to inform a Before-After Control-Impact (BACI) design impact assessment study. The aim of the BUS conducted to-date has been to compile a list of species that may use the proposed wind farm site as a flyway or migration route. Further baseline BUS surveys will generate a greater understanding of the utilisation rate of the site by species of birds and bats. These data will also identify resident raptor species that occur on the site and their seasonal distribution pattern. These resident raptor species may include Little Eagle, Wedge-tailed Eagle and other raptors.

The fixed-point bird count method for the BUS surveys should be undertaken over four seasons per year for two years. This will provide an understanding of seasonal variation in bird species activity. The data collected by the BUS surveys is collected in a way that can be used to develop a Collision Risk Model (CRM) for species recorded regularly, if a CRM is in fact needed.

The fixed-point bird counts have and will continue to involve an observer stationed at a survey point for 15 minutes. During this period, all bird species and numbers of individual birds observed will be recorded. The species, the number of birds and the height of the bird when first observed to be documented. For species of concern (raptors and threatened and migratory species), the minimum and maximum heights will be recorded and flight paths plotted on a map.

For example, as flights to and from raptor nesting sites represent concentrated, higher risk areas for these species, turbine free buffer zones are recommended to be implemented around confirmed raptor nests. Surveys in winter and early spring will enable active threatened raptor nests to be located and flight behaviour documented to infirm mitigation measures, such as turbine layout changes if required.

6.2. White-throated Needletail

The White-throated Needletail (*Hirundapus caudacutus*) is listed as Vulnerable and Migratory under the EPBC Act.

This species is widespread in eastern and south-eastern Australia and is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. The species is also widespread in Victoria and Tasmania and occurs in south-eastern South Australia (Threatened Species Scientific Committee 2019).

The White-throated Needletail subspecies that occurs in Australia is *Hirundapus caudacutus caudacutus*. This subspecies is a trans-equatorial migrant that breeds in the Northern Hemisphere summer and migrates south for the Southern Hemisphere summer. The White-throated Needletail is mostly aerial in Australia, flying at heights of less than one metre up to more than 1000 metres above the ground. It has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (Threatened Species Scientific Committee 2019).

The species occurs over most habitat types and is recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. When flying above farmland, it is more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Threatened Species Scientific Committee 2019).

This species may regularly occur at the proposed WWF site. The surveys to-date have been limited in scope and thus may not have been at a time suitable to detect this species. It is recommended that further targeted surveys are conducted over the summer months for this species of concern. Specific

point-count surveys for White-throated Needletail should be undertaken targeting the times of year when the species is likely to be present on the site (November-April). If this species is recorded regularly on the site in these targeted surveys will generate data for a more detailed assessment. This data can also be used in a collision risk model if the species is recorded on-site in a regular pattern.

The use of the WWF by this species would involve undertaking point-count surveys when the species is most likely to be present at the site from November to April. Surveys would involve setting up survey points form vantage points across the site. Survey each point twice, once a fortnight. Emphasis on dusk surveys to determine if the White-throated Needletail are utilising the forest to the west as roosting areas. If it is recorded in high numbers on site more focussed surveys should be undertaken.

6.3. Other listed bird species

As threatened species can often be cryptic, additional targeted surveys may be required for these species. Investigations into how the Glossy Black-Cockatoo, may be utilising the site should be considered. These investigations should be designed to identify favoured habitats at the site. For example:

- Mapping Allocasuarina, the favoured food tree of the Glossy Black-Cockatoo; and
- Applying appropriate turbine free buffers from these habitats.

Targeted surveys recording flights of Glossy Black-Cockatoo will provide an understanding of the use of the site by this species. If they are found to utilise specific patches of habitat, turbine free buffers may be appropriate and incorporated into project design. Thus, given the nomadic movements of the Glossy Black-Cockatoo, it may not be practical to obtain data on flight paths/frequency for this species. Therefore, habitat mapping and turbine free buffers are currently recommended as the best, precautionary way to mitigate potential risks to this species.

6.4. Need for collision risk model

A CRM is likely to be required for listed threatened species that have a moderate to high risk of being impacted by the proposed WWF and where data exists.

Currently, one listed species is a potential candidate for collision risk modelling:

- White-throated Needletail.

In relation to the White-throated Needletail, if this species is recorded during statistically designed utilisation surveys in moderate numbers at the WWF regularly between November and April, this will generate sufficient information for the development of CRM for this species. There is currently insufficient data to complete a CRM for this species.

As no other species had a moderate to high risk from the risk assessment a collision risk model is not necessary for any other species. Sufficient data is required to undertake a collision risk model effectively. A CRM is less accurate for species that have low activity levels across the site and is not recommended to be generated in such circumstances.

The CRM can estimate the residual number of bird movements which have the potential to interact with wind turbines at the WWF site and from this the annual collision risk can be determined. A CRM involves the following.

- Collecting flight data at the site;
- Generating specific model inputs, including species abundance, flight behaviour and frequency, and turbine locations and dimensions;
- Applying predicted avoidance rates for the species; and

- Running two different scenarios of pre-mitigation and post-mitigation to show the predicted difference in collision rates, if relevant.

6.5. Bat species

Bat surveys have been undertaken to determine which bat species are present on site. Five bat species listed as 'vulnerable' under the *Biodiversity and Conservation 2016* have been recorded at the site including the following.

- Eastern False Pipistrelle *Falsistrellus tasmaniensis*
- Greater Broad-nosed Bat *Scoteanax rueppelli*
- Large Bent-winged Bat *Miniopterus orianae oceanensis*
- Little Bent-winged Bat *Miniopterus australis*
- Yellow-bellied Sheathtail-Bat *Saccolaimus flaviventris*.

An analysis was undertaken by Nature Advisory using monitoring data collected at 10 wind farms across south-eastern Australia. The monitoring data used in this analysis were the results of the monthly mortality monitoring for the first two years at operating wind farms. This data clearly showed that the increase in the lower end of the RSA heights resulted in a decrease in bat mortality (Nature Advisory unpub. data).

As most bats fly within or just above the canopy when foraging and dispersing having an RSA height that is high above ground level will help to reduce collision with bats. For example, having an RSA at the lower end beginning at 60 metres above the ground and higher, is likely to significantly reduce the number of bat collisions compared with an RSA 20 or 30 metres above the ground.

Bat activity across cleared agricultural land drops off considerably at 120 metres from forested areas (Brett Lane and Associates Pty Ltd 2015). A gradient study was undertaken at a proposed wind farm site in western Victoria and it showed that at 120 metres away from the forest edge bat activity was comparable with sites largely surrounded by cleared by cleared agricultural land. Whereas the forested areas had high bat activity levels.

An elevated lower RSA height and 120 metre buffer from RSA of turbines is recommended as a bat impact mitigation measures.

6.6. Adaptive management

This risk assessment recommends development of a stronger information base for the WWF to understand the use of the site by the following key species:

- White-throated Needletail (temporal and spatial patterns of abundance and activity);
- Wedge-tailed Eagle (location of breeding sites); and
- Glossy Black-Cockatoo (location of favoured foraging habitat).

The additional consideration of the use of the site by these species will further inform project design and other mitigation measures.

In the future, the additional information gained can also be incorporated into the Bird and Bat Adaptive Management Plan (BBAMP) that will be implemented as a likely condition of development approval. It is noted that the Commonwealth government is currently requiring draft BBAMP's to be lodged with EPBC Act Assessment documentation that include an adaptive management framework, such as impact trigger and responses (i.e. investigation and mitigation measures).

6.7. Average collision rates

An assessment was undertaken by Symbolix (2020) on post construction bird and bat monitoring at wind farms in western Victoria. The analysis considered the mortality carcass monitoring data, searcher efficiency, scavenger rates and size of turbine.

The results showed that between 7 and 10.8 bat mortalities occur per turbine per year (Symbolix 2020). White-striped Freetail Bat and Gould's Wattled Bat had the vast majority of casualties. A case study was undertaken for White-striped Freetail Bat and it estimated that 3.8 to 6.2 White-striped Freetail Bat occur per turbine per year in Western Victoria (Symbolix 2020). It is also observed that turbines with a higher minimum rotor swept area have comparatively lower impacts on bat species, although this is yet to be fully quantified.

For birds the results showed that turbine size had an influence on bird strike. For small turbines, with rotor-diameter less than or equal to 103 metres, between 3.4 and 4.1 bird mortalities occur poer turbine per year (Symbolix 2020). For large turbines, with rotor-diameter larger than 103 metres, 5 and 6.7 birds per turbine per year (Symbolix 2020). The Australian Magpie, European Skylark and Nankeen Kestrel had the highest mortality rates.

7. References

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Office of Environment & Heritage, NSW (OEH) 2021, Threatened Species Profile, viewed 17th October 2021, http://www.environment.gov.au.

Appendix F BAM-C credit reports

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00022013/BAAS19015/21/00029956

Proposal Name
21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check

BAM data last updated *
16/06/2022

Assessor Name
Elizabeth (Beth) Q Noel

Assessor Number
BAAS19015

BAM Data version *
54

Proponent Names

Report Created
10/10/2022

BAM Case Status
Finalised

Assessment Revision
16

Assessment Type
Major Projects

Date Finalised
10/10/2022

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
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	Critically Endangered Ecological Community	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	Critically Endangered Ecological Community	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
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	Critically Endangered Ecological Community	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

BAM Biodiversity Credit Report (Like for like)

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	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	20.1	450	142	592
526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	Not a TEC	69.4	1085	0	1085
534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	14.4	349	47	396
565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	Not a TEC	20.0	386	0	386
568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	Not a TEC	21.6	248	0	248
766-Carex sedgeland of the slopes and tablelands	Not a TEC	1.6	0	17	17
970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	Not a TEC	72.8	690	0	690
997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion	Not a TEC	16.3	187	0	187

1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	23.6	164	0	164
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	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	128.9	3325	0	3325
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Not a TEC	38.4	1097	0	1097

510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
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 This includes PCT's: 74, 75, 83, 250, 266, 267,	-	510_Grassland	No	142	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	510_Woodland	Yes	450	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	526_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	526_Woodland	Yes	1085	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion This includes PCT's: 533, 534, 681, 704, 734, 736, 965, 970, 996, 1188, 1198, 1200, 1331, 1332, 1551	-	534_Grassland	No	47	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion This includes PCT's: 533, 534, 681, 704, 734, 736, 965, 970, 996, 1188, 1198, 1200, 1331, 1332, 1551	-	534_Woodland	Yes	349	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Dry Sclerophyll Forests This includes PCT's: 493, 495, 524, 526, 530, 540, 541, 542, 550, 559, 565, 568, 572, 575, 608, 611, 632, 736, 738, 740, 949, 964, 965, 970, 993, 996, 997, 1164, 1394, 1396, 1553	New England Dry Sclerophyll Forests <50%	565_Grassland	Yes	89	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	New England Dry Sclerophyll Forests This includes PCT's: 493, 495, 524, 526, 530, 540, 541, 542, 550, 559, 565, 568, 572, 575, 608, 611, 632, 736, 738, 740, 949, 964, 965, 970, 993, 996, 997, 1164, 1394, 1396, 1553	New England Dry Sclerophyll Forests <50%	565_Woodland	Yes	297	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	567_Grassland_ TEC	Yes	2411	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	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 This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099,	-	567_Woodland_TEC	Yes	914	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Grassy Woodlands This includes PCT's: 488, 489, 496, 501, 510, 533, 539, 567, 571, 704, 734, 853, 1118, 1171, 1174, 1331, 1332, 1512	New England Grassy Woodlands >=50% and <70%	567_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	New England Grassy Woodlands This includes PCT's: 488, 489, 496, 501, 510, 533, 539, 567, 571, 704, 734, 853, 1118, 1171, 1174, 1331, 1332, 1512	New England Grassy Woodlands >=50% and <70%	567_Woodland	Yes	1097	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	568_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	568_Woodland	Yes	248	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

766-Carex sedgeland of the slopes and tablelands	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Montane Bogs and Fens This includes PCT's: 765, 766, 1229, 1256	Montane Bogs and Fens >=70% and <90%	766_Riparian	No	17	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

766-Carex sedgeland of the slopes and tablelands

970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	970_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	970_Woodland	Yes	690	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	997_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	997_Woodland	Yes	187	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion

1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion This includes PCT's: 507, 540, 554, 606, 681, 965, 1188, 1192, 1194, 1200, 1298, 1551, 1555, 1559, 1576	-	1194_Grassland	No	0	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion This includes PCT's: 507, 540, 554, 606, 681, 965, 1188, 1192, 1194, 1200, 1298, 1551, 1555, 1559, 1576	-	1194_Woodland	Yes	164	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Calyptorhynchus lathami / Glossy Black-Cockatoo	**510_Woodland, 526_Woodland, 534_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	33.8	987.00

Dichanthium setosum / Bluegrass	**970_Woodland, 970_Grassland**	13.2	180.00
Eucalyptus nicholii / Narrow-leaved Black Peppermint	**526_Woodland, 568_Woodland, 567_Woodland, 567_Woodland_TEC, 568_Grassland, 1194_Grassland**	13.0	26.00
Ninox connivens / Barking Owl	**510_Woodland, 526_Woodland, 534_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 567_Woodland, 567_Woodland_TEC**	17.7	530.00
Petauroides volans / Greater Glider	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.5	5694.00

Petaurus norfolcensis / Squirrel Glider	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.5	5694.00
Phascolarctos cinereus / Koala	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.9	5709.00

Credit Retirement Options

Like-for-like credit retirement options

Calyptorhynchus lathami / Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami / Glossy Black-Cockatoo	Any in NSW

Dichanthium setosum / Bluegrass	Spp	IBRA subregion
	Dichanthium setosum / Bluegrass	Any in NSW
Eucalyptus nicholii / Narrow-leaved Black Peppermint	Spp	IBRA subregion
	Eucalyptus nicholii / Narrow-leaved Black Peppermint	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Petauroides volans / Greater Glider	Spp	IBRA subregion
	Petauroides volans / Greater Glider	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00022013/BAAS19015/21/00029956

Proposal Name
21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check

BAM data last updated *
16/06/2022

Assessor Name
Elizabeth (Beth) Q Noel

Assessor Number
BAAS19015

BAM Data version *
54

Proponent Name(s)

Report Created
10/10/2022

BAM Case Status
Finalised

Assessment Revision
16

Assessment Type
Major Projects

Date Finalised
10/10/2022

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
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	Critically Endangered Ecological Community	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	Critically Endangered Ecological Community	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion

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	Critically Endangered Ecological Community	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Variations)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	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	20.1	450	142	592.00
526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	Not a TEC	69.4	1085	0	1085.00
534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	14.4	349	47	396.00
565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	Not a TEC	20.0	386	0	386.00
568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	Not a TEC	21.6	248	0	248.00
766-Carex sedgeland of the slopes and tablelands	Not a TEC	1.6	0	17	17.00
970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	Not a TEC	72.8	690	0	690.00
997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion	Not a TEC	16.3	187	0	187.00
1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	23.6	164	0	164.00

567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	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	128.9	3325	0	3325.00
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Not a TEC	38.4	1097	0	1097.00

510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	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 This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	510_Grassland	No	142	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	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 This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	510_Woodland	Yes	450	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	526_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	526_Woodland	Yes	1085	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	526_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	526_Woodland	Yes (including artificial)	1085	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion This includes PCT's: 533, 534, 681, 704, 734, 736, 965, 970, 996, 1188, 1198, 1200, 1331, 1332, 1551	-	534_Grassland	No	47	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion This includes PCT's: 533, 534, 681, 704, 734, 736, 965, 970, 996, 1188, 1198, 1200, 1331, 1332, 1551	-	534_Woodland	Yes	349	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 493, 495, 524, 526, 530, 540, 541, 542, 550, 559, 565, 568, 572, 575, 608, 611, 632, 736, 738, 740, 949, 964, 965, 970, 993, 996, 997, 1164, 1394, 1396, 1553	New England Dry Sclerophyll Forests <50%	565_Grassland	Yes	89	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 493, 495, 524, 526, 530, 540, 541, 542, 550, 559, 565, 568, 572, 575, 608, 611, 632, 736, 738, 740, 949, 964, 965, 970, 993, 996, 997, 1164, 1394, 1396, 1553	New England Dry Sclerophyll Forests <50%	565_Woodland	Yes	297	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	565_Grassland	Yes (including artificial)	89	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	565_Woodland	Yes (including artificial)	297	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	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 This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	567_Grassland_TEC	Yes	2411	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	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 This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	567_Woodland_TEC	Yes	914	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Grassy Woodlands This includes PCT's: 488, 489, 496, 501, 510, 533, 539, 567, 571, 704, 734, 853, 1118, 1171, 1174, 1331, 1332, 1512	New England Grassy Woodlands >=50% and <70%	567_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Grassy Woodlands This includes PCT's: 488, 489, 496, 501, 510, 533, 539, 567, 571, 704, 734, 853, 1118, 1171, 1174, 1331, 1332, 1512	New England Grassy Woodlands >=50% and <70%	567_Woodland	Yes	1097	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Grassy Woodlands	Tier 3 or higher threat status	567_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Grassy Woodlands	Tier 3 or higher threat status	567_Woodland	Yes (including artificial)	1097	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	568_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	568_Woodland	Yes	248	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	568_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	568_Woodland	Yes (including artificial)	248	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
766-Carex sedgeland of the slopes and tablelands	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Montane Bogs and Fens This includes PCT's: 765, 766, 1229, 1256	Montane Bogs and Fens >=70% and <90%	766_Riparian	No	17	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Freshwater Wetlands	Tier 2 or higher threat status	766_Riparian	No	17	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	970_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	970_Woodland	Yes	690	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	970_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	970_Woodland	Yes (including artificial)	690	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	997_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	New England Dry Sclerophyll Forests This includes PCT's: 524, 526, 540, 541, 542, 559, 568, 608, 632, 738, 740, 949, 965, 970, 996, 997, 1164, 1394, 1396	New England Dry Sclerophyll Forests >=50% and <70%	997_Woodland	Yes	187	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	997_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	997_Woodland	Yes (including artificial)	187	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion This includes PCT's: 507, 540, 554, 606, 681, 965, 1188, 1192, 1194, 1200, 1298, 1551, 1555, 1559, 1576	-	1194_Grassland	No	0	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion This includes PCT's: 507, 540, 554, 606, 681, 965, 1188, 1192, 1194, 1200, 1298, 1551, 1555, 1559, 1576	-	1194_Woodland	Yes	164	Walcha Plateau,Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Wet Sclerophyll Forests (Grassy sub-formation)	Tier 3 or higher threat status	1194_Grassland	No	0	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Wet Sclerophyll Forests (Grassy sub-formation)	Tier 3 or higher threat status	1194_Woodland	Yes (including artificial)	164	IBRA Region: New England Tablelands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Calyptorhynchus lathami / Glossy Black-Cockatoo	**510_Woodland, 526_Woodland, 534_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	33.8	987.00
Dichanthium setosum / Bluegrass	**970_Woodland, 970_Grassland**	13.2	180.00
Eucalyptus nicholii / Narrow-leaved Black Peppermint	**526_Woodland, 568_Woodland, 567_Woodland, 567_Woodland_TEC, 568_Grassland, 1194_Grassland**	13.0	26.00
Ninox connivens / Barking Owl	**510_Woodland, 526_Woodland, 534_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 567_Woodland, 567_Woodland_TEC**	17.7	530.00
Petauroides volans / Greater Glider	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.5	5694.00

Petaurus norfolcensis / Squirrel Glider	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.5	5694.00
Phascolarctos cinereus / Koala	**510_Woodland, 526_Woodland, 534_Woodland, 565_Woodland, 568_Woodland, 970_Woodland, 997_Woodland, 1194_Woodland, 567_Woodland, 567_Woodland_TEC**	206.9	5709.00

Credit Retirement Options

Like-for-like options

Calyptorhynchus lathami/ Glossy Black-Cockatoo	Spp	IBRA region	
	Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Dichanthium setosum/ Bluegrass	Spp	IBRA region	
	Dichanthium setosum/Bluegrass	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Eucalyptus nicholii/ Narrow-leaved Black Peppermint	Spp	IBRA region	
	Eucalyptus nicholii/Narrow-leaved Black Peppermint	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Petauroides volans/ Greater Glider	Spp		IBRA region
	Petauroides volans/Greater Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Not Listed	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Walcha Plateau, Armidale Plateau, Comboyne Plateau, Eastern Nandewars, Macleay Gorges, Mummel Escarpment, Peel, Tomalla and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Candidate Species Report

Proposal Details

Assessment Id 00022013/BAAS19015/21/00029956	Proposal Name 21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check	BAM data last updated * 16/06/2022
Assessor Name Elizabeth (Beth) Q Noel	Report Created 10/10/2022	BAM Data version * 54
Assessor Number BAAS19015	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 16	Date Finalised 10/10/2022	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Adelotus brevis - endangered population Tusked Frog population in the Nandewar and New England Tableland Bioregions	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Aepyprymnus rufescens Rufous Bettong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Bertya ingramii Narrow-leaved Bertya	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Boronia granitica Granite Boronia	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Callitris oblonga Pygmy Cypress Pine	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami Glossy Black-Cockatoo	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Chiloglottis anaticeps Bird Orchid	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Chiloglottis platyptera Barrington Tops Ant Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cryptostylis hunteriana Leafless Tongue Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Dichanthium setosum Bluegrass	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Diuris pedunculata Small Snake Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus magnificata Northern Blue Box	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Eucalyptus nicholii Narrow-leaved Black Peppermint	Yes (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Euphrasia arguta Euphrasia arguta	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Euphrasia ciliolata Polblue Eyebright	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Grevillea beadleana Beadle's Grevillea	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Haloragis exalata subsp. velutina Tall Velvet Sea-berry	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Hoplocephalus bitorquatus Pale-headed Snake	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria booroolongensis Booroolong Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria castanea Yellow-spotted Tree Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria daviesae Davies' Tree Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria piperata Peppered Tree Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria subglandulosa Glandular Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Lophoictinia isura Square-tailed Kite	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Macropus parma Parma Wallaby	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Ninox strenua Powerful Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petauroides volans Greater Glider	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Picris evae Hawkweed	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Prostanthera cineolifera Singleton Mint Bush	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pteropus poliocephalus Grey-headed Flying-fox	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Pterostylis elegans Elegant Greenhood	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pterostylis riparia Pterostylis riparia	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Styphelia perileuca Montane Green Five-corners	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Tasmannia glaucifolia Fragrant Pepperbush	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Tasmannia purpurascens Broad-leaved Pepperbush	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Thesium australe Austral Toadflax	No (expert report)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto tenebricosa Sooty Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Granite Boronia	Boronia granitica
Beadle's Grevillea	Grevillea beadleana
Yellow-spotted Tree Frog	Litoria castanea
Glandular Frog	Litoria subglandulosa
Hawkweed	Picris evae
Montane Green Five-corners	Styphelia perileuca
Silky Swainson-pea	Swainsona sericea
Peppered Tree Frog	Litoria piperata
Eastern Cave Bat	Vespadelus troughtoni
Little Bent-winged Bat	Miniopterus australis

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Brush-tailed Phascogale	Phascogale tapoatafa	Refer to BAR
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints

Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Stuttering Frog	Mixophyes balbus	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00022013/BAAS19015/21/00029956

Proposal Name
21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check

BAM data last updated *
16/06/2022

Assessor Name
Elizabeth (Beth) Q Noel

Report Created
10/10/2022

BAM Data version *
54

Assessor Number
BAAS19015

BAM Case Status
Finalised

Date Finalised
10/10/2022

Assessment Revision
16

Assessment Type
Major Projects

* 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

Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion												
1	510_Grassland	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	25.4	25.4	9	PCT Cleared - 79%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	142

2	510_Woodland	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	64.5	64.5	11.2	PCT Cleared - 79%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	450
											Subtotal	**592**

Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion												
18	567_Grassland_TEC	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	39.7	39.7	97.1	PCT Cleared - 62%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	2411

19	567_Woodland_TEC	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	46	46.0	31.8	PCT Cleared - 62%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	914
											Subtotal	**3325**
Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion												
20	567_Grassland	Not a TEC	11.1	11.1	3	PCT Cleared - 62%	High Sensitivity to Gain			1.75		0
21	567_Woodland	Not a TEC	70.7	70.7	35.4	PCT Cleared - 62%	High Sensitivity to Gain			1.75		1097
											Subtotal	**1097**

Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion												
9	568_Grassland	Not a TEC	14.7	14.7	12.8	PCT Cleared - 59%	High Sensitivity to Gain			1.75		0
10	568_Woodland	Not a TEC	64.4	64.4	8.8	PCT Cleared - 59%	High Sensitivity to Gain			1.75		248
											Subtotal	**248**
Carex sedgeland of the slopes and tablelands												
11	766_Riparian	Not a TEC	20.8	20.8	1.6	PCT Cleared - 75%	High Sensitivity to Gain			2.00		17
											Subtotal	**17**
Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion												
3	526_Grassland	Not a TEC	5.5	5.5	28.6	PCT Cleared - 56%	High Sensitivity to Gain			1.75		0
4	526_Woodland	Not a TEC	60.7	60.7	40.9	PCT Cleared - 56%	High Sensitivity to Gain			1.75		1085
											Subtotal	**1085**
Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion												
12	970_Grassland	Not a TEC	8.2	8.2	34.8	PCT Cleared - 56%	High Sensitivity to Gain			1.75		0

13	970_Woodland	Not a TEC	41.5	41.5	38	PCT Cleared - 56%	High Sensitivity to Gain			1.75		690
											Subtotal	**690**
New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion												
5	534_Grassland	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	22.5	22.5	3.3	PCT Cleared - 90%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	47
6	534_Woodland	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	50.3	50.3	11.1	PCT Cleared - 90%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	349

											Subtotal	**396**
New England stringybarks - peppermint open forest of the New England Tableland Bioregion												
14	997_Grassland	Not a TEC	11.6	11.6	6	PCT Cleared - 55%	High Sensitivity to Gain			1.75		0
15	997_Woodland	Not a TEC	41.6	41.6	10.3	PCT Cleared - 55%	High Sensitivity to Gain			1.75		187
											Subtotal	**187**
Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion												
7	565_Grassland	Not a TEC	38.4	38.4	6.2	PCT Cleared - 44%	High Sensitivity to Gain			1.50		89
8	565_Woodland	Not a TEC	57.2	57.2	13.8	PCT Cleared - 44%	High Sensitivity to Gain			1.50		297
											Subtotal	**386**

Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion												
16	1194_Grassland	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	12.3	12.3	18	PCT Cleared - 80%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
17	1194_Woodland	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	58.2	58.2	5.6	PCT Cleared - 80%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		164
											Subtotal	**164**
											Total	**8187**

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

Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
510_Woodland	64.5	64.5	0.55			Vulnerable	Not Listed	False	18
526_Woodland	60.7	60.7	4			Vulnerable	Not Listed	False	122
534_Woodland	50.3	50.3	3.9			Vulnerable	Not Listed	False	97
568_Woodland	64.4	64.4	5.1			Vulnerable	Not Listed	False	164
970_Woodland	41.5	41.5	5.8			Vulnerable	Not Listed	False	120
997_Woodland	41.6	41.6	1.1			Vulnerable	Not Listed	False	23
1194_Woodland	58.2	58.2	0.1			Vulnerable	Not Listed	False	3
567_Woodland	70.7	70.7	10.9			Vulnerable	Not Listed	False	385
567_Woodland_TEC	46.0	46.0	2.4			Vulnerable	Not Listed	False	55
								Subtotal	**987**
Dichanthium setosum / Bluegrass (Flora)									
970_Woodland	41.5	41.5	7.6			Vulnerable	Vulnerable	False	157
970_Grassland	8.2	8.2	5.6			Vulnerable	Vulnerable	False	23
								Subtotal	**180**
Eucalyptus nicholii / Narrow-leaved Black Peppermint (Flora)									
526_Woodland	N/A	N/A	5			Vulnerable	Vulnerable	False	10
568_Woodland	N/A	N/A	2			Vulnerable	Vulnerable	False	4
567_Woodland	N/A	N/A	2			Vulnerable	Vulnerable	False	4
567_Woodland_TEC	N/A	N/A	2			Vulnerable	Vulnerable	False	4
568_Grassland	N/A	N/A	1			Vulnerable	Vulnerable	False	2
1194_Grassland	N/A	N/A	1			Vulnerable	Vulnerable	False	2
								Subtotal	**26**

Ninox connivens / Barking Owl (Fauna)									
510_Woodland	64.5	64.5	0.25			Vulnerable	Not Listed	False	8
526_Woodland	60.7	60.7	2.3			Vulnerable	Not Listed	False	71
534_Woodland	50.3	50.3	1.2			Vulnerable	Not Listed	False	31
568_Woodland	64.4	64.4	2.8			Vulnerable	Not Listed	False	90
970_Woodland	41.5	41.5	3.2			Vulnerable	Not Listed	False	65
997_Woodland	41.6	41.6	0.01			Vulnerable	Not Listed	False	1
567_Woodland	70.7	70.7	6.7			Vulnerable	Not Listed	False	235
567_Woodland_TEC	46.0	46.0	1.3			Vulnerable	Not Listed	False	29
								Subtotal	**530**
Petauroides volans / Greater Glider (Fauna)									
510_Woodland	64.5	64.5	11.2			Not Listed	Vulnerable	False	360
526_Woodland	60.7	60.7	40.9			Not Listed	Vulnerable	False	1240
534_Woodland	50.3	50.3	11.1			Not Listed	Vulnerable	False	279
565_Woodland	57.2	57.2	13.8			Not Listed	Vulnerable	False	396
568_Woodland	64.4	64.4	8.8			Not Listed	Vulnerable	False	284
970_Woodland	41.5	41.5	38			Not Listed	Vulnerable	False	788
997_Woodland	41.6	41.6	10.3			Not Listed	Vulnerable	False	214
1194_Woodland	58.2	58.2	5.6			Not Listed	Vulnerable	False	164
567_Woodland	70.7	70.7	35			Not Listed	Vulnerable	False	1238
567_Woodland_TEC	46.0	46.0	31.8			Not Listed	Vulnerable	False	731
								Subtotal	**5694**

Petaurus norfolcensis / Squirrel Glider (Fauna)									
510_Woodland	64.5	64.5	11.2			Vulnerable	Not Listed	False	360
526_Woodland	60.7	60.7	40.9			Vulnerable	Not Listed	False	1240
534_Woodland	50.3	50.3	11.1			Vulnerable	Not Listed	False	279
565_Woodland	57.2	57.2	13.8			Vulnerable	Not Listed	False	396
568_Woodland	64.4	64.4	8.8			Vulnerable	Not Listed	False	284
970_Woodland	41.5	41.5	38			Vulnerable	Not Listed	False	788
997_Woodland	41.6	41.6	10.3			Vulnerable	Not Listed	False	214
1194_Woodland	58.2	58.2	5.6			Vulnerable	Not Listed	False	164
567_Woodland	70.7	70.7	35			Vulnerable	Not Listed	False	1238
567_Woodland_TEC	46.0	46.0	31.8			Vulnerable	Not Listed	False	731
								Subtotal	**5694**
Phascolarctos cinereus / Koala (Fauna)									
510_Woodland	64.5	64.5	11.2			Endangered	Endangered	False	360
526_Woodland	60.7	60.7	40.9			Endangered	Endangered	False	1240
534_Woodland	50.3	50.3	11.1			Endangered	Endangered	False	279
565_Woodland	57.2	57.2	13.8			Endangered	Endangered	False	396
568_Woodland	64.4	64.4	8.8			Endangered	Endangered	False	284
970_Woodland	41.5	41.5	38			Endangered	Endangered	False	788
997_Woodland	41.6	41.6	10.3			Endangered	Endangered	False	214
1194_Woodland	58.2	58.2	5.6			Endangered	Endangered	False	164
567_Woodland	70.7	70.7	35.4			Endangered	Endangered	False	1253
567_Woodland_TEC	46.0	46.0	31.8			Endangered	Endangered	False	731

								Subtotal	**5709**

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00022013/BAAS19015/21/00029956		16	10/10/2022

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Elizabeth (Beth) Q Noel	BAAS19015	21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check	Finalised

Assessment Type	Date Finalised
Major Projects	10/10/2022

PCT list

Price calculated	PCT common name	Credits
Yes	**510 -** Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	592
Yes	**526 -** Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	1085
Yes	**534 -** New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	396
Yes	**565 -** Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	386
Yes	**567 -** Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	3325
Yes	**568 -** Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	248
Yes	**766 -** Carex sedgeland of the slopes and tablelands	17

Yes	**970 -** Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	690
Yes	**997 -** New England stringybarks - peppermint open forest of the New England Tableland Bioregion	187
Yes	**1194 -** Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	164
Yes	**567 -** Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	1097

Species list

Price calculated	Species	Credits
Yes	***Calyptorhynchus lathami*** (Glossy Black-Cockatoo)	987
Yes	***Dichanthium setosum*** (Bluegrass)	180
Yes	***Eucalyptus nicholii*** (Narrow-leaved Black Peppermint)	26
Yes	***Ninox connivens*** (Barking Owl)	530
Yes	***Petaurus norfolcensis*** (Squirrel Glider)	5694
Yes	***Phascolarctos cinereus*** (Koala)	5709
Yes	***Petauroides volans*** (Greater Glider)	5694

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

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Walcha Plateau	**510 -** Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	Yes	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	18.83%	$244.89	2.1064	$7,519.83	592	$ 4,451,736.56
Walcha Plateau	**526 -** Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	No	New England Dry Sclerophyll Forests >=50% and <70%	19.12%	$98.98	2.1950	$3,046.53	1085	$ 3,305,479.90

Walcha Plateau	**534 -** New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	Yes	New England Peppermint (Eucalyptus nova-anglica) Woodland on Basalts and Sediments in the New England Tableland Bioregion	18.67%	$521.14	1.7395	$ 15,981.98	396	$ 6,328,863.34
Walcha Plateau	**565 -** Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	No	New England Dry Sclerophyll Forests <50%	19.12%	$80.00	2.1074	$1,612.40	386	$622,387.24

Walcha Plateau	**567 -** Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Yes	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	18.83%	$244.89	2.1064	$7,519.83	3325	$ 25,003,419.01
Walcha Plateau	**568 -** Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	No	New England Dry Sclerophyll Forests >=50% and <70%	19.12%	$98.98	2.1950	$3,046.53	248	$755,538.26
Walcha Plateau	**766 -** Carex sedgeland of the slopes and tablelands	No	Montane Bogs and Fens >=70% and <90%	19.12%	$285.02	1.3601	$8,772.98	17	$149,140.63

Walcha Plateau	**970 -** Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	No	New England Dry Sclerophyll Forests >=50% and <70%	19.12%	$98.98	2.1950	$3,046.53	690	$ 2,102,102.43
Walcha Plateau	**997 -** New England stringybarks - peppermint open forest of the New England Tableland Bioregion	No	New England Dry Sclerophyll Forests >=50% and <70%	19.12%	$98.98	2.1950	$3,046.53	187	$569,700.22
Walcha Plateau	**1194 -** Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	Yes	Ribbon Gum—Mountain Gum—Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	18.67%	$352.72	1.8560	$ 10,816.93	164	$ 1,773,976.50
Walcha Plateau	**567 -** Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	No	New England Grassy Woodlands >=50% and <70%	19.12%	$80.00	2.0767	$1,092.60	1097	$ 1,198,587.08

Subtotal (excl. GST) **$46,260,931.17**

GST **$4,626,093.12**

Total ecosystem credits (incl. GST)	**$50,887,024.29**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
10140	***Calyptorhynchus lathami*** (Glossy Black-Cockatoo)	Vulnerable	$463.67	20.6900%	$80.00	987	$631,288.48
10221	***Dichanthium setosum*** (Bluegrass)	Vulnerable	$158.64	20.6900%	$80.00	180	$48,863.27
10302	***Eucalyptus nicholii*** (Narrow-leaved Black Peppermint)	Vulnerable	$173.02	20.6900%	$80.00	26	$7,509.26
10561	***Ninox connivens*** (Barking Owl)	Vulnerable	$173.02	20.6900%	$80.00	530	$153,073.45
10604	***Petaurus norfolcensis*** (Squirrel Glider)	Vulnerable	$495.24	20.6900%	$80.00	5694	$3,858,853.16
10616	***Phascolarctos cinereus*** (Koala)	Endangered	$495.24	20.6900%	$80.00	5709	$3,869,018.74
20306	***Petauroides volans*** (Greater Glider)	Not Listed	$463.67	20.6900%	$80.00	5694	$3,641,901.32

Subtotal (excl. GST)	**$12,210,507.68**
GST	**$1,221,050.77**
Total species credits (incl. GST)	**$13,431,558.45**

Biodiversity payment summary report

Grand total	**$64,318,582.74**

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00022013/BAAS19015/21/00029956	21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Elizabeth (Beth) Q Noel	10/10/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS19015	Major Projects	Finalised
Assessment Revision		**Date Finalised**
16		10/10/2022

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion

Barking Owl	Ninox connivens	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	766-Carex sedgeland of the slopes and tablelands
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Diamond Firetail	Stagonopleura guttata	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion

Diamond Firetail	Stagonopleura guttata	997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		766-Carex sedgeland of the slopes and tablelands
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Eastern False Pipistrelle	Falsistrellus tasmaniensis	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion

Eastern False Pipistrelle	Falsistrellus tasmaniensis	568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Flame Robin	Petroica phoenicea	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion

Glossy Black-Cockatoo	Calyptorhynchus lathami	565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Greater Broad-nosed Bat	Scoteanax rueppellii	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
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		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

Grey-headed Flying-fox	Pteropus poliocephalus	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Hastings River Mouse	Pseudomys oralis	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
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		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Little Eagle	Hieraaetus morphnoides	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		766-Carex sedgeland of the slopes and tablelands
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion

Little Eagle	Hieraaetus morphnoides	1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Little Lorikeet	Glossopsitta pusilla	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Masked Owl	Tyto novaehollandiae	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
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		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion

Masked Owl	Tyto novaehollandiae	1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
New Holland Mouse	Pseudomys novaehollandiae	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Olive Whistler	Pachycephala olivacea	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
Painted Honeyeater	Grantiella picta	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
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		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Powerful Owl	Ninox strenua	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

Powerful Owl	Ninox strenua	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Regent Honeyeater	Anthochaera phrygia	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Scarlet Robin	Petroica boodang	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		766-Carex sedgeland of the slopes and tablelands
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion

Scarlet Robin	Petroica boodang	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Sooty Owl	Tyto tenebricosa	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
Speckled Warbler	Chthonicola sagittata	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
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		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Spotted Harrier	Circus assimilis	766-Carex sedgeland of the slopes and tablelands
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion

Spotted-tailed Quoll	Dasyurus maculatus	565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Square-tailed Kite	Lophoictinia isura	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Swift Parrot	Lathamus discolor	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

Swift Parrot	Lathamus discolor	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Varied Sittella	Daphoenositta chrysoptera	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
White-throated Needletail	Hirundapus caudacutus	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		766-Carex sedgeland of the slopes and tablelands
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Yellow-bellied Glider	Petaurus australis	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

Yellow-bellied Glider	Petaurus australis	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion
		567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
		526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
		534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
		565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
		568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
		766-Carex sedgeland of the slopes and tablelands
		970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
		997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion
		1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00022013/BAAS19015/21/00029956

Assessment name
21-570 WInterbourne Wind Farm - All Subregions - Subject Land - updated 20221005 after TEC check

BAM data last updated *
16/06/2022

Assessor Name
Elizabeth (Beth) Q Noel

Report Created
10/10/2022

BAM Data version *
54

Assessor Number
BAAS19015

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
16

Date Finalised
10/10/2022

* 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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	510_Grassland	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	Grassland	8.96	3	
2	510_Woodland	510-Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	Woodland	11.15	3	
3	526_Grassland	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	Grassland	28.56	4	
4	526_Woodland	526-Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion	Woodland	40.88	4	
5	534_Grassland	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	Grassland	3.32	2	
6	534_Woodland	534-New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion	Woodland	11.11	3	
7	565_Grassland	565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	Grassland	6.19	3	

8	565_Woodland	565-Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion	Woodland	13.84	3	
9	568_Grassland	568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	Grassland	12.84	3	
10	568_Woodland	568-Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion	Woodland	8.8	3	
11	766_Riparian	766-Carex sedgeland of the slopes and tablelands	Riparian	1.6	1	
12	970_Grassland	970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	Grassland	34.84	4	
13	970_Woodland	970-Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion	Woodland	37.99	4	
14	997_Grassland	997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion	Grassland	6.03	3	
15	997_Woodland	997-New England stringybarks - peppermint open forest of the New England Tableland Bioregion	Woodland	10.27	3	

16	1194_Grassland	1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	Grassland	17.95	3	
17	1194_Woodland	1194-Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion	Woodland	5.65	3	
18	567_Grassland_TEC	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Grassland_TEC	97.12	5	
19	567_Woodland_TEC	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Woodland_TEC	31.76	4	
20	567_Grassland	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Grassland	2.96	2	
21	567_Woodland	567-Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion	Woodland	35.45	4	

Appendix G Plot field data

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF130	**Pic 20x20**		**Pic 20x50**		
Survey date:	10/03/2021		**Compass Orientation (head of 20x20 plot)**				38	
Recorders	DP EE		**PCT:**	565	Woodland			now 130
GPS Easting	355926	**GPS Northing**	6597869		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. blakelyi nearby

FUNCTION

Function attributes for WWF130

BAM Attribute (20x20m plot)

	Stratum	Sum
	Tree (TG)	**1**
	Shrub (SG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	2%	
	15m	5%	

Count of Native Richness	Forb (FG)	6
	Grass & grasslike (GG)	4
	Fern (EG)	0
	Other (OG)	0
	TOTAL	11
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	0
	Forb (FG)	1
	Grass & grasslike (GG)	80
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	111
	TOTAL 'HTE'	5

	25m	10%	3.4%
	35m	0%	
	45m	0%	
Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	3		3
50-79	1		
30-49	1		
20-29	1		
10-19			
5-9			
<5			N/A
Length of logs (m)		73	

COMPOSITION & STRUCTURE

Species recorded for WWF130

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	30	4		Tree (TG)	No
gali mura	*Galium murale*	Small Bedstraw	Rubiaceae	0.5	10	*		No
dysp	*Dysphania spp.*		Chenopodiace	0.5	10		Forb (FG)	No
anth	*Anthosachne sp*		Poaceae	1	20			No
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	10	50	*		No
brom	*Bromus spp.*	A Brome	Poaceae	60	100	*	Grass & grasslike (GG)	No

cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	5	20		Grass & grasslike (GG)	No
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	2	10	*		No
chen albu	*Chenopodium album*	Fat Hen	Chenopodiace	0.1	1	*		No
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	20	*		No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No
both macr	*Bothriochloa macra*	Red Grass	Poaceae	5	30		Grass & grasslike (GG)	No
ryti pilo	*Rytidosperma pilosum*	Smooth-flowered Wallaby Grass	Poaceae	0.1	2			No
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.1	5	*		No
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	10		Forb (FG)	No
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	0.1	1		Forb (FG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	5	20	*		HTE
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10	50		Grass & grasslike (GG)	No
tage minu	*Tagetes minuta*	Stinking Roger	Asteraceae	0.1	1	*		No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF22	**Pic 20x20**	QField SD	**Pic 20x50**		
Survey date:	31/03/2021		**Compass Orientation (head of 20x20 plot)**				210	SW
Recorders	GY SD		**PCT:**	997	DNG			was WWF2011 (11)
GPS Easting	386735	**GPS Northing**	6568838		**Datum**	GDA 94	**Zone**	56

Landform		**Soils**		**Drainage & Slope**		
Morphology	hill top	**Soil Texture**	clay	**Slope**	4 degrees	
LandF Element		**Soil Colour**	brown	**Aspect**	296	NW
LandF Pattern		**Soil Depth**	deep fertile	**Drainage**		
Microrelief		**Geology**		**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2		
Cultivation	1		
Soil erosion	0		
Firewood	0		
Grazing	1	R	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

cattle

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. acaciiformis , E. caliginosa , E. radiata*

FUNCTION

Function attributes for WWF22

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**14**

BAM Attribute (20x20m plot)

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	6%	**8.2%**	q fiels SDo
	15m	12%		
	25m	14%		
	35m	5%		
	45m	4%		
Bare ground cover	5m	2%	**4.8%**	
	15m	8%		
	25m	3%		

Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.2
	Grass & grasslike (GG)	60.9
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	62.1
	TOTAL 'HTE'	0.5

cover	35m	9%		
	45m	2%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees inside plot

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF22

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.4	50	*		HTE	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	3000		Grass & grasslike (GG)	No	
junc fili	*Juncus filicaulis*		Juncaceae	0.4	300		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	500	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	5	2000	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	3000		Forb (FG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.2	500	*		No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.2	2000		Forb (FG)	No	
hain cyli	*Hainardia cylindrica*	Common Barbgrass	Poaceae	18	4000	*		No	
junc cogn	*Juncus cognatus*		Juncaceae	0.1	10	*		No	
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllaceae	0.1	1		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	30	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	30		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	20		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	15	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No	

gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	15		Forb (FG)	No	
seta parv	*Setaria parviflora*		Poaceae	0.1	5	*		No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	1	*		No	
fest	*Festuca spp.*		Poaceae	0.1	5	*	Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	5	*		No	
leon tara tara	*Leontodon taraxacoides*	Lesser Hawkbit	Asteraceae	0.1	3	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
hypo hygr	*Hypoxis hygrometrica*	Golden Weather-grass	Hypoxidaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF001	**Pic 20x20**		**Pic 20x50**		Former Plot ID: WWF75
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				3	
Recorders	DP NS		**PCT:**	1194	DNG			
GPS Easting	394220	**GPS Northing**	6565000		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. radiata/dalrympleana* nearby

FUNCTION

Function attributes for **WWF001**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**2**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	8%	**3.0%**	
	15m	3%		
	25m	2%		
	35m	2%		
	45m	0%		

	Other (OG)	0
	TOTAL	13
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	1.1
	Forb (FG)	1.4
	Grass & grasslike (GG)	91
	Fern (EG)	3
	Other (OG)	0
	TOTAL Native	101.5
	TOTAL 'HTE'	3

Bare ground cover	5m	0%	5.6%	
	15m	4%		
	25m	1%		
	35m	20%		
	45m	3%		
Cryptogam cover	5m	1%	0.6%	
	15m	0%		
	25m	0%		
	35m	2%		
	45m	0%		
Rock Cover	5m	2%	3.6%	
	15m	0%		
	25m	6%		
	35m	10%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		2.5	

COMPOSITION & STRUCTURE

Species recorded for WWF001

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca pauc	*Eucalyptus pauciflora*	White Sally	Myrtaceae	5	1		Tree (TG)	No	
olea alpi	*Olearia alpicola*	Alpine Daisy-bush	Asteraceae	1	1		Shrub (SG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	2		Shrub (SG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	3	50	*		HTE	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.2	5	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	20		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	50	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.1	5	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	2		Forb (FG)	No	
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	20	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	10		Forb (FG)	No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	1	20	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	10		Grass & grasslike (GG)	No	

brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	5	50	*		No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	30	100+		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	10	100+	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	30		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	3	15		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF002	**Pic 20x20**		**Pic 20x50**		WWF 81
Survey date:	10/10/2020		**Compass Orientation (head of 20x20 plot)**				248	
Recorders	DP NS		**PCT:**	526	DNG			
GPS Easting	393966	**GPS Northing**	6565419		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF002

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	1%	**1.4%**	
	15m	1%		
	25m	1%		
	35m	2%		
	45m	2%		

	Other (OG)	1
	TOTAL	11

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	3.7
	Grass & grasslike (GG)	72.6
	Fern (EG)	0
	Other (OG)	5
	TOTAL Native	81.3
	TOTAL 'HTE'	5

Bare ground cover	5m	5%	2.4%	
	15m	3%		
	25m	2%		
	35m	2%		
	45m	0%		
Cryptogam cover	5m	1%	1.0%	
	15m	4%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	3%	2.6%	
	15m	10%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF002

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	1		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	100+	*		HTE	
ammo alat	*Ammobium alatum*		Asteraceae	1	20		Forb (FG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	1	5	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	20		Forb (FG)	No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.5	20		Forb (FG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	1		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.2	10	*		No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	5	10	*		No	
care	*Carex spp.*		Cyperaceae	2	5		Grass & grasslike (GG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	1		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	0.5	2		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	10	100+	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	20		Grass & grasslike (GG)	No	
smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	5	3		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF003	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF76
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				235	
Recorders	DP NS		**PCT:**	526	Woodland			
GPS Easting	393629	**GPS Northing**	6565821		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for **WWF003**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	4%	**10.8%**	
	15m	7%		
	25m	10%		
	35m	18%		
	45m	15%		

	Other (OG)	1
	TOTAL	13

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	10
	Shrub (SG)	0
	Forb (FG)	2.8
	Grass & grasslike (GG)	56
	Fern (EG)	0.1
	Other (OG)	0.1
	TOTAL Native	69
	TOTAL 'HTE'	0.5

Bare ground cover	5m	2%	2.4%
	15m	0%	
	25m	3%	
	35m	3%	
	45m	4%	
Cryptogam cover	5m	0%	0.6%
	15m	0%	
	25m	0%	
	35m	3%	
	45m	0%	
Rock Cover	5m	0%	1.0%
	15m	0%	
	25m	5%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	0
50-79	1	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		13.5	

Species recorded for WWF003

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	10	1		Tree (TG)	No	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.2	10	*		No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.5	1	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	1	5		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.5	10	*		HTE	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	20	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	30		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	2	20	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.5	15		Forb (FG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	3		Forb (FG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	3	30	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.2	2	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	3		Forb (FG)	No	

anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	1	10	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	5	15		Grass & grasslike (GG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	30	50	*		No	
care	*Carex spp.*		Cyperaceae	1	3		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	5	100+	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	40		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.1	1		Fern (EG)	No	
smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	0.1	1		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF004	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF71
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				177	
Recorders	DP NS		**PCT:**	526	Woodland			
GPS Easting	393582	**GPS Northing**	6565977		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage	3	R	High intensity fire Summer 2019/20
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF004

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**1**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**11.6%**	
	15m	20%		
	25m	15%		
	35m	8%		
	45m	10%		

	Other (OG)	1
	TOTAL	19

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	12
	Shrub (SG)	0.1
	Forb (FG)	4.7
	Grass & grasslike (GG)	57.1
	Fern (EG)	0.1
	Other (OG)	0.1
	TOTAL Native	74.1
	TOTAL 'HTE'	0

Bare ground cover	5m	80%	45.0%
	15m	10%	
	25m	55%	
	35m	20%	
	45m	60%	
Cryptogam cover	5m	0%	0.2%
	15m	1%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	9.8%
	15m	40%	
	25m	6%	
	35m	0%	
	45m	3%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	3	0	1
50-79	3	0	1
30-49	3	0	1
20-29	1	0	1
10-19	3	0	0
5-9	1	0	
<5	0	0	N/A
Length of logs (m)		69	

COMPOSITION & STRUCTURE

Species recorded for WWF004

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	1	1		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	1	10		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	10	5		Tree (TG)	No	
olea	*Olearia spp.*		Asteraceae	0.1	1		Shrub (SG)	No	
brac spat	*Brachyscome spathulata*		Asteraceae	0.1	5		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	10	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	1	20	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	10		Other (OG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	20		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	20		Forb (FG)	No	
hypo glab	*Hypochaeris glabra*	Smooth Catsear	Asteraceae	0.1	5	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	25	*		No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	0.1	30		Forb (FG)	No	
sene pren	*Senecio prenanthoides*		Asteraceae	0.1	5		Forb (FG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No	

sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	1	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	2	50		Forb (FG)	No	
viol hede	*Viola hederacea*	Ivy-leaved Violet	Violaceae	0.1	1		Forb (FG)	No	
cype	*Cyperus spp.*		Cyperaceae	0.1	2		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	50	100+		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	25		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	50		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.1	1		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF005	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF83
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				69	
Recorders	DP NS		**PCT:**	526	Woodland			
GPS Easting	393308	**GPS Northing**	6565897		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF005

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**3**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	75%	**61.8%**	
	15m	70%		
	25m	68%		
	35m	8%		
	45m	88%		

	Other (OG)	3
	TOTAL	24

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	27.1
	Shrub (SG)	0.3
	Forb (FG)	2.8
	Grass & grasslike (GG)	63.2
	Fern (EG)	0.5
	Other (OG)	1.6
	TOTAL Native	95.5
	TOTAL 'HTE'	0

Bare ground cover	5m	3%	20.0%
	15m	3%	
	25m	0%	
	35m	90%	
	45m	4%	
Cryptogam cover	5m	4%	2.6%
	15m	1%	
	25m	4%	
	35m	1%	
	45m	3%	
Rock Cover	5m	0%	2.4%
	15m	2%	
	25m	0%	
	35m	5%	
	45m	5%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	0
50-79	5	0	0
30-49	11	0	0
20-29	1	0	0
10-19	2	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		29	

COMPOSITION & STRUCTURE

Species recorded for WWF005

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	1	0		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	1	0		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	25	10		Tree (TG)	No	
acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	0.1	5		Tree (TG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	0.1	1		Shrub (SG)	No	
davi lati	*Daviesia latifolia*	Bitter-pea	Fabaceae (Fab	0.1	1		Shrub (SG)	No	
olea	*Olearia spp.*		Asteraceae	0.1	5		Shrub (SG)	No	
brac spat	*Brachyscome spathulata*		Asteraceae	0.2	10		Forb (FG)	No	
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1	25		Forb (FG)	No	
cras vari	*Craspedia variabilis*	Common Billy-buttons	Asteraceae	2	20		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.2	20		Forb (FG)	No	
gono teuc	*Gonocarpus teucrioides*	Germander Raspwort	Haloragaceae	0.1	1		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	20	*		No	
loma fili fili	*Lomandra filiformis subs*		Lomandracea	0.1	5		Grass & grasslike (GG)	No	
sene pren	*Senecio prenanthoides*		Asteraceae	0.1	5		Forb (FG)	No	

trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.2	5	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	25		Forb (FG)	No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	5	30	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	2	10	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	5		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	2	5		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	100+		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	30	50		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	1	5		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.5	5		Fern (EG)	No	
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	1	3		Other (OG)	No	
smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	0.5	1		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF006	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF80
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				197	
Recorders	DP NS		**PCT:**	526	DNG			
GPS Easting	393061	**GPS Northing**	6566056		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. radiata/obliqua/nobilis* forest

FUNCTION

Function attributes for WWF006

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**1**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**
	Other (OG)	**0**
	TOTAL	**9**

BAM Attribute (20x20m plot)

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**5.2%**	
	15m	5%		
	25m	3%		
	35m	9%		
	45m	9%		
Bare ground cover	5m	4%	**3.8%**	
	15m	3%		
	25m	3%		

Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0.1
	Shrub (SG)	0.1
	Forb (FG)	0.5
	Grass & grasslike (GG)	60.4
	Fern (EG)	5
	Other (OG)	0
	TOTAL Native	66.1
	TOTAL 'HTE'	0.5

cover	35m	5%		
	45m	4%		
Cryptogam cover	5m	0%	0.8%	
	15m	0%		
	25m	2%		
	35m	2%		
	45m	0%		
Rock Cover	5m	5%	10.2%	
	15m	10%		
	25m	4%		
	35m	17%		
	45m	15%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF006

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	0.1	1		Tree (TG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	1		Shrub (SG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.5	100+	*		HTE	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	50		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	30	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Faboideae)	0.5	100+	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllaceae	1	20	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Faboideae)	5	50	*		No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	0.1	5	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	5	25	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	25	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	5		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	0.1	2		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	20	100+	*		No	
ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiaceae	5	50		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF007	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF84
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				42	
Recorders	DP NS		**PCT:**	526	Woodland			
GPS Easting	392082	**GPS Northing**	6566145		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF007

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**2**
	Forb (FG)	**14**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	30%	**66.6%**	
	15m	55%		
	25m	88%		
	35m	80%		
	45m	80%		

	Other (OG)	3
	TOTAL	29
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	31.1
	Shrub (SG)	0.6
	Forb (FG)	4.3
	Grass & grasslike (GG)	41.2
	Fern (EG)	2
	Other (OG)	0.7
	TOTAL Native	79.9
	TOTAL 'HTE'	0.1

Bare ground cover	5m	4%	3.2%	
	15m	0%		
	25m	0%		
	35m	2%		
	45m	10%		
Cryptogam cover	5m	5%	6.4%	
	15m	16%		
	25m	5%		
	35m	4%		
	45m	2%		
Rock Cover	5m	14%	13.0%	
	15m	18%		
	25m	8%		
	35m	10%		
	45m	15%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	0
50-79	6	0	1
30-49	7	0	1
20-29	6	0	2
10-19	6	0	0
5-9	2	0	N/A
<5	2	0	N/A
Length of logs (m)		45	

COMPOSITION & STRUCTURE

Species recorded for WWF007

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	1	0		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	10	3		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	20	7		Tree (TG)	No	
acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	0.1	0.1		Tree (TG)	No	
olea	*Olearia spp.*		Asteraceae	0.1	1		Shrub (SG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.5	5		Shrub (SG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	5		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE	
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	2		Forb (FG)	No	
amar	*Amaranthus spp.*	Amaranth	Amaranthace	0.2	5		Forb (FG)	No	
brac spat	*Brachyscome spathulata*		Asteraceae	0.1	3		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	10	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	1	*		No	
cras vari	*Craspedia variabilis*	Common Billy-buttons	Asteraceae	0.1	5		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	5		Forb (FG)	No	

dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.5	25		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	50		Forb (FG)	No	
gomp celo	*Gomphrena celosioides*	Gomphrena Weed	Amaranthace	0.1	1	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	20	*		No	
lept squa	*Leptorhynchos squamat*	Scaly Buttons	Asteraceae	0.1	2		Forb (FG)	No	
loma fili fili	*Lomandra filiformis subs*		Lomandracea	0.1	5		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	0.2	30		Forb (FG)	No	
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No	
sene pren	*Senecio prenanthoides*		Asteraceae	0.1	5		Forb (FG)	No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	0.1	5	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	3	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.5	20		Forb (FG)	No	
xant pilo	*Xanthosia pilosa*	Woolly Xanthosia	Apiaceae	0.1	3		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	1	10	*		No	
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	1	5		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	5	50	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	50		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	2	5		Fern (EG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	4		Other (OG)	No	
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	0.5	20		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF008	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF608	
Survey date:	12/03/2021		**Compass Orientation (head of 20x20 plot)**				247		
Recorders	DP EE		**PCT:**	970	Woodland				
GPS Easting	390851	**GPS Northing**	6568047		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF008

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**2**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	90%	**50.0%**	
	15m	80%		
	25m	30%		
	35m	20%		
	45m	30%		

	Other (OG)	2
	TOTAL	15
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	80
	Shrub (SG)	0.2
	Forb (FG)	1.4
	Grass & grasslike (GG)	95
	Fern (EG)	0
	Other (OG)	0.2
	TOTAL Native	176.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		2
50-79	11		5
30-49	12		5
20-29	3		1
10-19	1		
5-9			
<5			N/A
Length of logs (m)		146	

COMPOSITION & STRUCTURE

Species recorded for WWF008

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	40	7		Tree (TG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	20	3		Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrympleana*		Myrtaceae	20	2		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	90	100		Grass & grasslike (GG)	No	
sola pung	*Solanum pungetium*	Eastern Nightshade	Solanaceae	0.5	10		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	1	5	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	25		Forb (FG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.5	20		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.2	5	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	10		Grass & grasslike (GG)	No	
xero brac	*Xerochrysum bracteatun*	Golden Everlasting	Asteraceae	0.1	1		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	20	*		No	

dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	20		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	5	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	10		Other (OG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	0.1	1		Shrub (SG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	0.1	2		Forb (FG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	2		Shrub (SG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	5		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF009	**Pic 20x20**		**Pic 20x50**	revious Plot ID: WWF609		
Survey date:	12/03/2021		**Compass Orientation (head of 20x20 plot)**				13		
Recorders	DP EE		**PCT:**	970	Woodland				
GPS Easting	390882	**GPS Northing**	6568259		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. stellulata also within patch

FUNCTION

Function attributes for WWF009

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**1**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**38.0%**	
	15m	30%		
	25m	100%		
	35m	10%		
	45m	30%		

	Other (OG)	2
	TOTAL	13
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	60
	Shrub (SG)	0.1
	Forb (FG)	7.2
	Grass & grasslike (GG)	91
	Fern (EG)	0
	Other (OG)	0.6
	TOTAL Native	158.9
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	4.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	20%		
Cryptogam cover	5m	0%	16.0%	
	15m	0%		
	25m	0%		
	35m	80%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	5		3
50-79	7		3
30-49	7		1
20-29	9		1
10-19			
5-9			
<5			N/A
Length of logs (m)		114	

COMPOSITION & STRUCTURE

Species recorded for WWF009

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	40	10		Tree (TG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	10	2		Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrymplean*		Myrtaceae	10	1		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	80	100		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	2	50		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	0.5	1		Other (OG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	20	*		No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	5	30		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	2		Shrub (SG)	No	
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	1	*		No	

poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	30		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
cera	*Cerastium spp.*		Caryophyllace	0.1	2	*		No	
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	1	10		Grass & grasslike (GG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.5	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
sene dias	*Senecio diaschides*		Asteraceae	0.1	1		Forb (FG)	No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.1	10		Forb (FG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF010	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211208-03
Survey date:	8/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	1194				
GPS Easting	388738	**GPS Northing**	6567772		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF010

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**7**
	Shrub (SG)	**3**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	90%	**84.0%**	
	15m	90%		
	25m	70%		
	35m	80%		
	45m	90%		

	Other (OG)	0
	TOTAL	27
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	43.1
	Shrub (SG)	1.8
	Forb (FG)	1.2
	Grass & grasslike (GG)	1.7
	Fern (EG)	0.1
	Other (OG)	0
	TOTAL Native	47.9
	TOTAL 'HTE'	3.1

Bare ground cover	5m	0%	1.0%	
	15m	0%		
	25m	0%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	0%	1.0%	
	15m	5%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		
50-79	3		
30-49	9		
20-29	8		
10-19	22		
5-9	10		
<5	1		N/A
Length of logs (m)		91	

COMPOSITION & STRUCTURE

Species recorded for WWF010

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca youm	*Eucalyptus youmanii*	Youman's Stringybark	Myrtaceae	14	9		Tree (TG)	No	
euca radi	*Eucalyptus radiata*	Narrow-leaved Peppermint	Myrtaceae	1	1		Tree (TG)	No	
euca pauc	*Eucalyptus pauciflora*	White Sally	Myrtaceae	9	4		Tree (TG)	No	
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	8	3		Tree (TG)	No	
euca dalr	*Eucalyptus dalrympleand*	Mountain Gum	Myrtaceae	0.1	1		Tree (TG)	No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	4	100	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	70	1000	*		No	
rubu frut	*Rubus fruticosus sp. agg.*	Blackberry complex	Rosaceae	0.1	2	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.2	10	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	10	*		No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	1	20		Tree (TG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	30	*		No	

euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	10	3		Tree (TG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	20		Forb (FG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.1	5	*		No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.7	10		Shrub (SG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	30	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE	
poa labi labi	*Poa labillardierei var. lab*	Tussock	Poaceae	1	30		Grass & grasslike (GG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	10		Forb (FG)	No	
sola semi	*Solanum semiarmatum*		Solanaceae	0.1	1		Shrub (SG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	2		Forb (FG)	No	
exoc cupr	*Exocarpos cupressiformis*	Cherry Ballart	Santalaceae	1	3		Shrub (SG)	No	
good hete	*Goodenia heteromera*		Goodeniaceae	0.1	10		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	5		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	5	*		No	
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.2	10		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.3	20		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.2	100		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	1		Forb (FG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.1	1		Fern (EG)	No	
care appr	*Carex appressa*	Tall Sedge	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	1		Grass & grasslike (GG)	No	
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	0.1	2		Forb (FG)	No	
cenc cili	*Cenchrus ciliaris*	Buffel Grass	Poaceae	3	10	*		HTE	
aust nodo	*Austrostipa nodosa*	A Speargrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
caes	*Caesia spp.*		Asphodelacea	0.1	1	*	Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF011	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF82
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				212	
Recorders	DP NS		**PCT:**	1194	Woodland			
GPS Easting	387716	**GPS Northing**	6567080		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF011**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**4**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	85%	**67.6%**	
	15m	80%		
	25m	88%		
	35m	20%		
	45m	65%		

	Other (OG)	2
	TOTAL	21
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	31.5
	Forb (FG)	16.6
	Grass & grasslike (GG)	20.1
	Fern (EG)	0
	Other (OG)	1.1
	TOTAL Native	99.3
	TOTAL 'HTE'	0

Bare ground cover	5m	4%	14.2%	
	15m	8%		
	25m	8%		
	35m	48%		
	45m	3%		
Cryptogam cover	5m	0%	1.0%	
	15m	0%		
	25m	0%		
	35m	5%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	1
50-79	4	0	1
30-49	7	0	0
20-29	7	0	0
10-19	23	0	0
5-9	13	0	N/A
<5	29	0	N/A
Length of logs (m)		147	

COMPOSITION & STRUCTURE

Species recorded for WWF011

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	10	4		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	15	10		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	5	3		Tree (TG)	No	
acac falc	*Acacia falcata*		Fabaceae (Mi	20	12		Shrub (SG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	1	5		Shrub (SG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	10	25		Shrub (SG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	2	3	*		No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.5	5		Shrub (SG)	No	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	1	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	30	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.5	15		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.5	10		Forb (FG)	No	
eina poly	*Einadia polygonoides*	Knotweed Goosefoot	Chenopodiace	0.1	2		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	15	*		No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.5	20		Forb (FG)	No	

sene bipi	*Senecio bipinnatisectus*		Asteraceae	0.5	20		Forb (FG)	No	
sene pren	*Senecio prenanthoides*		Asteraceae	2	30		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.5	3	*		No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	2	15		Forb (FG)	No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	0.2	10	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	5	50	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	5	30		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.5	20		Forb (FG)	No	
aira	*Aira spp.*	A Hairgrass	Poaceae	0.5	5	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	5	25	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	1	*		No	
loma fili fili	*Lomandra filiformis subs*		Lomandracea	0.1	5		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	1	20	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	100+		Grass & grasslike (GG)	No	
amye miqu	*Amyema miquelii*	Box Mistletoe	Loranthaceae	1	1		Other (OG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	2		Other (OG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF012	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211208-05
Survey date:	8/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	1194				
GPS Easting	387437	**GPS Northing**	6567097		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF012**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**3**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**9**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**36.0%**	
	15m	50%		
	25m	20%		
	35m	30%		
	45m	40%		

	Other (OG)	1
	TOTAL	26
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	44
	Shrub (SG)	0.5
	Forb (FG)	1.7
	Grass & grasslike (GG)	55.1
	Fern (EG)	0.2
	Other (OG)	20
	TOTAL Native	121.5
	TOTAL 'HTE'	0.4

Bare ground cover	5m	20%	14.2%	
	15m	10%		
	25m	1%		
	35m	0%		
	45m	40%		
Cryptogam cover	5m	0%	1.4%	
	15m	1%		
	25m	1%		
	35m	5%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	6		2
30-49	7		5
20-29	2		1
10-19	3		
5-9			
<5	3		N/A
Length of logs (m)		119	

COMPOSITION & STRUCTURE

Species recorded for WWF012

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	18	2		Tree (TG)	No	
euca youm	*Eucalyptus youmanii*	Youman's Stringybark	Myrtaceae	24	2		Tree (TG)	No	
euca pauc	*Eucalyptus pauciflora*	White Sally	Myrtaceae	2	4		Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	0.1	1		Shrub (SG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	4	300	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	8	200		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	15	300		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	2		Grass & grasslike (GG)	No	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.2	10		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	50		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.6	100	*		No	

ryti	*Rytidosperma spp.*		Poaceae	30	1000		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.7	100	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	40	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.3	10	*		HTE	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	10		Forb (FG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.2	5	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.1	10		Forb (FG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.9	100		Forb (FG)	No	
petr nant	*Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllace	0.1	10	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	1		Forb (FG)	No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	1	30	*		No	
hypo hygr	*Hypoxis hygrometrica*	Golden Weather-grass	Hypoxidaceae	0.1	5		Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	0.7	20		Grass & grasslike (GG)	No	
aust nodo	*Austrostipa nodosa*	A Speargrass	Poaceae	0.8	10		Grass & grasslike (GG)	No	
ammo alat	*Ammobium alatum*		Asteraceae	0.1	2		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg.*	Blackberry complex	Rosaceae	0.2	2	*		No	
vibu tinu	*Viburnum tinus*		Adoxaceae	0.1	1	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
amye pend	*Amyema pendula*		Loranthaceae	20	30		Other (OG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.2	1		Shrub (SG)	No	
burs spin	*Bursaria spinosa*	Native Blackthorn	Pittosporacea	0.2	2		Shrub (SG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.2	10		Fern (EG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	2		Forb (FG)	No	
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2	20	*		No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	0.2	10		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF013	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF79
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				22	
Recorders	DP NS		**PCT:**	1194	Woodland			
GPS Easting	387165	**GPS Northing**	6567116		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Potential Dusky Woodswallow observed, probably Black-faced Woodswallow

Dominant Species outside Plot	*E. nobilis/stellulata*

FUNCTION

Function attributes for WWF013

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**2.0%**	
	15m	2%		
	25m	1%		
	35m	1%		
	45m	1%		

	Other (OG)	0
	TOTAL	12

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	26.2
	Grass & grasslike (GG)	0.2
	Fern (EG)	0.1
	Other (OG)	0
	TOTAL Native	26.5
	TOTAL 'HTE'	1.1

Bare ground cover	5m	25%	8.6%	
	15m	0%		
	25m	2%		
	35m	10%		
	45m	6%		
Cryptogam cover	5m	0%	0.8%	
	15m	4%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	5%	3.2%	
	15m	6%		
	25m	5%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	0
50-79	1	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		15	

COMPOSITION & STRUCTURE

Species recorded for WWF013

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
pinu radi	*Pinus radiata*	Radiata Pine	Pinaceae	20	1	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	20	40		Forb (FG)	No	
xant occi	*Xanthium occidentale*	Noogoora Burr	Asteraceae	0.1	1	*		HTE	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.5	10		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1	20	*		HTE	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.5	10	*		No	
ammo alat	*Ammobium alatum*		Asteraceae	0.5	5		Forb (FG)	No	
chen albu	*Chenopodium album*	Fat Hen	Chenopodiace	0.5	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	5	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	2	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	10		Forb (FG)	No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	20		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
lepi bona	*Lepidium bonariense*	Argentine Peppercress	Brassicaceae	0.5	5	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	1	10	*		No	

modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	2	20	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	1	50		Forb (FG)	No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	1	25		Forb (FG)	No	
poly avic	*Polygonum aviculare*	Wireweed	Polygonaceae	1	10	*		No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	2	50		Forb (FG)	No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	5	50	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.5	20	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	4	25	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.2	10	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	40	100	*		No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	5		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.1	1		Fern (EG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF014	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211208-11
Survey date:	8/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	997				
GPS Easting	386625	**GPS Northing**	6567406		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF014

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**8.0%**	
	15m	5%		
	25m	5%		
	35m	15%		
	45m	5%		

	Other (OG)	0
	TOTAL	4

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.7
	Grass & grasslike (GG)	10.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	11.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	1%	0.4%	
	15m	0%		
	25m	1%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF014

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	40	400	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	30	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	0.2	5	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	20	*		No	
ammo alat	*Ammobium alatum*		Asteraceae	0.5	20		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	40	500	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	10	100	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
ryti	*Rytidosperma spp.*		Poaceae	0.5	30		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	40		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10	100		Grass & grasslike (GG)	No	

cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF020	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF85
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				203	
Recorders	DP NS		**PCT:**	997	Woodland			
GPS Easting	386576	**GPS Northing**	6567821		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF020**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**20.0%**	
	15m	15%		
	25m	20%		
	35m	15%		
	45m	10%		

	Other (OG)	1
	TOTAL	14
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	26
	Shrub (SG)	0
	Forb (FG)	10.7
	Grass & grasslike (GG)	50
	Fern (EG)	0.2
	Other (OG)	1
	TOTAL Native	87.9
	TOTAL 'HTE'	2

Bare ground cover	5m	5%	9.6%	
	15m	0%		
	25m	35%		
	35m	3%		
	45m	5%		
Cryptogam cover	5m	0%	0.8%	
	15m	0%		
	25m	2%		
	35m	2%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	0
50-79	2	0	0
30-49	6	0	1
20-29	6	0	0
10-19	19	0	0
5-9	8	0	N/A
<5	1	0	N/A
Length of logs (m)		44	

COMPOSITION & STRUCTURE

Species recorded for WWF020

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	20	5		Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrympleana*		Myrtaceae	5	1		Tree (TG)	No	
euca will	*Eucalyptus williamsiana*		Myrtaceae	1	1		Tree (TG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2	25	*		HTE	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	1	10	*		No	
bras	*Brassica spp.*	Brassica	Brassicaceae	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	20	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	2	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	1	10		Forb (FG)	No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.5	30		Forb (FG)	No	
gamo	*Gamochaeta spp.*		Asteraceae	1	25	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
gomp celo	*Gomphrena celosioides*	Gomphrena Weed	Amaranthace	0.1	1	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	2	15		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	2	30		Forb (FG)	No	
sene bipi	*Senecio bipinnatisectus*		Asteraceae	0.1	1		Forb (FG)	No	

sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	2		Forb (FG)	No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	2	50	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	5	30	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	1	10	*		No	
aven barb	*Avena barbata*	Bearded Oats	Poaceae	0.5	5	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	10	30	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	1	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	0.5	5	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	30	100+		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.2	1		Fern (EG)	No	
amye	*Amyema spp.*	Mistletoe	Loranthaceae	1	1		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF021	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF86
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				164	
Recorders	DP NS		**PCT:**	997	Woodland			
GPS Easting	386143	**GPS Northing**	6568180		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF021

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**0**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	15%	**6.2%**	
	15m	3%		
	25m	5%		
	35m	3%		
	45m	5%		

	Other (OG)	0
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	40
	Shrub (SG)	0
	Forb (FG)	19.2
	Grass & grasslike (GG)	0
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	59.2
	TOTAL 'HTE'	2

Bare ground cover	5m	7%	2.2%	
	15m	2%		
	25m	0%		
	35m	0%		
	45m	2%		
Cryptogam cover	5m	0%	0.4%	
	15m	2%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.4%	
	15m	2%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	1
50-79	4	0	1
30-49	4	0	0
20-29	4	0	0
10-19	5	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		46	

COMPOSITION & STRUCTURE

Species recorded for WWF021

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	10	2		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	30	4		Tree (TG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	15	30		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2	10	*		HTE	
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	1		Forb (FG)	No	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.2	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	10	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	2	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.5	5		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.5	15		Forb (FG)	No	
eina hast	*Einadia hastata*	Berry Saltbush	Chenopodiace	0.2	10		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.5	10		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	25		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.2	15		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	3	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	

poly avic	*Polygonum aviculare*	Wireweed	Polygonaceae	1	5	*		No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	2	50	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	2	20	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	3	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	10	*		No	
xero brac	*Xerochrysum bracteatun*	Golden Everlasting	Asteraceae	0.1	1		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	80	100+	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	10	*		No	
poa annu	*Poa annua*	Winter Grass	Poaceae	5	30	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF023	**Pic 20x20**	QField SD	**Pic 20x50**		
Survey date:	31/03/2021		**Compass Orientation (head of 20x20 plot)**				246	SW
Recorders	GY SD		**PCT:**	970	DNG			
GPS Easting	386889	**GPS Northing**	6569004		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology	hill top		**Soil Texture**	clay		**Slope**		
LandF Element			**Soil Colour**	brown		**Aspect**	328	NW
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	1		
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	1	R	cattle observed
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees inside plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. dives , E. caliginosa , E. acaciiformis*

FUNCTION

Function attributes for WWF023

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**9**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**17**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
	Tree (TG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	11%	**11.8%**	q field SDo
	15m	8%		
	25m	11%		
	35m	13%		
	45m	16%		
Bare ground cover	5m	5%	**3.8%**	
	15m	3%		
	25m	4%		
	35m	4%		
	45m	3%		

Count of cover abundance (native vascular plants)	Shrub (SG)	0
	Forb (FG)	2.1
	Grass & grasslike (GG)	76.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	78.3
	TOTAL 'HTE'	0.4

Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF023

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	1	2000		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.2	500		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	2000		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	75	5000		Grass & grasslike (GG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.2	200	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	300	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.2	200	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	5	1500	*		No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.2	500	*		No	
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	5		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.3	200		Grass & grasslike (GG)	No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	5	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	3		Forb (FG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	150	*		HTE	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	40	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	3		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	500	*		HTE	
junc fili	*Juncus filicaulis*		Juncaceae	0.2	400		Grass & grasslike (GG)	No	
junc cogn	*Juncus cognatus*		Juncaceae	0.1	2	*		No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	5		Forb (FG)	No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.1	30	*		No	
hydr pedi	*Hydrocotyle pedicellosa*		Apiaceae	0.1	20		Forb (FG)	No	

hain cyli	*Hainardia cylindrica*	Common Barbgrass	Poaceae	0.2	300	*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
seta parv	*Setaria parviflora*		Poaceae	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	8	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllaceae	0.1	5	*		No	
penn alop	*Cenchrus purpurascens*	Swamp Foxtail	Poaceae	0.1	2		Grass & grasslike (GG)	No	
fest	*Festuca spp.*		Poaceae	0.1	5	*	Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginaceae	0.1	1	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	1		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	211210-02	**Pic 20x20**		**Pic 20x50**		
Survey date:	10/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**					
GPS Easting	386344	**GPS Northing**	6571292		**Datum**		**Zone**	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for 211210-02

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**1**
	Grass & grasslike (GG)	**0**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**15.0%**	
	15m	25%		
	25m	5%		
	35m	20%		
	45m	15%		

	Other (OG)	0
	TOTAL	1

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.2
	Grass & grasslike (GG)	0
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	0.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	2.0%
	15m	0%	
	25m	10%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for 211210-02

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	60	1000	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	1	20	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	20	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	15	500	*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	0.5	50	*		No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	2	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	10		Forb (FG)	No	
rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	0.1	1	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	1	30	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF025	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF66
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				181	
Recorders	DP NS		**PCT:**	970	Woodland			
GPS Easting	390978	**GPS Northing**	6568923		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF025

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**2**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**29.8%**	
	15m	85%		
	25m	15%		
	35m	5%		
	45m	4%		

	Other (OG)	1
	TOTAL	14
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	42
	Shrub (SG)	0.2
	Forb (FG)	0.9
	Grass & grasslike (GG)	65.5
	Fern (EG)	5
	Other (OG)	0.1
	TOTAL Native	113.7
	TOTAL 'HTE'	0.1

Bare ground cover	5m	5%	6.4%	
	15m	10%		
	25m	4%		
	35m	8%		
	45m	5%		
Cryptogam cover	5m	0%	3.4%	
	15m	2%		
	25m	4%		
	35m	2%		
	45m	9%		
Rock Cover	5m	0%	2.6%	
	15m	2%		
	25m	4%		
	35m	3%		
	45m	4%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	4	0	0
50-79	2	0	0
30-49	2	0	1
20-29	0	0	0
10-19	0	0	0
5-9	0		
<5	0		N/A
Length of logs (m)		17.5	

COMPOSITION & STRUCTURE

Species recorded for WWF025

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	2	0		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	40	3		Tree (TG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	0.1	2		Shrub (SG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	2		Shrub (SG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	15	*		HTE	
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	1		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	10	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	10		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
gomp celo	*Gomphrena celosioides*	Gomphrena Weed	Amaranthace	0.1	1	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	15	*		No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.5	5		Forb (FG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.2	5	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	30	*		No	

verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	3		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	10	30	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	10	*		No	
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandracea	0.5	10		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	40	100+		Grass & grasslike (GG)	No	
penn clan	*Pennisetum clandestinur*	Kikuyu Grass	Poaceae	20	100+	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	25	50		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5	20		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF026	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF65
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				326	
Recorders	DP NS		**PCT:**	970	Woodland			
GPS Easting	391054	**GPS Northing**	6569020		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF026**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**2**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	70%	**29.0%**	
	15m	45%		
	25m	15%		
	35m	8%		
	45m	7%		

	Other (OG)	0
	TOTAL	17
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	50
	Shrub (SG)	0.6
	Forb (FG)	7.1
	Grass & grasslike (GG)	60.1
	Fern (EG)	0.5
	Other (OG)	0
	TOTAL Native	118.3
	TOTAL 'HTE'	0.6

Bare ground cover	5m	0%	5.0%	
	15m	0%		
	25m	5%		
	35m	0%		
	45m	20%		
Cryptogam cover	5m	2%	2.0%	
	15m	3%		
	25m	0%		
	35m	5%		
	45m	0%		
Rock Cover	5m	0%	2.2%	
	15m	0%		
	25m	4%		
	35m	0%		
	45m	7%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0		
50-79	6		
30-49	5		
20-29	2		
10-19	0		
5-9	0		
<5	0		N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF026

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	50	6		Tree (TG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	0.5	7		Shrub (SG)	No	
olea	*Olearia spp.*		Asteraceae	0.1	1		Shrub (SG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	1	5	*		No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	1		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.2	5	*		No	
cera vulg	*Cerastium vulgare*	Mouse-ear Chickweed	Caryophyllace	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	10	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	3	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	5		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	25		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	5		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	20	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	

plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.5	10		Forb (FG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllace	5	15		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	5	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	1		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	0.5	10	*		HTE	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	10	30	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	1	10	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	40	100+		Grass & grasslike (GG)	No	
penn clan	*Pennisetum clandestinur*	Kikuyu Grass	Poaceae	5	5	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	15	50		Grass & grasslike (GG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	5	20		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.5	5		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF027	**Pic 20x20**	QField SD	**Pic 20x50**		
Survey date:	31/03/2021		**Compass Orientation (head of 20x20 plot)**				264	W
Recorders	GY SD		**PCT:**	1194	DNG			
GPS Easting	390954	**GPS Northing**	6569783		**Datum**	GDA 94	**Zone**	56

Landform		**Soils**			**Drainage & Slope**		
Morphology	upper slope	**Soil Texture**			**Slope**	7 degrees	
LandF Element	tablelands, high country	**Soil Colour**			**Aspect**	264	
LandF Pattern		**Soil Depth**			**Drainage**		
Microrelief		**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2		
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	1		sheep observed
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

sheep grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

some minir weeds

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. radiata*

FUNCTION

Function attributes for	**WWF027**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**1**
	Forb (FG)	**19**
	Grass & grasslike (GG)	**10**
	Fern (EG)	**1**
	Other (OG)	**2**
	TOTAL	**33**

BAM Attribute (20x20m plot)

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	11%	**11.0%**	q field SDo
	15m	15%		
	25m	4%		
	35m	13%		
	45m	12%		
Bare ground cover	5m	9%	**5.4%**	
	15m	4%		
	25m	5%		

Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.1
	Forb (FG)	2.3
	Grass & grasslike (GG)	63.2
	Fern (EG)	10
	Other (OG)	0.2
	TOTAL Native	75.8
	TOTAL 'HTE'	0.2

cover	35m	3%		
	45m	6%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	10%	6.4%	
	15m	22%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees no logs

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF027

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
poa sieb sieb	*Poa sieberiana var. siebe*	Snowgrass	Poaceae	52	1500		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	300	*		No	
gali lept	*Galium leptogonium*		Rubiaceae	0.1	50		Forb (FG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllaceae	0.1	50		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.2	2000		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	1000	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	750	*		HTE	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.1	500		Other (OG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	20		Forb (FG)	No	
wahl mult	*Wahlenbergia multicauli*	Tadgell's Bluebell in the local go	Campanulaceae	0.1	5		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.2	2000		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	10		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.2	2000		Forb (FG)	No	
sole gunn	*Solenogyne gunnii*	Solengyne	Asteraceae	0.1	10		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	20		Forb (FG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	0.2	1000	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10	3000		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiaceae	10	500		Fern (EG)	No	

both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	1000		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.1	30		Other (OG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	3		Grass & grasslike (GG)	No	
oreo erio	*Oreomyrrhis eriopoda*	Australian Carraway	Apiaceae	0.1	40		Forb (FG)	No	
care	*Carex spp.*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllaceae	0.2	500		Forb (FG)	No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	0.2	40		Grass & grasslike (GG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No	
leon tara tara	*Leontodon taraxacoides*	Lesser Hawkbit	Asteraceae	0.1	40	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	1	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllaceae	0.1	1	*		No	
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	1		Shrub (SG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	0.3	20		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	5		Grass & grasslike (GG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginaceae	0.1	15		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	30		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiaceae	0.1	1		Forb (FG)	No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
prun vulg	*Prunella vulgaris*	Self-heal	Lamiaceae	0.1	1	*		No	
cymb laws	*Cymbonotus lawsonianus*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
epil bill hydr	*Epilobium billardierianum*		Onagraceae	0.1	1		Forb (FG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF028	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF69
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				7	
Recorders	DP NS		**PCT:**	1194	DNG			
GPS Easting	390754	**GPS Northing**	6570154		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. pauciflora /obliqua*

FUNCTION

Function attributes for WWF028

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	4%	**3.2%**	
	15m	5%		
	25m	2%		
	35m	4%		
	45m	1%		

	Other (OG)	0
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	2
	Shrub (SG)	0.1
	Forb (FG)	5.4
	Grass & grasslike (GG)	100
	Fern (EG)	10
	Other (OG)	0
	TOTAL Native	117.5
	TOTAL 'HTE'	0.2

Bare ground cover	5m	4%	2.2%	
	15m	3%		
	25m	1%		
	35m	0%		
	45m	3%		
Cryptogam cover	5m	2%	2.2%	
	15m	4%		
	25m	2%		
	35m	3%		
	45m	0%		
Rock Cover	5m	3%	3.2%	
	15m	5%		
	25m	3%		
	35m	4%		
	45m	1%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF028

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	2	0		Tree (TG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	5		Shrub (SG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	2	20		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	30	*		HTE	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	5	50	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	10		Forb (FG)	No	
gali	*Galium spp.*		Rubiaceae	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	50		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	20		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	1		Forb (FG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllace	2	20		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	20	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	100+		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	70	100+		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	10	40		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF64	**Pic 20x20**		**Pic 20x50**			
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				124		
Recorders	DP NS		**PCT:**	526	Woodland				
GPS Easting	390864	**GPS Northing**	6570285		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	Same but slightly better condition; *Cyathea australis* , *Smilax australis* etc

FUNCTION

Function attributes for	**WWF64**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**1**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**26.0%**	
	15m	20%		
	25m	50%		
	35m	20%		
	45m	15%		

	Other (OG)	0
	TOTAL	13

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	40
	Shrub (SG)	0.5
	Forb (FG)	12.2
	Grass & grasslike (GG)	71.1
	Fern (EG)	5
	Other (OG)	0
	TOTAL Native	128.8
	TOTAL 'HTE'	0

Bare ground cover	5m	3%	2.2%	
	15m	2%		
	25m	4%		
	35m	2%		
	45m	0%		
Cryptogam cover	5m	3%	2.2%	
	15m	2%		
	25m	4%		
	35m	0%		
	45m	2%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	3		2
50-79	6		2
30-49	7		
20-29	0		
10-19	3		
5-9			
<5			N/A
Length of logs (m)		137	

COMPOSITION & STRUCTURE

Species recorded for WWF64

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	10	4		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	30	7		Tree (TG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.5	15		Shrub (SG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	5	80		Forb (FG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	5	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	5	100+		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	100+		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	25	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	20		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2	10	*		No	
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	1	2		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	100+		Grass & grasslike (GG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	5	50	*		No	

poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	60		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5	25		Fern (EG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF030	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211210-01	
Survey date:	10/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	0					
GPS Easting	388232	**GPS Northing**	6571843		**Datum**		**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF030**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**0**
	Grass & grasslike (GG)	**0**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**9.0%**	
	15m	10%		
	25m	20%		
	35m	0%		
	45m	5%		

	Other (OG)	0
	TOTAL	0

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0
	Grass & grasslike (GG)	0
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	0
	TOTAL 'HTE'	0.2

Bare ground cover	5m	0%	28.0%	
	15m	50%		
	25m	0%		
	35m	75%		
	45m	15%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	6.0%	
	15m	0%		
	25m	0%		
	35m	25%		
	45m	5%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF030

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	30	500	*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	20	1000	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.7	30	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	2	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	15	500	*		No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.3	5	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	1	50	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF031	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF73
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**				211	
Recorders	DP NS		**PCT:**	970	Woodland			
GPS Easting	388422	**GPS Northing**	6571993		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF031

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	3%	**3.6%**	
	15m	6%		
	25m	2%		
	35m	5%		
	45m	2%		

	Other (OG)	0
	TOTAL	5

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	0
	Forb (FG)	0.6
	Grass & grasslike (GG)	50
	Fern (EG)	10
	Other (OG)	0
	TOTAL Native	65.6
	TOTAL 'HTE'	5

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		20	

Bare ground cover	5m	0%	1.2%	
	15m	4%		
	25m	0%		
	35m	0%		
	45m	2%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for WWF031

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	5	1		Tree (TG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	30	*		HTE	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	10	20	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.2	20	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	15		Forb (FG)	No	
soli sess	*Soliva sessilis*	Bindyi	Asteraceae	1	10	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	25	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		FALSE	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	20	50	*		FALSE	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	100+		Grass & grasslike (GG)	FALSE	
poa annu	*Poa annua*	Winter Grass	Poaceae	5	50	*		FALSE	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	10	40		Fern (EG)	FALSE	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF032	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF77
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**				233	
Recorders	DP NS		**PCT:**	970	Woodland			
GPS Easting	388649	**GPS Northing**	6572092		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*A. melanoxylon* , *E. acaciiformis/dalrympleana* nearby

FUNCTION

Function attributes for WWF032

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**11.8%**	
	15m	8%		
	25m	18%		
	35m	10%		
	45m	3%		

	Other (OG)	0
	TOTAL	7
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	0.1
	Forb (FG)	7
	Grass & grasslike (GG)	71
	Fern (EG)	0.2
	Other (OG)	0
	TOTAL Native	108.3
	TOTAL 'HTE'	5

Bare ground cover	5m	5%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.8%
	15m	0%	
	25m	4%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	3	0	1
50-79	4	0	0
30-49	0	0	0
20-29	1	0	0
10-19	0	0	0
5-9	0	0	N/A
<5	0	0	N/A
Length of logs (m)		30	

COMPOSITION & STRUCTURE

Species recorded for WWF032

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	30	2		Tree (TG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	1		Shrub (SG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	30	*		HTE	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.5	3	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	10	20	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.5	10	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	2	100+		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	1	*		No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	1	10	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.5	5	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	10		Grass & grasslike (GG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	15	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	70	100+		Grass & grasslike (GG)	No	

pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.2	5		Fern (EG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF033	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF519	
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				329		
Recorders	DP GX		**PCT:**	526	Woodland				
GPS Easting	386595	**GPS Northing**	6574037		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for **WWF033**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**0**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	80%	**24.0%**	
	15m	10%		
	25m	10%		
	35m	15%		
	45m	5%		

	Other (OG)	0
	TOTAL	3

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	20
	Shrub (SG)	0
	Forb (FG)	0
	Grass & grasslike (GG)	30
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	50
	TOTAL 'HTE'	0

Bare ground cover	5m	5%	1.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	0
50-79	3	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF033

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	20	3		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	0	1		Tree (TG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	65	100	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	1	5	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	30	100		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	10	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF034	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF520	
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				103		
Recorders	DP GX		**PCT:**	970					
GPS Easting	386968	**GPS Northing**	6574570		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. acaciiformis* nearby

FUNCTION

Function attributes for **WWF034**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**1.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	5%		

	Other (OG)	0
	TOTAL	8
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.8
	Grass & grasslike (GG)	40
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	41.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF034

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	20	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	5	50	*		No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	20	100		Grass & grasslike (GG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	10	100		Grass & grasslike (GG)	No	
scae hook	*Scaevola hookeri*		Goodeniaceae	0.5	25		Forb (FG)	No	
hypo hygr	*Hypoxis hygrometrica*	Golden Weather-grass	Hypoxidaceae	0.1	10		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	50	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	10	*		No	
lemn	*Lemna spp.*		Lemnaceae	0.1	20		Forb (FG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	10	20		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	5	20	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No	
pers hydr	*Persicaria hydropiper*	Water Pepper	Polygonaceae	1	10		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF035	**Pic 20x20**	QField SD	**Pic 20x50**		
Survey date:	30/03/2021		**Compass Orientation (head of 20x20 plot)**				31	NE
Recorders	GY SD		**PCT:**	970	DNG			
GPS Easting	387065	**GPS Northing**	6575386		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology	mid slope		**Soil Texture**	loam		**Slope**	5 degrees	
LandF Element			**Soil Colour**	orange		**Aspect**	288	W
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**	basalt		**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3		
Cultivation	2		sone pasture improved sp
Soil erosion	0		
Firewood	0		
Grazing	cattle	r	pats
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
cattle grazing
Age class of trees (DBH range) , Condition of Vegetation, Hollows
no trees or large wood debris
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
cattle, blackberry sprayed
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. nicholii*

FUNCTION

Function attributes for	**WWF035**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**12**
	Fern (EG)	**2**
	Other (OG)	**2**
	TOTAL	**25**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	11%	**15.6%**	q field SDo
	15m	15%		
	25m	23%		
	35m	14%		
	45m	15%		
Bare ground cover	5m	4%	**8.4%**	
	15m	8%		
	25m	9%		
	35m	11%		
	45m	10%		
E	5m	0%		

Count of cover abundance (native vascular plants)	Forb (FG)	0.9
	Grass & grasslike (GG)	67.9
	Fern (EG)	1.5
	Other (OG)	0.3
	TOTAL Native	70.6
	TOTAL 'HTE'	0.3

Cryptogam cover	15m	0%	0.0%	
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF035								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	65	5000		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	100	*		No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	50	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.2	200		Other (OG)	No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	20	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.5	200		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiaceae	0.5	150		Fern (EG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	100		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	150		Grass & grasslike (GG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.2	400	*		No	
aust pube	*Austrostipa pubescens*		Poaceae	0.2	200		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	200	*		HTE	
ryti	*Rytidosperma spp.*		Poaceae	0.1	10		Grass & grasslike (GG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.1	5		Other (OG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	15		Grass & grasslike (GG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.1	10	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	1	500	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginaceae	0.1	10	*		No	
gali lept	*Galium leptogonium*		Rubiaceae	0.1	1		Forb (FG)	No	
sole gunn	*Solenogyne gunnii*	Solengyne	Asteraceae	0.1	5		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	3	*		HTE	
oreo erio	*Oreomyrrhis eriopoda*	Australian Carraway	Apiaceae	0.1	4		Forb (FG)	No	

cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	20	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	15	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.5	200	*		No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiaceae	1	200		Fern (EG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.5	400		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	1		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	1		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex		0.2	10	*		No	
them tria	*Themeda triandra*		Poaceae	0.1	4		Grass & grasslike (GG)	No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccaceae	0.1	1	*		No	
poa prat	*Poa pratensis*	Kentucky Bluegrass	Poaceae	0.1	15	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
fest	*Festuca spp.*		Poaceae	0.1	3	*	Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF036	**Pic 20x20**	QField SD	**Pic 20x50**		Previous Plot ID: WWF2003 (3)	
Survey date:	30/03/2021		**Compass Orientation (head of 20x20 plot)**				302	NW	
Recorders	GY SD		**PCT:**	970	DNG				
GPS Easting	386624	**GPS Northing**	6575603		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology	frost hollow		**Soil Texture**	loam		**Slope**	2 degrees	
LandF Element			**Soil Colour**	brown		**Aspect**	42	NE
LandF Pattern			**Soil Depth**			**Drainage**	well drained	
Microrelief			**Geology**	basalt ?		**Watercourses**	none close	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3		
Cultivation	2		
Soil erosion	0		
Firewood	0		
Grazing	cattle		
Fire Damage	0		
Storm Damage	0		
Weediness	3		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

grazing

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. nicholii , E. pauciflora*

FUNCTION

Function attributes for WWF036

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**11**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	6%	**6.8%**	q field SDo
	15m	5%		
	25m	11%		
	35m	7%		
	45m	5%		

	Other (OG)	2
	TOTAL	23
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.9
	Grass & grasslike (GG)	26.6
	Fern (EG)	6
	Other (OG)	0.2
	TOTAL Native	33.7
	TOTAL 'HTE'	5.1

Bare ground cover	5m	6%	6.8%	
	15m	5%		
	25m	11%		
	35m	4%		
	45m	8%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees no logs

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF036							
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	20	2000	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	50	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	2	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	50	*		No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	8	500	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	25	2000		Grass & grasslike (GG)	No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	50	*		No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	6	200		Fern (EG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	100	*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	0.1	10	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	1		Other (OG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	300		Grass & grasslike (GG)	No	

acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.2	30	*		No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	20		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
hypo glab	*Hypochaeris glabra*	Smooth Catsear	Asteraceae	0.1	4	*		No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	5	150	*		HTE	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	10	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	10	50	*		No	
fest prat	*Festuca pratensis*	Meadow Fescue	Poaceae	0.1	2	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.5	200		Grass & grasslike (GG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	20		Other (OG)	No	
penn alop	*Pennisetum alopecuroid*	Swamp Foxtail	Poaceae	0.2	10		Grass & grasslike (GG)	No	
cype spha	*Cyperus sphaeroideus*		Cyperaceae	0.1	2		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	5		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.1	1	*		No	
oreo erio	*Oreomyrrhis eriopoda*	Australian Carraway	Apiaceae	0.1	5		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
junc aust	*Juncus australis*	Rush	Juncaceae	0.1	1		Grass & grasslike (GG)	No	
nass tric	*Nassella trichotoma*	Serrated Tussock	Poaceae	0.1	1	*		No	
sisy sp.	*Sisyrinchium sp. A*	Scourweed	Iridaceae	0.1	1	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	1	*		No	
wahl mult	*Wahlenbergia multicaul*	Tadgell's Bluebell in the local go	Campanulace	0.1	1		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	1		Forb (FG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	5		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	1		Grass & grasslike (GG)	No	
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1	1		Forb (FG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	1		Forb (FG)	No	
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
leon tara tara	*Leontodon saxatilis*	Lesser Hawkbit	Asteraceae	0.1	2	*		No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF037	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF518
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				207	
Recorders	DP GX		**PCT:**	526				
GPS Easting	386244	**GPS Northing**	6575845		**Datum**	UTM	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF037

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**2**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	95%	**89.0%**	
	15m	95%		
	25m	90%		
	35m	95%		
	45m	70%		

	Other (OG)	2
	TOTAL	22
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	71
	Shrub (SG)	2.1
	Forb (FG)	2.8
	Grass & grasslike (GG)	71.1
	Fern (EG)	5
	Other (OG)	0.2
	TOTAL Native	152.2
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	2.0%	
	15m	5%		
	25m	0%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	8	0	1
50-79	10	0	0
30-49	2	0	0
20-29	1	0	1
10-19	2	0	3
5-9	1	0	0
<5	3	0	N/A
Length of logs (m)		30	

COMPOSITION & STRUCTURE

Species recorded for WWF037

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	60	6		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	10	3		Tree (TG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	1	1		Tree (TG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	2	15		Shrub (SG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	50	100		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	30		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	10		Other (OG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5	20		Fern (EG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	1	30		Forb (FG)	No	
hydr sibt	*Hydrocotyle sibthorpioid*		Apiaceae	0.1	10		Forb (FG)	No	
wahl lute	*Wahlenbergia luteola*	Bluebell	Campanulace	0.1	5		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	100		Grass & grasslike (GG)	No	

glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	10		Other (OG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
oreo erio	*Oreomyrrhis eriopoda*	Australian Carraway	Apiaceae	0.1	5		Forb (FG)	No	
dian	*Dianella spp.*		Phormiaceae	0.1	5		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	20		Forb (FG)	No	
sene dias	*Senecio diaschides*		Asteraceae	0.1	1		Forb (FG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	1	10		Grass & grasslike (GG)	No	
olea argo	*Olearia argophylla*	Native Musk	Asteraceae	0.1	1		Shrub (SG)	No	
gono tetr	*Gonocarpus tetragynus*	Poverty Raspwort	Haloragaceae	0.1	1		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF038	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF512
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				166	
Recorders	DP GX		**PCT:**	970	DNG			
GPS Easting	385625	**GPS Northing**	6576150		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF038

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**4.4%**	
	15m	0%		
	25m	2%		
	35m	5%		
	45m	10%		

	Other (OG)	1
	TOTAL	9

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	1
	Forb (FG)	0.2
	Grass & grasslike (GG)	31
	Fern (EG)	10
	Other (OG)	0.1
	TOTAL Native	42.3
	TOTAL 'HTE'	1.5

Bare ground cover	5m	5%	39.0%	
	15m	0%		
	25m	90%		
	35m	30%		
	45m	70%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	1	0	0
30-49	1	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		5	

COMPOSITION & STRUCTURE

Species recorded for WWF038

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	20	340		Grass & grasslike (GG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	10	100		Grass & grasslike (GG)	No	
wahl grac	*Wahlenbergia gracilis*	Sprawling Bluebell	Campanulace	0.1	10		Forb (FG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtia	10	25		Fern (EG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	5	100	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	10	100	*		No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	1	20	*		No	
ryti pall	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silver	Poaceae	1	20		Grass & grasslike (GG)	No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	0.5	20	*		HTE	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	2		Other (OG)	No	
petr nant	*Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllace	0.1	5	*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	3		Shrub (SG)	No	

acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1	20	*		HTE	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	10	50	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	25	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	30	100	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	0	1		Tree (TG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.5	1	*		No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF039	**Pic 20x20**		**Pic 50x50**		Previous Plot ID: 211209-05
Survey date:	9/12/2021		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	DC, CC		**PCT:**	997				
GPS Easting	386357	**GPS Northing**	6577659		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF039**

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**0**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**5.0%**	
	15m	5%		
	25m	10%		
	35m	0%		
	45m	5%		

	Other (OG)	0
	TOTAL	5
BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	5
	Shrub (SG)	0
	Forb (FG)	0
	Grass & grasslike (GG)	80.3
	Fern (EG)	0.1
	Other (OG)	0
	TOTAL Native	85.4
	TOTAL 'HTE'	0.2

Bare ground cover	5m	5%	1.4%	
	15m	0%		
	25m	2%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49			
20-29			
10-19	2		
5-9	1		
<5			N/A
Length of logs (m)		54	

COMPOSITION & STRUCTURE

Species recorded for WWF039

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	4	4		Tree (TG)	No	
euca radi	*Eucalyptus radiata*	Narrow-leaved Peppermint	Myrtaceae	1	1		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	80	1000		Grass & grasslike (GG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.2	40	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	10	*		HTE	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.1	2		Fern (EG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.3	10		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF040	**Pic 20x20**		**Pic 20x50**		211210-03
Survey date:	10/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	997				
GPS Easting	386263	**GPS Northing**	6577844		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF040

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**26.0%**	
	15m	25%		
	25m	45%		
	35m	20%		
	45m	15%		

	Other (OG)	0
	TOTAL	11

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	2
	Grass & grasslike (GG)	19.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	21.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	10%	10.0%	
	15m	25%		
	25m	10%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	5%	1.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	1%		
Rock Cover	5m	4%	0.8%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		
50-79	6		
30-49	2		
20-29	2		1
10-19			
5-9			
<5			N/A
Length of logs (m)		28	

COMPOSITION & STRUCTURE

Species recorded for	WWF040								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	500		Grass & grasslike (GG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.2	10		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	10	100	*		No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	60	1000	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	50	*		No	
junc usit	*Juncus usitatus*		Juncaceae	1	20		Grass & grasslike (GG)	No	
stel angu	*Stellaria angustifolia*	Swamp Starwort	Caryophyllace	0.2	10		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	8	500	*		No	
chry apic	*Chrysocephalum apiculat*	Common Everlasting	Asteraceae	0.8	100		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	200		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	1	100		Grass & grasslike (GG)	No	

gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.7	20		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	10		Forb (FG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.2	5		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.3	10	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	
brom	*Bromus spp.*	A Brome	Poaceae	5	100	*	Grass & grasslike (GG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.2	20	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF041	**Pic 20x20**		**Pic 20x50**			Previous Plot ID
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				173		
Recorders	DP GX		**PCT:**	526	Woodland				
GPS Easting	387332	**GPS Northing**	6578044		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF041

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**14.6%**	
	15m	30%		
	25m	3%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	11

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	0
	Forb (FG)	2.6
	Grass & grasslike (GG)	51
	Fern (EG)	25
	Other (OG)	0.1
	TOTAL Native	83.7
	TOTAL 'HTE'	1

Bare ground cover	5m	0%	3.0%
	15m	0%	
	25m	0%	
	35m	5%	
	45m	10%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF041

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	5	1		Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	50		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	25	100		Fern (EG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	10	50		Grass & grasslike (GG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	2	25		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	15	100		Grass & grasslike (GG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	20	100	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	20	*		No	
oreo erio	*Oreomyrrhis eriopoda*	Australian Carraway	Apiaceae	0.5	25		Forb (FG)	No	
hyba mono	*Hybanthus monopetalus*	Slender Violet-bush	Violaceae	0.1	5		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1	20	*		HTE	

sisy rosu	*Sisyrinchium rosulatum*	Scourweed	Iridaceae	1	50	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	1	20		Grass & grasslike (GG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	5	50		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	5	100	*		No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	10		Other (OG)	No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF042	**Pic 20x20**		**Pic 20x50**		WWF510
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				240	
Recorders	DP GX		**PCT:**	526	Woodland			
GPS Easting	386667	**GPS Northing**	6579424		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF042

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**0**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	30%	**27.0%**	
	15m	30%		
	25m	15%		
	35m	20%		
	45m	40%		

	Other (OG)	2
	TOTAL	11
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	55
	Shrub (SG)	0
	Forb (FG)	5.3
	Grass & grasslike (GG)	40
	Fern (EG)	0.1
	Other (OG)	0.3
	TOTAL Native	100.7
	TOTAL 'HTE'	0

Bare ground cover	5m	10%	2.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	20%	13.0%	
	15m	5%		
	25m	20%		
	35m	5%		
	45m	15%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	1
30-49	3	0	1
20-29	8	0	2
10-19	2	0	1
5-9	0	0	0
<5	1	0	N/A
Length of logs (m)		55	

COMPOSITION & STRUCTURE

Species recorded for WWF042

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	25	4		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	20	5		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	10	3		Tree (TG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	30	100	*		No	
pyrr rupe	*Pyrrosia rupestris*	Rock Felt Fern	Polypodiacea	0.1	5		Fern (EG)	No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	20	20	*		No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	5		Forb (FG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	5	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	10	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	40	100		Grass & grasslike (GG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	

hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	0.2	5		Other (OG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	2	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	1	10	*		No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	5	20	*		No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF043	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF501	
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				158		
Recorders	DP GX		**PCT:**	526					
GPS Easting	389170	**GPS Northing**	6580558		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. obliqua* , *E. nobilis* nearby

FUNCTION

Function attributes for WWF043

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**1**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	10
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	5
	Forb (FG)	5.7
	Grass & grasslike (GG)	32
	Fern (EG)	0.5
	Other (OG)	1
	TOTAL Native	44.2
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF043

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	20	40		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	15	25	*		No	
sola neoa	*Solanum neoanglicum*		Solanaceae	5	10		Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	15	50	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	50	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	15		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	2		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	1	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	5	25	*		No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.5	5		Fern (EG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllace	0.5	50		Forb (FG)	No	

wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	5		Forb (FG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	2	10		Grass & grasslike (GG)	No	
smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	1	10		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF044	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF502
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				300	
Recorders	DP GX		**PCT:**	970	DNG			
GPS Easting	388473	**GPS Northing**	6581606		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF044

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**1**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	7
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1
	Grass & grasslike (GG)	11.3
	Fern (EG)	20
	Other (OG)	0
	TOTAL Native	32.3
	TOTAL 'HTE'	10

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF044

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dich seto	*Dichanthium setosum*	Bluegrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	V
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	20	40		Fern (EG)	No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	10	50	*		HTE	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	50	100	*		No	
cyno echi	*Cynosurus echinatus*	Rough Dog's Tail	Poaceae	1	20	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	30		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	5	*		No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.1	3	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	10		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10	100		Grass & grasslike (GG)	No	
amar powe	*Amaranthus powellii*	Powell's Amaranth	Amaranthace	0.1	1	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	10		Grass & grasslike (GG)	No	

brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	1	20	*		No	

BAM Site Field Survey

Project:	20-250 WWF	**Plot Identifier**	WWF045	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF503	
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				152		
Recorders	DP GX		**PCT:**	970					
GPS Easting	387920	**GPS Northing**	6582495		**Datum**	UTM	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF045

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	25%	**36.0%**	
	15m	40%		
	25m	30%		
	35m	25%		
	45m	60%		

	Other (OG)	0
	TOTAL	8
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	35
	Shrub (SG)	0
	Forb (FG)	6.1
	Grass & grasslike (GG)	55
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	96.1
	TOTAL 'HTE'	0

Bare ground cover	5m	75%	16.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	5%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	11.0%	
	15m	15%		
	25m	20%		
	35m	0%		
	45m	20%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	1
50-79	7	0	5
30-49	3	0	1
20-29	2	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF045

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	15	4		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	20	3		Tree (TG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	20	50		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	10	25	*		No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	30	100		Grass & grasslike (GG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllace	1	30		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	5	100		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	20		Grass & grasslike (GG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	5	10	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.1	5	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF602	**Pic 20x20**		**Pic 20x50**			
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				326		
Recorders	DP EE		**PCT:**	526	DNG				
GPS Easting	384933	**GPS Northing**	6580677		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**nobilis radiata nearby**

FUNCTION

Function attributes for WWF602

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	5.8
	Grass & grasslike (GG)	90.2
	Fern (EG)	2
	Other (OG)	0.1
	TOTAL Native	98.1
	TOTAL 'HTE'	5

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		6	

COMPOSITION & STRUCTURE

Species recorded for WWF602

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	40	100		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	50	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	5	25	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	20	100		Grass & grasslike (GG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	5	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	5		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	50	*		HTE	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	2	15		Fern (EG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	20		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	30	50		Grass & grasslike (GG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	10		Other (OG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	25	*		No	

euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	20		Forb (FG)	No	
gali mura	*Galium murale*	Small Bedstraw	Rubiaceae	0.1	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	10	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	20		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF047	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF601	
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				338		
Recorders	DP EE		**PCT:**	526	Woodland				
GPS Easting	384881	**GPS Northing**	6580655		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF047

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	80%	**82.0%**	
	15m	90%		
	25m	90%		
	35m	80%		
	45m	70%		

	Other (OG)	0
	TOTAL	9

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	50
	Shrub (SG)	0
	Forb (FG)	15.6
	Grass & grasslike (GG)	80
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	145.6
	TOTAL 'HTE'	0.5

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	2.0%
	15m	10%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	9		3
30-49	17		4
20-29	17		3
10-19	14		3
5-9	2		1
<5	1		N/A
Length of logs (m)		196	

COMPOSITION & STRUCTURE

Species recorded for	WWF047								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nobi	*Eucalyptus nobilis*	Forest Ribbon Gum	Myrtaceae	25	3		Tree (TG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	20	5		Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	5	1		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	80	100		Grass & grasslike (GG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.5	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	1	15	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	5	50		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.5	20	*		HTE	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	

gali mura	*Galium murale*	Small Bedstraw	Rubiaceae	0.1	20	*		No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	1	15	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	1	25	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	10	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	5	*		No	
sola pung	*Solanum pungetium*	Eastern Nightshade	Solanaceae	5	20		Forb (FG)	No	
myos disc	*Myosotis discolor*	Forget-me-not	Boraginaceae	0.1	1	*		No	
bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.1	1	*		No	
petr nant	*Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllace	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF048	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF72	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX		**PCT:**	526	Woodland				
GPS Easting	384227	**GPS Northing**	6581608		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**E.calingnosa**

FUNCTION

Function attributes for WWF048

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**4**
	Forb (FG)	**18**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**51.0%**	
	15m	95%		
	25m	10%		
	35m	60%		
	45m	50%		

	Other (OG)	2
	TOTAL	34

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	29
	Shrub (SG)	8.2
	Forb (FG)	2.7
	Grass & grasslike (GG)	24.1
	Fern (EG)	0
	Other (OG)	0.2
	TOTAL Native	64.2
	TOTAL 'HTE'	0

Bare ground cover	5m	25%	22.2%
	15m	1%	
	25m	60%	
	35m	25%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	19.0%
	15m	5%	
	25m	25%	
	35m	5%	
	45m	60%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		
30-49	9		
20-29	14	1	
10-19	10		
5-9	4		
<5	17		N/A
Length of logs (m)		84	

COMPOSITION & STRUCTURE

Species recorded for WWF048

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca dalr hept	*Eucalyptus dalrympleana*		Myrtaceae	15			Tree (TG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	2			Tree (TG)	No	
euca mich	*Eucalyptus michaeliana*	Brittle Gum	Myrtaceae	7			Tree (TG)	No	
euca radi	*Eucalyptus radiata*	Narrow-leaved Peppermint	Myrtaceae	5			Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	6			Shrub (SG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	2		Other (OG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	2			Shrub (SG)	No	
erag lept	*Eragrostis leptostachya*	Drooping Lovegrass	Poaceae	5			Grass & grasslike (GG)	No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	3			Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	1			Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	500		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5			Grass & grasslike (GG)	No	
verb	*Verbascum spp.*		Scrophulariac	0.1	2	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.2	30		Forb (FG)	No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.5	50		Forb (FG)	No	

oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	30		Forb (FG)	No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	0.1	50		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	100		Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	50		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
chry semi	*Chrysocephalum semipa*	Clustered Everlasting	Asteraceae	0.1	3		Forb (FG)	No	
meli urce	*Melichrus urceolatus*	Urn Heath	Ericaceae	0.1	1		Shrub (SG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	10	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10			Grass & grasslike (GG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	4		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	20		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.1	3	*		No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1			Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
davi geni	*Daviesia genistifolia*	Broom Bitter Pea	Fabaceae (Fab	0.1	1		Shrub (SG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	2		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	20		Forb (FG)	No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	1		Forb (FG)	No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	3		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	100		Forb (FG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	2		Forb (FG)	No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	10	*		No	
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	0.1	1		Other (OG)	No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.5	100	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF049	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF610
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				148	
Recorders	DP EE		**PCT:**	526	DNG			
GPS Easting	384526	**GPS Northing**	6582171		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. nobilis, E. obliqua

FUNCTION

Function attributes for WWF049

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**2**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**5.0%**	
	15m	5%		
	25m	10%		
	35m	5%		
	45m	5%		

	Other (OG)	1
	TOTAL	15

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	1
	Shrub (SG)	6
	Forb (FG)	5.6
	Grass & grasslike (GG)	111
	Fern (EG)	10
	Other (OG)	1
	TOTAL Native	134.6
	TOTAL 'HTE'	2

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	2%	25.4%
	15m	5%	
	25m	0%	
	35m	60%	
	45m	60%	
Rock Cover	5m	5%	39.0%
	15m	30%	
	25m	0%	
	35m	80%	
	45m	80%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		16	

COMPOSITION & STRUCTURE

Species recorded for WWF049

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	70	100		Grass & grasslike (GG)	No	
acac falc	*Acacia falciformis*		Fabaceae (Mi	5	5		Shrub (SG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	1	10	*		No	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	10		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.5	100		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	50		Forb (FG)	No	
trag porr porr	*Tragopogon porrifolius s*	Salsify	Asteraceae	0.1	2	*		No	
lepi late	*Lepidosperma laterale*		Cyperaceae	0.5	1		Grass & grasslike (GG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	1	50		Other (OG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	20		Grass & grasslike (GG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	1		Shrub (SG)	No	

allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	1	1		Tree (TG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	20	50		Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2	50	*		HTE	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10	30		Grass & grasslike (GG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	0.5	1		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	10	30		Fern (EG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
erag lept	*Eragrostis leptostachya*	Drooping Lovegrass	Poaceae	5	30		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	20	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	5	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF050	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF504	
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				25		
Recorders	DP GX		**PCT:**	567	Woodland				
GPS Easting	386793	**GPS Northing**	6586353		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF050

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**3**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**47.0%**	
	15m	50%		
	25m	70%		
	35m	70%		
	45m	20%		

	Other (OG)	0
	TOTAL	20
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	20
	Shrub (SG)	8
	Forb (FG)	2.7
	Grass & grasslike (GG)	44.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	74.9
	TOTAL 'HTE'	0

Bare ground cover	5m	30%	7.0%	
	15m	5%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	30%	21.0%	
	15m	0%		
	25m	20%		
	35m	40%		
	45m	15%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	4	0	0
30-49	2	0	0
20-29	0	0	0
10-19	2	0	1
5-9	1	1	0
<5	5	0	N/A
Length of logs (m)		58	

COMPOSITION & STRUCTURE

Species recorded for WWF050

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	20	3		Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrympleana*		Myrtaceae	0	1		Tree (TG)	No	
stel pung	*Stellaria pungens*	Prickly Starwort	Caryophyllace	0.1	10		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	30		Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	5	40	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	2	30	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	10	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.1	5	*		No	
arth mill	*Arthropodium milleflorur*	Pale Vanilla-lily	Anthericaceae	0.1	5		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	1	20		Forb (FG)	No	
myop mont	*Myoporum montanum*	Western Boobialla	Myoporaceae	1	1		Shrub (SG)	No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
wahl grac	*Wahlenbergia gracilis*	Annual Bluebell	Campanulace	0.1	20		Forb (FG)	No	

micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	100		Grass & grasslike (GG)	No	
sene bipi	*Senecio bipinnatisectus*		Asteraceae	0.5	3		Forb (FG)	No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	1	20	*		No	
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	2	10		Grass & grasslike (GG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	5		Forb (FG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	5	10		Shrub (SG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	2		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	2	10	*		No	
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	0.1	5		Forb (FG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	2	15		Shrub (SG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	2	25		Grass & grasslike (GG)	No	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	3		Forb (FG)	No	
petr nant	*Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllace	0.1	5	*		No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	0.2	1		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	20		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF051	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF505
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				223	
Recorders	DP GX		**PCT:**	567	DNG			
GPS Easting	386789	**GPS Northing**	6586469		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF051

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	15%	**4.0%**	
	15m	0%		
	25m	3%		
	35m	0%		
	45m	2%		

	Other (OG)	0
	TOTAL	6
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	0
	Forb (FG)	2.1
	Grass & grasslike (GG)	70
	Fern (EG)	2
	Other (OG)	0
	TOTAL Native	79.1
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	2.0%	
	15m	0%		
	25m	10%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	60%	24.0%	
	15m	15%		
	25m	15%		
	35m	0%		
	45m	30%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	1	0	0
30-49	1	0	1
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		12	

COMPOSITION & STRUCTURE

Species recorded for WWF051

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5	2		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	70	100		Grass & grasslike (GG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	5	50	*		No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	10		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.5	10	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	5	*		No	
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	1	20	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	20	100	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	1	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	20		Forb (FG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	1	*		No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	2	10		Fern (EG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.1	1	*		No	

rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF052	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF513	
Survey date:	2/12/2020		**Compass Orientation (head of 20x20 plot)**				220		
Recorders	DP GX		**PCT:**	567	Woodland				
GPS Easting	383590	**GPS Northing**	6577150		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF052

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**7**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	95%	**71.0%**	
	15m	100%		
	25m	70%		
	35m	40%		
	45m	50%		

	Other (OG)	4
	TOTAL	28
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	45.1
	Shrub (SG)	8.8
	Forb (FG)	0.8
	Grass & grasslike (GG)	40.6
	Fern (EG)	1
	Other (OG)	2.3
	TOTAL Native	98.6
	TOTAL 'HTE'	0

Bare ground cover	5m	3%	4.6%	
	15m	0%		
	25m	5%		
	35m	15%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	5%	13.0%	
	15m	0%		
	25m	30%		
	35m	30%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	0
50-79	2	1	0
30-49	3	0	0
20-29	1	0	0
10-19	10	0	0
5-9	5	0	0
<5	20	0	N/A
Length of logs (m)		60	

COMPOSITION & STRUCTURE

Species recorded for WWF052

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	40	15		Tree (TG)	No	
allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	5	1		Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	30	50		Grass & grasslike (GG)	No	
oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	0.1	5		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.2	20		Other (OG)	No	
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	1	10		Other (OG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	0.5	2		Shrub (SG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	5		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	20	*		No	
ryti pall	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silver	Poaceae	5	30		Grass & grasslike (GG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	3		Shrub (SG)	No	
wahl grac	*Wahlenbergia gracilis*	Annual Bluebell	Campanulace	0.1	5		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	5	20		Shrub (SG)	No	

aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	5		Forb (FG)	No	
gono teuc	*Gonocarpus teucrioides*	Germander Raspwort	Haloragaceae	0.1	1		Forb (FG)	No	
meli urce	*Melichrus urceolatus*	Urn Heath	Ericaceae	2	15		Shrub (SG)	No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	3		Grass & grasslike (GG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	2		Forb (FG)	No	
micr eric	*Micrantheum ericoides*		Euphorbiacea	0.1	10		Shrub (SG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	5	10		Grass & grasslike (GG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	10		Other (OG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	0.1	1		Tree (TG)	No	
brac daph	*Brachyloma daphnoides*	Daphne Heath	Ericaceae	0.1	1		Shrub (SG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	10		Forb (FG)	No	
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.1	2	*		No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.5	4		Grass & grasslike (GG)	No	
amye	*Amyema spp.*	Mistletoe	Loranthaceae	1	1		Other (OG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	1	5		Fern (EG)	No	
acac ulic	*Acacia ulicifolia*	Prickly Moses	Fabaceae (Mi	1	3		Shrub (SG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF053	**Pic 20x20**	QField SD	**Pic 20x50**		Previous Plot ID: WWF2005 (5)
Survey date:	30/03/2021		**Compass Orientation (head of 20x20 plot)**				183	S
Recorders	GY SD		**PCT:**	766	Riparian			
GPS Easting	381987	**GPS Northing**	6578331		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology	creek		**Soil Texture**	clay		**Slope**	flat	
LandF Element	riparian		**Soil Colour**	orange		**Aspect**	na	
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	O	
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	1	R	cow dung
Fire Damage	0		
Storm Damage	0		
Weediness	3	O	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

farmland

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees inside plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	none in riparian zone

FUNCTION

Function attributes for WWF053

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**12**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	12%	**12.6%**	q field SDo
	15m	5%		
	25m	16%		
	35m	19%		
	45m	11%		

	Other (OG)	0
	TOTAL	18
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	3.5
	Grass & grasslike (GG)	6.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	10
	TOTAL 'HTE'	25.1

Bare ground cover	5m	13%	6.4%	
	15m	8%		
	25m	5%		
	35m	3%		
	45m	3%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees no logs

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF053

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	25	2000	*		HTE	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	100	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	35	3000	*		No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	3	1500		Forb (FG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.2	30		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	5	150		Grass & grasslike (GG)	No	
eleo atri	*Eleocharis atricha*		Cyperaceae	0.3	300		Grass & grasslike (GG)	No	
alte dent	*Alternanthera denticulat*	Lesser Joyweed	Amaranthacea	0.1	10		Forb (FG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	0.5	300	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed		0.1	20		Forb (FG)	No	
scho vali	*Schoenoplectus validus*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	20	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	

dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	10	200	*		No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.5	150	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.1	2		Forb (FG)	No	
fest	*Festuca spp.*		Poaceae	0.1	5	*	Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2	200	*		No	
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.1	1	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	150		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	5		Grass & grasslike (GG)	No	
aust pube	*Austrostipa pubescens*		Poaceae	0.1	3		Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	50	*		No	
leon tara tara	*Leontodon taraxacoides*	Lesser Hawkbit	Asteraceae	0.1	50	*		No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	0.5	200	*		No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	2	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	2	*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	0.1	1	*		No	
cycl lept	*Cyclospermum leptophyl*	Slender Celery	Apiaceae	0.1	1	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	2	*		HTE	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
pasp dist	*Paspalidium distans*		Poaceae	0.1	1		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF054	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF509
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				190	
Recorders	DP GX		**PCT:**	567	DNG			
GPS Easting	381642	**GPS Northing**	6578915		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF054

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	2%	**28.0%**	
	15m	5%		
	25m	70%		
	35m	3%		
	45m	60%		

	Other (OG)	0
	TOTAL	11

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	5.3
	Grass & grasslike (GG)	30.5
	Fern (EG)	5
	Other (OG)	0
	TOTAL Native	40.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.6%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	3%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	5%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	0
50-79	0	0	0
30-49	2	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		5	

COMPOSITION & STRUCTURE

Species recorded for WWF054

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	0	1		Tree (TG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	50	100	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	5	100		Forb (FG)	No	
lach fili	*Lachnagrostis filiformis*		Poaceae	0.1	1		Grass & grasslike (GG)	No	
erag trac	*Eragrostis trachycarpa*	A Lovegrass	Poaceae	0.2	20		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	10	30		Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5	20		Fern (EG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.2	10		Grass & grasslike (GG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	2	10	*		No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	5	20	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	5	*		No	

card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	1	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.1	5	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	2	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	20	100		Grass & grasslike (GG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	5		Forb (FG)	No	
wahl grac	*Wahlenbergia gracilis*	Annual Bluebell	Campanulace	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF055	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF508	
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				89		
Recorders	DP GX		**PCT:**	567	Woodland				
GPS Easting	381637	**GPS Northing**	6579426		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF055

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**38.0%**	
	15m	20%		
	25m	85%		
	35m	20%		
	45m	40%		

	Other (OG)	0
	TOTAL	5

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	0
	Forb (FG)	0.6
	Grass & grasslike (GG)	30
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	60.6
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	5.0%	
	15m	0%		
	25m	15%		
	35m	5%		
	45m	5%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	15%	21.0%	
	15m	75%		
	25m	0%		
	35m	5%		
	45m	10%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	3	0	0
30-49	5	0	0
20-29	3	0	3
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		7	

COMPOSITION & STRUCTURE

Species recorded for WWF055

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30	10		Tree (TG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	30	50	*		No	
hord lepo	*Hordeum leporinum*	Barley Grass	Poaceae	5	20	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	5	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	5	20	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	30	100		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.1	2	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.5	50		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	5	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF056	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211210-05	
Survey date:	10/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	766					
GPS Easting	382391	**GPS Northing**	6579128		**Datum**		**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF056**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	2%	**7.6%**	
	15m	5%		
	25m	20%		
	35m	1%		
	45m	10%		

	Other (OG)	0
	TOTAL	12

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.5
	Grass & grasslike (GG)	3.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	3.6
	TOTAL 'HTE'	0.3

Bare ground cover	5m	1%	18.2%
	15m	70%	
	25m	0%	
	35m	20%	
	45m	0%	
Cryptogam cover	5m	0%	1.0%
	15m	0%	
	25m	5%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	2.4%
	15m	2%	
	25m	0%	
	35m	10%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF056								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	55	500	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	25	500	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	3	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	0.5	20	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	2		Forb (FG)	No	
dauc caro	*Daucus carota*	Wild Carrot	Apiaceae	0.3	10	*		No	
junc usit	*Juncus usitatus*		Juncaceae	1	30		Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
cype exal	*Cyperus exaltatus*		Cyperaceae	0.1	2		Grass & grasslike (GG)	No	

care appr	*Carex appressa*	Tall Sedge	Cyperaceae	1	40		Grass & grasslike (GG)	No	
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	5	100	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	1	*		No	
care gaud	*Carex gaudichaudiana*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.2	50		Forb (FG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	0.3	30	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	5	*		HTE	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.2	10		Grass & grasslike (GG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	5	*		No	
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulacea	0.1	1		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.1	1	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
pers	*Persicaria spp.*	Knotweed	Polygonaceae	0.1	2	*	Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	0.5	20		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.4	1	*		No	
scho apog	*Schoenus apogon*	Fluke Bogrush	Cyperaceae	0.1	10		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF057	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211210-04
Survey date:	10/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	766				
GPS Easting	383078	**GPS Northing**	6579975		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF057**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**1**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**9**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	60%	**47.0%**	
	15m	50%		
	25m	55%		
	35m	40%		
	45m	30%		

	Other (OG)	0
	TOTAL	14
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.7
	Forb (FG)	10.3
	Grass & grasslike (GG)	58
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	69
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.4%	
	15m	1%		
	25m	0%		
	35m	1%		
	45m	0%		
Cryptogam cover	5m	0%	1.0%	
	15m	5%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	2.4%	
	15m	2%		
	25m	0%		
	35m	10%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF057

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
holc lana	*Holcus lanatus*	Yorkshire Fog	Poaceae	65	1000	*		No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	1	20	*		No	
lach aemu	*Lachnagrostis aemula*	Blowngrass	Poaceae	1	30		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	4	100		Grass & grasslike (GG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	50	1000		Grass & grasslike (GG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	10	1000		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.4	10		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	50	*		No	
lept poly	*leptospermum polygalifo*		Myrtaceae	0.7	2		Shrub (SG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	1		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	1	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	0.6	20	*		No	

plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	1	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	1	50		Grass & grasslike (GG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	2	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	12	1000	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No	
hypo hygr	*Hypoxis hygrometrica*	Golden Weather-grass	Hypoxidaceae	0.1	1		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
dich crin	*Dichelachne crinita*	Longhair Plumegrass	Poaceae	1	50		Grass & grasslike (GG)	No	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.2	4		Grass & grasslike (GG)	No	
aust nodo	*Austrostipa nodosa*	A Speargrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
scho apog	*Schoenus apogon*	Fluke Bogrush	Cyperaceae	0.3	50		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF058	**Pic 20x20**	QField SD	**Pic 20x50**		Previous Plot ID: WWF2006 (6)	
Survey date:	30/03/2021		**Compass Orientation (head of 20x20 plot)**				264	W	
Recorders	GY SD		**PCT:**	526	DNG				
GPS Easting	383338	**GPS Northing**	6580560		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology	lower slope		**Soil Texture**	loam		**Slope**	6 degrees	
LandF Element			**Soil Colour**	brown		**Aspect**	264	
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**	?		**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3		
Cultivation	2		
Soil erosion	0		
Firewood	0		
Grazing	2	R	sheep tracks short grass
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

sheep grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

E nicholii

Dominant Species outside Plot	*E. caliginosa , E. nicholi*

FUNCTION

Function attributes for WWF058

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**1**
	Forb (FG)	**11**
	Grass & grasslike (GG)	**13**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	5%	**4.6%**	q field SDo
	15m	11%		
	25m	2%		
	35m	3%		
	45m	2%		

	Other (OG)	1
	TOTAL	27
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.1
	Forb (FG)	3
	Grass & grasslike (GG)	75.9
	Fern (EG)	0.2
	Other (OG)	0.1
	TOTAL Native	79.3
	TOTAL 'HTE'	0.2

Bare ground cover	5m	4%	3.8%	
	15m	5%		
	25m	3%		
	35m	2%		
	45m	5%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF058

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	20		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	70	4000		Grass & grasslike (GG)	No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	10	5000	*		No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	0.5	150		Grass & grasslike (GG)	No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	40	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.1	30		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	4	400		Grass & grasslike (GG)	No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.5	5000	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	500		Grass & grasslike (GG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	2	1500		Forb (FG)	No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	8		Forb (FG)	No	

hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	50	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	0.1	1		Grass & grasslike (GG)	No	
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandracea	0.1	4		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	30		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.1	1	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	4		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	2	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	3		Forb (FG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.1	30		Grass & grasslike (GG)	No	
leon tara tara	*Leontodon taraxacoides*	Lesser Hawkbit	Asteraceae	0.1	10	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	1		Forb (FG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.2	50		Fern (EG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	3	*		No	
cype spha	*Cyperus sphaeroideus*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
junc fili	*Juncus filicaulis*		Juncaceae	0.1	5		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	15	*		HTE	
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1	1		Forb (FG)	No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	1	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
scho vali	*Schoenoplectus validus*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	1		Other (OG)	No	
erag pilo	*Eragrostis pilosa*	Soft Lovegrass	Poaceae	0.1	1	*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1	1		Shrub (SG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF062	**Pic 20x20**		**Pic 20x50**		WWF1003
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				56	
Recorders	DP EE		**PCT:**	567	DNG			
GPS Easting	380504	**GPS Northing**	6582085		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. dalyrympleana, E. caliginosa, E. acaciaformis nearby

FUNCTION

Function attributes for WWF062

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**2**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	5%	**1.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	17

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	2
	Forb (FG)	5.6
	Grass & grasslike (GG)	97.1
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	104.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	5%	9.6%	
	15m	40%		
	25m	1%		
	35m	2%		
	45m	0%		
Rock Cover	5m	1%	20.6%	
	15m	95%		
	25m	5%		
	35m	2%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		36	

COMPOSITION & STRUCTURE

Species recorded for WWF062

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	30	50		Grass & grasslike (GG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	2	10		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	5	100		Forb (FG)	No	
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	0.1	20		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	25	40		Grass & grasslike (GG)	No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	2	*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	1		Shrub (SG)	No	
burs long	*Bursaria longisepala*		Pittosporacea	1	1		Shrub (SG)	No	
stac vimi	*Stackhousia viminea*	Slender Stackhousia	Stackhousiace	0.1	20		Forb (FG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	15	40		Grass & grasslike (GG)	No	
erag trac	*Eragrostis trachycarpa*	A Lovegrass	Poaceae	5	20		Grass & grasslike (GG)	No	

micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	50		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	25	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	2	20	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	2	*		No	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	2		Forb (FG)	No	
calo lapp	*Calotis lappulacea*	Yellow Burr-daisy	Asteraceae	0.1	1		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	3		Forb (FG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	5		Other (OG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF063	**Pic 20x20**		**Pic 20x50**		Previous Plot ID:
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				300	
Recorders	MP/GX		**PCT:**	567	Woodland			
GPS Easting	380805	**GPS Northing**	6582257		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF063**

BAM Attribute (20x20m plot)

Stratum	Sum
Tree (TG)	**3**
Shrub (SG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	25%	
	15m	10%	

Count of Native Richness	Forb (FG)	7
	Grass & grasslike (GG)	5
	Fern (EG)	0
	Other (OG)	1
	TOTAL	17
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	33
	Shrub (SG)	15
	Forb (FG)	4.5
	Grass & grasslike (GG)	12.3
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	64.9
	TOTAL 'HTE'	0

	25m	5%	11.0%
	35m	0%	
	45m	15%	
Bare ground cover	5m	0%	16.2%
	15m	5%	
	25m	0%	
	35m	1%	
	45m	75%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	30%	11.0%
	15m	10%	
	25m	5%	
	35m	0%	
	45m	10%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	9		
20-29	10		
10-19	6		
5-9			
<5			N/A
Length of logs (m)		103	

COMPOSITION & STRUCTURE

Species recorded for WWF063

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30			Tree (TG)	No
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	2			Tree (TG)	No
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	1			Tree (TG)	No
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	15			Shrub (SG)	No
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	1			Forb (FG)	No
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5		*		No
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.1		*		No
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.2		*		No
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1		*		No

malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.1		*		No
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.1		*		No
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	1			Forb (FG)	No
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	2			Forb (FG)	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1		*		No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1			Forb (FG)	No
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1		*		No
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2			Forb (FG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1			Other (OG)	No
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1			Forb (FG)	No
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.1		*		No
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginaceae			*		No
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	0.5		*		No
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2		*		No
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1		*		No
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	0.1			Grass & grasslike (GG)	No
erag lept	*Eragrostis leptostachya*	Drooping Lovegrass	Poaceae	0.1			Grass & grasslike (GG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1			Grass & grasslike (GG)	No
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.1		*		No
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.1		*		No
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.5		*		No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5			Grass & grasslike (GG)	No
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	7			Grass & grasslike (GG)	No
tage minu	*Tagetes minuta*	Stinking Roger	Asteraceae	0.1		*		No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1			Forb (FG)	No
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	1		*		No

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF064	**Pic 20x20**		**Pic 20x50**		WWF13
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				300	
Recorders	MP/GX		**PCT:**	568	Woodland			
GPS Easting	381139	**GPS Northing**	6581920		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF064

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**1**
	Forb (FG)	**18**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**15.0%**	
	15m	35%		
	25m	20%		
	35m	10%		
	45m	5%		

	Other (OG)	0
	TOTAL	30
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	43
	Shrub (SG)	5
	Forb (FG)	13.4
	Grass & grasslike (GG)	22.4
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	83.8
	TOTAL 'HTE'	0.2

Bare ground cover	5m	1%	1.6%	
	15m	1%		
	25m	5%		
	35m	0%		
	45m	1%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	8.0%	
	15m	10%		
	25m	10%		
	35m	20%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	13		
20-29	8		
10-19	8		
5-9	4		
<5	8		N/A
Length of logs (m)		97	

COMPOSITION & STRUCTURE

Species recorded for WWF064

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	50	*		HTE	
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	1			Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	7		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.2	10		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	15	*		No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	7		Forb (FG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	1			Grass & grasslike (GG)	No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.1	7		Forb (FG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	1			Tree (TG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30			Tree (TG)	No	
euca dalr	*Eucalyptus dalrympleanc*	Mountain Gum	Myrtaceae	7			Tree (TG)	No	
euca mala	*Eucalyptus malacoxylon*	Moonbi Apple Box	Myrtaceae	5			Tree (TG)	No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.1	50		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2			Forb (FG)	No	
gono tetr	*Gonocarpus tetragynus*	Poverty Raspwort	Haloragaceae	0.1	5		Forb (FG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	3		Forb (FG)	No	

hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	2		*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	2		*		No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	0.1	1		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5			Grass & grasslike (GG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	5			Shrub (SG)	No	
oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	0.1	3		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	50		Forb (FG)	No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	3		*		No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	3			Forb (FG)	No	
plan vari	*Plantago varia*		Plantaginacea	1			Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	15			Grass & grasslike (GG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	0.1	2		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2	10		Forb (FG)	No	
ryti pilo	*Rytidosperma pilosum*	Smooth-flowered Wallaby Gras	Poaceae	0.1	1		Grass & grasslike (GG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllace	0.1	2		Forb (FG)	No	
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	4			Forb (FG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	2			Forb (FG)	No	
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.5	50	*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	0.3	20	*		No	
verb	*Verbascum spp.*		Scrophulariac	0.1	1	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	2		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	2		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF066	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF14	
Survey date:	29/092020		**Compass Orientation (head of 20x20 plot)**				210		
Recorders	MP/GX		**PCT:**	568	Woodland				
GPS Easting	381759	**GPS Northing**	6581441		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF066

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**1**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**12.0%**	
	15m	10%		
	25m	5%		
	35m	5%		
	45m	15%		

	Other (OG)	0
	TOTAL	16

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	31.5
	Shrub (SG)	20
	Forb (FG)	2.7
	Grass & grasslike (GG)	40.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	94.4
	TOTAL 'HTE'	1.2

Bare ground cover	5m	0%	0.2%
	15m	0%	
	25m	1%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	25%	18.0%
	15m	5%	
	25m	20%	
	35m	25%	
	45m	15%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	9		
30-49	5		
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		109	

Species recorded for WWF066

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1		*		HTE	
allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinacea	0.5	1		Tree (TG)	No	
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	4		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	100	*		No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	1			Forb (FG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30			Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrymplean*		Myrtaceae	1			Tree (TG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	1	9		Forb (FG)	No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.1	12		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	2		*		No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	2		*		No	
lysi arve	*Lysimachia arvensis*	Scarlet Pimpernel	Myrsinaceae	0.1	4	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30			Grass & grasslike (GG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	20			Shrub (SG)	No	

oper	*Opercularia spp.*		Rubiaceae	0.1	7		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	7		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	10			Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	1		*		No	
plan vari	*Plantago varia*		Plantaginacea	0.1	50		Forb (FG)	No	
rosa rubi	*Rosa rubiginosa*	Sweet Briar	Rosaceae	0.2	2	*		HTE	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	3	*		No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.2	7		Forb (FG)	No	
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.1	10	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	2		*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	4		*		No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.5	20	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	3		*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF069	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF50	
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				155		
Recorders	MP/GX		**PCT:**	568	Woodland				
GPS Easting	382236	**GPS Northing**	6582263		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for **WWF069**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**3**
	Forb (FG)	**15**
	Grass & grasslike (GG)	**10**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%	**30.0%**	
	15m	30%		
	25m	30%		
	35m	40%		
	45m	40%		

	Other (OG)	2
	TOTAL	35
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	60.2
	Forb (FG)	6.8
	Grass & grasslike (GG)	13.1
	Fern (EG)	0.1
	Other (OG)	0.2
	TOTAL Native	110.4
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	1.6%	
	15m	5%		
	25m	2%		
	35m	0%		
	45m	1%		
Cryptogam cover	5m	5%	8.0%	
	15m	15%		
	25m	5%		
	35m	15%		
	45m	0%		
Rock Cover	5m	20%	46.0%	
	15m	70%		
	25m	30%		
	35m	40%		
	45m	70%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		1
30-49	7		1
20-29	6		1
10-19	7		
5-9			
<5			N/A
Length of logs (m)		67	

COMPOSITION & STRUCTURE

Species recorded for WWF069

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	15			Tree (TG)	No	
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	10			Tree (TG)	No	
euca mala	*Eucalyptus malacoxylon*	Moonbi Apple Box	Myrtaceae	1			Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	4			Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	60			Shrub (SG)	No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	1			Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	3			Forb (FG)	No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	2			Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10			Grass & grasslike (GG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	3		Other (OG)	No	
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	0.5	25		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1			Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.2	100		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	20		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	15		Forb (FG)	No	

dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	200		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.1	20		Forb (FG)	No	
verb	*Verbascum spp.*		Scrophulariac	0.1	1	*		No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.1	1		Forb (FG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	1		*		No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.5	20	*		No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.5	20		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	25		Fern (EG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	6		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	10		Forb (FG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	1		Forb (FG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	2		Shrub (SG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.1	11		Forb (FG)	No	
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandracea	0.1	2		Grass & grasslike (GG)	No	
dian	*Dianella spp.*		Phormiaceae	0.1	2		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	4		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	15		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	2		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	17	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	0.1	4		Grass & grasslike (GG)	No	
acac	*Acacia spp.*	Wattle	Fabaceae (Mi	0.1	1		Shrub (SG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF071	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211209-01
Survey date:	9/12/2021		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	DC, CC		**PCT:**	510				
GPS Easting	380298	**GPS Northing**	6582033		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF071

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**
	Other (OG)	**1**
	TOTAL	**12**

BAM Attribute (20x20m plot)

	Stratum	Sum
	Tree (TG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	35%	**36.0%**	
	15m	30%		
	25m	40%		
	35m	45%		
	45m	30%		
Bare ground cover	5m	5%	**1.8%**	
	15m	1%		
	25m	1%		
	35m	1%		
	45m	1%		

Count of cover abundance (native vascular plants)	Shrub (SG)	0
	Forb (FG)	15.8
	Grass & grasslike (GG)	29.8
	Fern (EG)	0
	Other (OG)	2
	TOTAL Native	47.6
	TOTAL 'HTE'	0.2

Cryptogam cover	5m	1%	0.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	2%	0.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5	1		N/A
Length of logs (m)		61	

COMPOSITION & STRUCTURE

Species recorded for	WWF071									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status	BCA Status
dich crin	*Dichelachne crinita*	Longhair Plumegrass	Poaceae	25	300		Grass & grasslike (GG)	No		
aust nodo	*Austrostipa nodosa*	A Speargrass	Poaceae	2	100		Grass & grasslike (GG)	No		
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	2	200	*		No		
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	100		Forb (FG)	No		
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	300	*		No		
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	15	1000		Forb (FG)	No		
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	2	200		Other (OG)	No		
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	20	1000	*		No		
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	20	*		No		
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	100		Grass & grasslike (GG)	No		
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	20		Forb (FG)	No		
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	1	*		No		
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	1	*		No		
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No		
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.2	20	*		No		
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.2	5		Forb (FG)	No		
scho apog	*Schoenus apogon*	Fluke Bogrush	Cyperaceae	0.8	50		Grass & grasslike (GG)	No		
hypo hygr	*Hypoxis hygrometrica*	Golden Weather-grass	Hypoxidaceae	0.1	10		Forb (FG)	No		
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	5	*		HTE		
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No		
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	2		Forb (FG)	No		

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF072	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF1002
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				207	
Recorders	DP EE		**PCT:**	510	DNG			
GPS Easting	380097	**GPS Northing**	6582215		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. melliodora, E. blakelyi nearby

FUNCTION

Function attributes for	**WWF072**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**12**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**1.0%**	
	15m	5%		
	25m	0%		
	35m	0%		
	45m	0%		
Bare ground	5m	0%		
	15m	0%		

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	15.4
	Grass & grasslike (GG)	36.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	51.5
	TOTAL 'HTE'	40

Bare ground cover	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF072

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	40	100	*		HTE	
stac vimi	*Stackhousia viminea*	Slender Stackhousia	Stackhousiace	10	100		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fal	5	25	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	5	50		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	5	50	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	50		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	5	20		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	5		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	15		Forb (FG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	1	10		Grass & grasslike (GG)	No	
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	0.1	5		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	0.1	5	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	5	30		Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	20	50		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	5	25		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF073	**Pic 20x20**		**Pic 20x50**		WWF15
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	567	Woodland			
GPS Easting	380881	**GPS Northing**	6580696		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF073

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**3**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**9.4%**	
	15m	30%		
	25m	2%		
	35m	5%		
	45m	5%		

	Other (OG)	0
	TOTAL	17

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	7
	Shrub (SG)	5.2
	Forb (FG)	3
	Grass & grasslike (GG)	46
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	61.2
	TOTAL 'HTE'	0

Bare ground cover	5m	5%	4.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	15%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	25%	14.0%	
	15m	5%		
	25m	5%		
	35m	20%		
	45m	15%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		
50-79			
30-49	2		
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		107	

COMPOSITION & STRUCTURE

Species recorded for	WWF073							
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	7			Tree (TG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	1			Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	2		*		No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	5			Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1			Forb (FG)	No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	15		*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1	2		Shrub (SG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	2		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	10		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.2	500		Forb (FG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	1		Shrub (SG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5		*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	2		*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	20		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	20		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	1		*		No	

spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	1			Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	500		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	100		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30			Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	15			Grass & grasslike (GG)	No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.2	10		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.1	1	*		No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.1	1	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.5	50	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF074	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF1001
Survey date:	11/03/2021		**Compass Orientation (head of 20x20 plot)**				89	
Recorders	DP EE		**PCT:**	510	DNG			
GPS Easting	379430	**GPS Northing**	6582422		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. bridgesiana, E. melliodora nearby

FUNCTION

Function attributes for	**WWF074**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**
	Other (OG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**4.0%**	
	15m	5%		
	25m	5%		
	35m	5%		
	45m	5%		
	5m	0%		

	TOTAL	5
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.6
	Grass & grasslike (GG)	5.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	5.8
	TOTAL 'HTE'	2

Bare ground cover	15m	0%	0.4%	
	25m	0%		
	35m	0%		
	45m	2%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF074

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	60	100	*		No	
trif prat	*Trifolium pratense*	Red Clover	Fabaceae (Fab	10	60	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	2	30	*		No	
erag trac	*Eragrostis trachycarpa*	A Lovegrass	Poaceae	5	25		Grass & grasslike (GG)	No	
cich inty	*Cichorium intybus*	Chicory	Asteraceae	5	50	*		No	
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	3	20	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2	30	*		HTE	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.5	30		Forb (FG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
lepi	*Lepidium spp.*	A Peppercress	Brassicaceae	0.1	10	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF075	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF26
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				155	
Recorders	MP/GX		**PCT:**	510	Woodland		340	
GPS Easting	379196	**GPS Northing**	6582956		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF075

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	85%	**30.0%**	
	15m	40%		
	25m	10%		
	35m	10%		
	45m	5%		

	Other (OG)	0
	TOTAL	9
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	8
	Shrub (SG)	0
	Forb (FG)	1.2
	Grass & grasslike (GG)	21.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	30.4
	TOTAL 'HTE'	7

Bare ground cover	5m	0%	1.4%
	15m	1%	
	25m	5%	
	35m	1%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79	2		
30-49	5		
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		15	

Species recorded for WWF075

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca brid	*Eucalyptus bridgesiana*	Apple Box	Myrtaceae	8			Tree (TG)	No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	15		*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	10		*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	20		*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	1			Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	10		*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	10	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	1			Grass & grasslike (GG)	No	
cype erag	*Cyperus eragrostis*	Umbrella Sedge	Cyperaceae	7		*		HTE	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	7		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10			Grass & grasslike (GG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	3	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	5		*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	3		*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	2		*		No	

oxal pere	*Oxalis perennans*	#REF!	Oxalidaceae	0.1	50		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
eleo acut	*Eleocharis acuta*	#REF!	Cyperaceae	10			Grass & grasslike (GG)	No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	5		*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	7		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF076	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF514	
Survey date:	30/11/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	DP GX		**PCT:**	567	Woodland				
GPS Easting	378931	**GPS Northing**	6583753		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. caliginosa*

FUNCTION

Function attributes for WWF076

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**1**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	2%	**1.2%**	
	15m	0%		
	25m	2%		
	35m	1%		
	45m	1%		

	Other (OG)	0
	TOTAL	4

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	0
	Forb (FG)	0.1
	Grass & grasslike (GG)	80
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	85.1
	TOTAL 'HTE'	5

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	8.0%	
	15m	5%		
	25m	5%		
	35m	30%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	1	0	2
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		37	

COMPOSITION & STRUCTURE

Species recorded for WWF076

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5	1		Tree (TG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	60	100+		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	50		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	10	50	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	5	20	*		HTE	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	2	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF077	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF516	
Survey date:	30/11/2020		**Compass Orientation (head of 20x20 plot)**				30		
Recorders	DP GX		**PCT:**	567	Woodland				
GPS Easting	378444	**GPS Northing**	6584218		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF077

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**5**
	Shrub (SG)	**1**
	Forb (FG)	**12**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	90%	**67.0%**	
	15m	90%		
	25m	75%		
	35m	30%		
	45m	50%		

	Other (OG)	1
	TOTAL	21
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	22
	Shrub (SG)	30
	Forb (FG)	10.2
	Grass & grasslike (GG)	5.5
	Fern (EG)	0
	Other (OG)	0.5
	TOTAL Native	68.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	1.0%	
	15m	5%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	3.0%	
	15m	15%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	0
50-79	7	0	5
30-49	2	0	3
20-29	2	0	1
10-19	1	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		92	

COMPOSITION & STRUCTURE

Species recorded for WWF077

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	10	10		Tree (TG)	No	
euca brid	*Eucalyptus bridgesiana*	Apple Box	Myrtaceae	1	1		Tree (TG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	1	0		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5	1		Tree (TG)	No	
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	5	1		Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	30	25		Shrub (SG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	30		Forb (FG)	No	
gamo	*Gamochaeta spp.*		Asteraceae	0.1	30	*		No	
wahl grac	*Wahlenbergia gracilis*	Sprawling Bluebell	Campanulace	0.1	5		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	5	100		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	2	*		No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	2	20		Forb (FG)	No	

eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	1	5		Forb (FG)	No	
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	1	15		Forb (FG)	No	
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	5	20		Grass & grasslike (GG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.1	1	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	5	*		No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.5	50		Other (OG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No	
sene dias	*Senecio diaschides*		Asteraceae	0.1	10		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	5	*		No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.2	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	3	*		No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	0.5	10		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	0.1	1	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	3		Forb (FG)	No	
sene bipi	*Senecio bipinnatisectus*		Asteraceae	0.1	1		Forb (FG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.1	1	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF078	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF507
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				190	
Recorders	DP GX		**PCT:**	568	Woodland			
GPS Easting	380170	**GPS Northing**	6585195		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			slightly more affinity to 568 than 567

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF078

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**2**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**19.0%**	
	15m	5%		
	25m	25%		
	35m	15%		
	45m	40%		

	Other (OG)	2
	TOTAL	21
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	11
	Shrub (SG)	6
	Forb (FG)	32.6
	Grass & grasslike (GG)	25.5
	Fern (EG)	0
	Other (OG)	0.2
	TOTAL Native	75.3
	TOTAL 'HTE'	0.1

Bare ground cover	5m	1%	7.2%	
	15m	15%		
	25m	5%		
	35m	10%		
	45m	5%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	2.0%	
	15m	5%		
	25m	5%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	3	0	2
30-49	6	0	1
20-29	4	0	0
10-19	2	0	0
5-9	2	0	0
<5	3	0	N/A
Length of logs (m)		50	

COMPOSITION & STRUCTURE

Species recorded for WWF078

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	5	5		Tree (TG)	No	
euca acac	*Eucalyptus acaciiformis*	Wattle-leaved Peppermint	Myrtaceae	5	5		Tree (TG)	No	
plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	10	100		Forb (FG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	2	20	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	10	100		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	5	50	*		No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.5	25	*		No	
lach fili	*Lachnagrostis filiformis*		Poaceae	5	30		Grass & grasslike (GG)	No	
cyno echi	*Cynosurus echinatus*	Rough Dog's Tail	Poaceae	0.1	10	*		No	
wahl grac	*Wahlenbergia gracilis*	Sprawling Bluebell	Campanulace	0.1	20		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	5	10		Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	30		Forb (FG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	10	30		Grass & grasslike (GG)	No	
oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	0.1	1		Forb (FG)	No	

glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	2		Other (OG)	No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.5	20	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	20		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	10	100		Forb (FG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	2	30			No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	2	25	*		No	
sene dias	*Senecio diaschides*		Asteraceae	0.1	1		Forb (FG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.5	20		Grass & grasslike (GG)	No	
good bell	*Goodenia bellidifolia*		Goodeniaceae	0.1	10		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	1	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	3	*		HTE	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	20		Forb (FG)	No	
euca brid	*Eucalyptus bridgesiana*	Apple Box	Myrtaceae	1	1		Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	1	1		Shrub (SG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	10	30		Grass & grasslike (GG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF080	**Pic 20x20**	QField SD	**Pic 20x50**		
Survey date:	30/03/2021		**Compass Orientation (head of 20x20 plot)**				253	W
Recorders	GY SD		**PCT:**	534 DNG				
GPS Easting	377697	**GPS Northing**	6583030		**Datum**	GDA 94	**Zone**	56

was WWF2007 (

Landform			**Soils**			**Drainage & Slope**		
Morphology	low hill		**Soil Texture**	clay		**Slope**	4 degrees	
LandF Element			**Soil Colour**	light orange		**Aspect**	253	W
LandF Pattern			**Soil Depth**			**Drainage**	well drained	
Microrelief			**Geology**	shale metisediments		**Watercourses**	50m	S

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	o	
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	2	o	
Fire Damage	0		
Storm Damage	0		
Weediness	1		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

cattle grazing and camping

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. nova-anglica*

FUNCTION

Function attributes for WWF080

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**3**
	Forb (FG)	**13**
	Grass & grasslike (GG)	**10**
	Fern (EG)	**0**
	Other (OG)	**2**
	TOTAL	**28**

BAM Attribute (20x20m plot)

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%		q field SDo
	15m	4%		
	25m	9%	**7.8%**	
	35m	11%		
	45m	5%		
Bare ground cover	5m	3%		
	15m	11%		
	25m	5%	**4.8%**	

Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.4
	Forb (FG)	2.7
	Grass & grasslike (GG)	82
	Fern (EG)	0
	Other (OG)	0.3
	TOTAL Native	85.4
	TOTAL 'HTE'	0.4

cover	35m	3%		
	45m	2%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees no logs

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF080

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.5	400		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	500		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.2	250		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	1	1000		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginaceae	0.5	400	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	2	400		Grass & grasslike (GG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.2	2000		Other (OG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariaceae	0.2	50	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
ammo alat	*Ammobium alatum*		Asteraceae	0.1	15		Forb (FG)	No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	5		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	50	1500		Grass & grasslike (GG)	No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.5	500	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	40		Grass & grasslike (GG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	50		Forb (FG)	No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	25	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllaceae	0.1	10	*		No	

aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	25	1000		Grass & grasslike (GG)	No	
them tria	*Themeda triandra*		Poaceae	0.1	1		Grass & grasslike (GG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	20		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1	5		Shrub (SG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	5	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.1	20		Other (OG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	100	*		No	
burs spin	*Bursaria spinosa*	Native Blackthorn	Pittosporaceae	0.2	3		Shrub (SG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	15	*		No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	1		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	4	150		Grass & grasslike (GG)	No	
scho vali	*Schoenoplectus validus*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Faboideae)	0.1	1	*		No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	1	*		No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	15	*		HTE	
cymb laws	*Cymbonotus lawsonianus*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	0.1	2		Grass & grasslike (GG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	0.1	1	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	5		Forb (FG)	No	
hype perf	*Hypericum perforatum*	St. Johns Wort	Clusiaceae	0.1	1	*		HTE	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	1		Forb (FG)	No	
pime curv acut	*Pimelea curviflora var. a*		Thymelaeaceae	0.1	1		Shrub (SG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF081	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF517	
Survey date:	1/12/2020		**Compass Orientation (head of 20x20 plot)**				321		
Recorders	DP GX		**PCT:**	534	Woodland				
GPS Easting	377099	**GPS Northing**	6583189		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			Originally thought dominant Euc was E. bridgesiana, however landscape position and assemblage lean more towards E. nova hence 534

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF081**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**2**
	Forb (FG)	**13**
	Grass & grasslike (GG)	**7**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	65%	**54.0%**	
	15m	30%		
	25m	85%		
	35m	60%		

Richness	Fern (EG)	0
	Other (OG)	2
	TOTAL	25
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	20
	Shrub (SG)	2.1
	Forb (FG)	3.3
	Grass & grasslike (GG)	47.4
	Fern (EG)	0
	Other (OG)	0.2
	TOTAL Native	73
	TOTAL 'HTE'	0

	45m	30%		
Bare ground cover	5m	0%	8.8%	
	15m	1%		
	25m	3%		
	35m	30%		
	45m	10%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	2	0	1
30-49	5	0	0
20-29	4	0	1
10-19	5	0	0
5-9	1	0	0
<5	15	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF081

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1	2		Forb (FG)	No	
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	2		Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	10		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	2	10		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	2	*		No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	25	*		No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	5		Forb (FG)	No	
conv erub	*Convolvulus erubescens*	Pink Bindweed	Convolvulace	0.1	5		Other (OG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	2	50		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	20		Other (OG)	No	

dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	10		Forb (FG)	No	
dich stri	*Dichopogon strictus*	Chocolate Lily	Anthericaceae	0.1	2		Forb (FG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	20	100		Grass & grasslike (GG)	No	
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	20	20		Tree (TG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	20		Forb (FG)	No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	2		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	1	50	*		No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	1		Grass & grasslike (GG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	2	10		Shrub (SG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	25	100		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
petr nant	*Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllace	0.1	10	*		No	
pime curv	*Pimelea curviflora*	Rice Flower	Thymelaeacea	0.1	30		Shrub (SG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.2	15	*		No	
ryti pall	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silver	Poaceae	0.1	5			No	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.1	10		Grass & grasslike (GG)	No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	5	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	20	*		No	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	5		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	15		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF083	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF87	
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX/CC		**PCT:**	1194	Woodland				
GPS Easting	374137	**GPS Northing**	6587963		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF083

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**11**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**71.0%**	
	15m	70%		
	25m	90%		
	35m	70%		
	45m	85%		

	Other (OG)	2
	TOTAL	20

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	35
	Shrub (SG)	0
	Forb (FG)	6.3
	Grass & grasslike (GG)	70.3
	Fern (EG)	3
	Other (OG)	0.2
	TOTAL Native	114.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	2.4%	
	15m	1%		
	25m	1%		
	35m	5%		
	45m	5%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	7		1
30-49	8		
20-29	6		
10-19	4		
5-9			
<5			N/A
Length of logs (m)		40	

COMPOSITION & STRUCTURE

Species recorded for WWF083

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	35			Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	50			Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	3			Fern (EG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	3			Forb (FG)	No	
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	20			Grass & grasslike (GG)	No	
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculacea	2			Forb (FG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.5	100		Forb (FG)	No	
dich	*Dichondra sp Ingelwood*		Convolvulacea	0.1	100		Forb (FG)	No	
dauc gloc	*Daucus glochidiatus*	Native Carrot	Apiaceae	0.1	100		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	50	*		No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	20		Other (OG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	3		Grass & grasslike (GG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllace	0.1	2		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	20		Forb (FG)	No	

sene	*Senecio spp.*	Groundsel, Fireweed	Asteraceae	0.1	50	*		No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.1	100		Forb (FG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	2		Grass & grasslike (GG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1	3		Other (OG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	2		Forb (FG)	No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	0.1	2	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	10	*		No	
sene laut	*Senecio lautus*	Variable Groundsel	Asteraceae	0.1	20		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF084	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF92	
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX/CC		**PCT:**	1194	Woodland				
GPS Easting	374123	**GPS Northing**	6588062		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF084

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**1**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	15%	**19.0%**	
	15m	25%		
	25m	15%		
	35m	10%		
	45m	30%		

	Other (OG)	1
	TOTAL	16
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	23
	Shrub (SG)	0.5
	Forb (FG)	10.9
	Grass & grasslike (GG)	23
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	57.5
	TOTAL 'HTE'	0.6

Bare ground cover	5m	1%	1.0%	
	15m	1%		
	25m	1%		
	35m	1%		
	45m	1%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		1
30-49	5		
20-29	8		
10-19	7		
5-9			
<5			N/A
Length of logs (m)		11	

COMPOSITION & STRUCTURE

Species recorded for WWF084

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
Euca stel	*Eucalyptus stellulata*	Black Sally	Myrtaceae	3			Tree (TG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	5			Tree (TG)	No	
euca dalr hept	*Eucalyptus dalrympleana*		Myrtaceae	15			Tree (TG)	No	
rosa rubi	*Rosa rubiginosa*	Sweet Briar	Rosaceae	0.5		*		HTE	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	10			Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	10		*		No	
onop	*Onopordum spp.*		Asteraceae	0.3		*		No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.1		*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.3			Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1			Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1			Forb (FG)	No	
gera moll moll	*Geranium molle subsp. m*	Cranesbill Geranium	Geraniaceae	20		*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5			Grass & grasslike (GG)	No	
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	15			Grass & grasslike (GG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.3		*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1		*		No	

sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1			Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1			Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1		*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1			Forb (FG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1			Forb (FG)	No	
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.1			Other (OG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	3			Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5		*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2		*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	0.1		*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1		*		HTE	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	0.5			Shrub (SG)	No	

BAM Site Field Survey

Project:	Winterbourne	**Plot Identifier**	WWF085	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF91
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	MP/GX/CC		**PCT:**	1194				
GPS Easting	374390	**GPS Northing**	6588420		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF085

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	30%	**8.4%**	
	15m	5%		
	25m	5%		
	35m	1%		
	45m	1%		

	Other (OG)	0
	TOTAL	16

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	2
	Forb (FG)	0.5
	Grass & grasslike (GG)	70.2
	Fern (EG)	5
	Other (OG)	0
	TOTAL Native	82.7
	TOTAL 'HTE'	2

Bare ground cover	5m	0%	0.4%	
	15m	2%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF085

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca stel	*Eucalyptus stellulata*	Black Sally	Myrtaceae	5			Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10			Grass & grasslike (GG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	2			Shrub (SG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	25			Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2		*		HTE	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1			Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1		*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	20		*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	2			Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	5		*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	2		*		No	
malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.2		*		No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	5			Grass & grasslike (GG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5			Fern (EG)	No	
acae nova	*Acaena novae-zelandiae*	Bidgee-widgee	Rosaceae	0.1			Forb (FG)	No	
stac arve	*Stachys arvensis*	Stagger Weed	Lamiaceae	0.1		*		No	

oxal pere	*Oxalis perennans*		Oxalidaceae	0.1			Forb (FG)	No	
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.1		*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1			Forb (FG)	No	
halo aspe	*Haloragis aspera*	Rough Raspwort	Haloragaceae	0.1			Forb (FG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	3			Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1		*		No	
ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.1			Grass & grasslike (GG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.1	6		Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	25			Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	Winterbourne	**Plot Identifier**	WWF086	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF90
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX/CC		**PCT:**	1194				
GPS Easting	374791	**GPS Northing**	6589215		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for **WWF086**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**5.4%**	
	15m	5%		
	25m	5%		
	35m	5%		
	45m	2%		

	Other (OG)	1
	TOTAL	14

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	20.7
	Grass & grasslike (GG)	65.2
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	86
	TOTAL 'HTE'	0.2

Bare ground cover	5m	1%	1.4%	
	15m	2%		
	25m	1%		
	35m	2%		
	45m	1%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF086

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
gera moll moll	*Geranium molle subsp. r*	Cranesbill Geranium	Geraniaceae	0.1	20	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	20			Forb (FG)	No	
verb	*Verbascum spp.*		Scrophulariac	0.1	20	*		No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	0.1	4		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
fest	*Festuca spp.*		Poaceae	5		*	Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	20	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	20		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	10	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	50			Grass & grasslike (GG)	No	
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	1		Forb (FG)	No	
dich repe ingl	*Dichondra repens subsp.*	Kidney Weed	Convolvulacea	0.1	50		Forb (FG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	10			Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	50	*		HTE	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	100		Other (OG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	20		Forb (FG)	No	

onop	*Onopordum spp.*		Asteraceae	0.1	1	*		No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	6		Forb (FG)	No	
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.5	50	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	10		Grass & grasslike (GG)	No	
malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.1	20	*		No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	1		Forb (FG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	10		*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.4	15	*		No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF087	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211207-07
Survey date:	7/12/2021		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	DC, CC		**PCT:**	1194				
GPS Easting	374951	**GPS Northing**	6589052		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF087**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**4**
	Forb (FG)	**15**
	Grass & grasslike (GG)	**14**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**41.0%**	
	15m	40%		
	25m	60%		
	35m	60%		
	45m	25%		

	Other (OG)	4
	TOTAL	39
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	3.6
	Forb (FG)	5.4
	Grass & grasslike (GG)	54.6
	Fern (EG)	0.7
	Other (OG)	2.5
	TOTAL Native	96.8
	TOTAL 'HTE'	0

Bare ground cover	5m	5%	6.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	25%		
Cryptogam cover	5m	10%	3.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	5%		
Rock Cover	5m	30%	11.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	25%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	10		
20-29	18		
10-19	18		
5-9	2		
<5	1		N/A
Length of logs (m)		256	

COMPOSITION & STRUCTURE

Species recorded for WWF087

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30	23		Tree (TG)	No	
good hete	*Goodenia heteromera*		Goodeniaceae	1	200		Forb (FG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.4	100		Forb (FG)	No	
aust nodo	*Austrostipa nodosa*	A Speargrass	Poaceae	6	100		Grass & grasslike (GG)	No	
dich crin	*Dichelachne crinita*	Longhair Plumegrass	Poaceae	5	200		Grass & grasslike (GG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.7	100		Fern (EG)	No	
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	0.5	30		Grass & grasslike (GG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.2	30		Forb (FG)	No	
indi aust	*Indigofera australis*	Australian Indigo	Fabaceae (Fab	1	10		Shrub (SG)	No	
lach aemu	*Lachnagrostis aemula*	Blowngrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	1	200		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.2	10	*		No	
Microtis spp.	*Microtis spp.*		Orchidaceae	0.1	2		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	50	*		No	

glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fab	0.3	100		Other (OG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	1	100		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	10		Shrub (SG)	No	
cala	*Caladenia spp.*		Orchidaceae	0.1	5		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	5		Forb (FG)	No	
briz mino	*Briza minor*	Shivery Grass	Poaceae	0.2	40	*		No	
poa labi labi	*Poa labillardierei var. lab*	Tussock	Poaceae	40	1000		Grass & grasslike (GG)	No	
oper hisp	*Opercularia hispida*	Hairy Stinkweed	Rubiaceae	0.4	50		Forb (FG)	No	
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandracea	0.1	5		Grass & grasslike (GG)	No	
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	20		Forb (FG)	No	
abil ovat	*Abildgaardia ovata*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
scho apog	*Schoenus apogon*	Fluke Bogrush	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulacea	0.2	30		Forb (FG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	1	100		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.7	100		Grass & grasslike (GG)	No	
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fab	2	50		Other (OG)	No	
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mi	0.8	10		Shrub (SG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.3	50		Grass & grasslike (GG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	0.8	10		Shrub (SG)	No	
gono tetr	*Gonocarpus tetragynus*	Poverty Raspwort	Haloragaceae	0.5	100		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
	Chrysocephalum spp.		Asteraceae	0.1	1		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	2		Other (OG)	No	
bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	0.1	1		Other (OG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	2		Grass & grasslike (GG)	No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulacea	0.1	20		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.5	100		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF088	**Pic 20x20**		**Pic 20x50**		WWF88
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX/CC		**PCT:**	1194	Woodland			
GPS Easting	375420	**GPS Northing**	6589368		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF088

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**3**
	Forb (FG)	**16**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	15%	**17.0%**	
	15m	5%		
	25m	15%		
	35m	20%		
	45m	30%		

	Other (OG)	0
	TOTAL	28

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30.1
	Shrub (SG)	6.5
	Forb (FG)	6.5
	Grass & grasslike (GG)	35.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	78.2
	TOTAL 'HTE'	0

Bare ground cover	5m	70%	18.2%	
	15m	1%		
	25m	10%		
	35m	5%		
	45m	5%		
Cryptogam cover	5m	0%	4.0%	
	15m	0%		
	25m	0%		
	35m	15%		
	45m	5%		
Rock Cover	5m	15%	29.0%	
	15m	10%		
	25m	5%		
	35m	75%		
	45m	40%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		
30-49	9		
20-29	5		
10-19	3		
5-9	1		
<5	2		N/A
Length of logs (m)		100	

COMPOSITION & STRUCTURE

Species recorded for WWF088

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	5			Grass & grasslike (GG)	No	
euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	20			Tree (TG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	5			Tree (TG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	1			Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	3			Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.1	5		Forb (FG)	No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	15		Forb (FG)	No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	15		*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	50		Forb (FG)	No	
gali prop	*Galium propinquum*	Maori Bedstraw	Rubiaceae	0.3	2100		Forb (FG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	20		Forb (FG)	No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	20	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1			Shrub (SG)	No	
dian arme	*Dianthus armeria*	Deptford Pink	Caryophyllace	0.1	6	*		No	

acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mi	0.5	1		Shrub (SG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	10	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	1		Forb (FG)	No	
verb	*Verbascum spp.*		Scrophulariac	0.1	2	*		No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	10		Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	1		*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2			Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	100		Forb (FG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	2			Grass & grasslike (GG)	No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	2			Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
dich repe ingl	*Dichondra sp Inglewood*		Convolvulacea	0.1	500		Forb (FG)	No	
dian	*Dianella spp.*		Phormiaceae	0.1	1		Forb (FG)	No	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	0.1	1		Tree (TG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	25			Grass & grasslike (GG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	5			Shrub (SG)	No	
gamo	*Gamochaeta spp.*		Asteraceae	0.1	2	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	100		Forb (FG)	No	
euca stel	*Eucalyptus stellulata*	Black Sally	Myrtaceae	5			Tree (TG)	No	

BAM Site Field Survey

Project:	Winterbourne	**Plot Identifier**	WWF089	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF89
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	MP/GX/CC		**PCT:**	1194				
GPS Easting	375554	**GPS Northing**	6590111		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**Possible Nicolii/possible Malaoxlyon. Limited floristic material**

FUNCTION

Function attributes for WWF089

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**3**
	Forb (FG)	**16**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	30%	**31.0%**	
	15m	15%		
	25m	60%		
	35m	30%		
	45m	20%		

	Other (OG)	1
	TOTAL	31

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	6.5
	Forb (FG)	2.5
	Grass & grasslike (GG)	46.7
	Fern (EG)	1
	Other (OG)	0.1
	TOTAL Native	86.8
	TOTAL 'HTE'	0

Bare ground cover	5m	1%	2.6%	
	15m	1%		
	25m	0%		
	35m	1%		
	45m	10%		
Cryptogam cover	5m	0%	5.6%	
	15m	5%		
	25m	3%		
	35m	5%		
	45m	15%		
Rock Cover	5m	30%	20.0%	
	15m	15%		
	25m	15%		
	35m	20%		
	45m	20%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	5		
20-29	3		
10-19	1		
5-9	2		
<5	13		N/A
Length of logs (m)		62	

COMPOSITION & STRUCTURE

Species recorded for WWF089

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	
euca radi seju	*Eucalyptus radiata subsp*		Myrtaceae	15			Tree (TG)	No	
euca brid	*Eucalyptus bridgesiana*	Apple Box	Myrtaceae	15			Tree (TG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1			Forb (FG)	No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	10		*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5			Grass & grasslike (GG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1			Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1			Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	10		*		No	
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mi	0.5	1		Shrub (SG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	2		*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	50		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	1		*		No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	20		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	1			Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	50	*		No	

cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	100		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	100		Other (OG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	5			Shrub (SG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.5	2	*		No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiace	0.1	1		Forb (FG)	No	
dich repe ingl	*Dichondra repens subsp.*	Kidney Weed	Convolvulacea	0.1	200		Forb (FG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	2		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.5	100	*		No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.1	10		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10			Grass & grasslike (GG)	No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.2	50	*		No	
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	0.1	2		Forb (FG)	No	
brac spp	*Brachyscome spp.*		Asteraceae	0.1	15		Forb (FG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	30			Grass & grasslike (GG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.1	40		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	500		Forb (FG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	1			Fern (EG)	No	
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	0.2	5		Grass & grasslike (GG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.3	20		Grass & grasslike (GG)	No	
Loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	6		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	Winterbourne	**Plot Identifier**	WWF090	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF120
Survey date:	28/09/2020		**Compass Orientation (head of 20x20 plot)**				160	
Recorders	MP/GX		**PCT:**	510	WD			
GPS Easting	373231	**GPS Northing**	6583396		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF090**

BAM Attribute (20x20m plot)		
	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**
	Other (OG)	**1**
	TOTAL	**15**

BAM Attribute (20x20m plot)		
	Stratum	**Sum**

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**5.6%**	
	15m	0%		
	25m	3%		
	35m	10%		
	45m	10%		
Bare ground cover	5m	0%	**1.0%**	
	15m	0%		
	25m	0%		
	35m	3%		

Count of cover abundance (native vascular plants)	Tree (TG)	7
	Shrub (SG)	0
	Forb (FG)	5.5
	Grass & grasslike (GG)	47.1
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	59.7
	TOTAL 'HTE'	0

	45m	2%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	2		
50-79			
30-49			
20-29			
10-19			
5-9			
<5	1		N/A
Length of logs (m)		1	

COMPOSITION & STRUCTURE

Species recorded for WWF090

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	7			Tree (TG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	25			Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	5			Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	15		*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	15			Grass & grasslike (GG)	No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fal	15		*		No	
phyl virg	*Phyllanthus virgatus*	Wiry Spurge	Phyllanthacea	0.1	10		Forb (FG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	1			Grass & grasslike (GG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.5	20		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	6		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	100		Other (OG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	5			Grass & grasslike (GG)	No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	5		*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fal	4		*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fal	3		*		No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	12		Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.5	20		Grass & grasslike (GG)	No	
dauc gloc	*Daucus glochidiatus*	Native Carrot	Apiaceae	0.1	1		Forb (FG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllace	0.1	2		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fal	5		*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF091	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF521
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				213	
Recorders	DP GX		**PCT:**	567	DNG			
GPS Easting	372148	**GPS Northing**	6582951		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. obliqua*

FUNCTION

Function attributes for WWF091

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	10

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.8
	Grass & grasslike (GG)	61
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	62.8
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF091

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
erag trac	*Eragrostis trachycarpa*	A Lovegrass	Poaceae	1	20		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	1	50		Forb (FG)	No	
bulb bulb	*Bulbine bulbosa*	Bulbine Lily	Asphodelacea	0.1	1		Forb (FG)	No	
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	5	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	1	*		No	
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	30	100		Grass & grasslike (GG)	No	
dich stri	*Dichopogon strictus*	Chocolate Lily	Anthericaceae	0.1	20		Forb (FG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	20	100		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	20		Forb (FG)	No	
gamo	*Gamochaeta spp.*		Asteraceae	0.5	20	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	5	50	*		No	

ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	5	50		Grass & grasslike (GG)	No	
stac vimi	*Stackhousia viminea*	Slender Stackhousia	Stackhousiace	0.1	1		Forb (FG)	No	
them tria	*Themeda triandra*		Poaceae	5	20		Grass & grasslike (GG)	No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	5	30	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	30	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	40	100	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF093	**Pic 20x20**		**Pic 20x50**		was WWF613
Survey date:	8/03/2021		**Compass Orientation (head of 20x20 plot)**				230	
Recorders	DP EE		**PCT:**	567	DNG			
GPS Easting	369854	**GPS Northing**	6583339		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF093

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**0**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**37.0%**	
	15m	30%		
	25m	20%		
	35m	80%		
	45m	15%		

	Other (OG)	0
	TOTAL	2

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.1
	Grass & grasslike (GG)	0
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	1.1
	TOTAL 'HTE'	2

Bare ground cover	5m	5%	1.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	2%		
Cryptogam cover	5m	0%	3.0%	
	15m	0%		
	25m	5%		
	35m	5%		
	45m	5%		
Rock Cover	5m	5%	2.8%	
	15m	2%		
	25m	0%		
	35m	2%		
	45m	5%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		22	

COMPOSITION & STRUCTURE

Species recorded for WWF093

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	2	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	3		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	2	25	*		HTE	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	30		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	3	*		No	
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	2	5	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	5	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF094	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF56	
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX/CC		**PCT:**	567	Woodland				
GPS Easting	370091	**GPS Northing**	6582544		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for **WWF094**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%	**16.0%**	
	15m	20%		
	25m	30%		
	35m	15%		
	45m	5%		

	Other (OG)	0
	TOTAL	15

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	15
	Shrub (SG)	0
	Forb (FG)	4.2
	Grass & grasslike (GG)	60.8
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	80
	TOTAL 'HTE'	1

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		
50-79	4		1
30-49			
20-29	1		
10-19			
5-9			
<5			N/A
Length of logs (m)		1	

COMPOSITION & STRUCTURE

Species recorded for WWF094

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca radi seju	*Eucalyptus radiata subsp. sejuncta*		Myrtaceae	10			Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5			Tree (TG)	No	
rosa rubi	*Rosa rubiginosa*	Sweet Briar	Rosaceae	1		*		HTE	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10			Grass & grasslike (GG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.5	50		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	50		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	3	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	0.1	20	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2	50		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	7		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	5		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	6		Grass & grasslike (GG)	No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	0.5	10	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	3			Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	30	*		No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1	2		Forb (FG)	No	

phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccacea	0.1	1	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No	
sola	*Solanum spp.*		Solanaceae	0.1	2	*	Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	50			Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	1	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	2	*		No	
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	1	*		No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	0.5	20		Grass & grasslike (GG)	No	
pani deco	*Panicum decompositum*	Native Millet	Poaceae	0.1	1		Grass & grasslike (GG)	No	
malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF095	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF58	
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX/CC		**PCT:**	567	DNG				
GPS Easting	370073	**GPS Northing**	6582037		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF095

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**2**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**10**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**8.0%**	
	15m	10%		
	25m	15%		
	35m	5%		
	45m	5%		

	Other (OG)	0
	TOTAL	16

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0.7
	Forb (FG)	0.5
	Grass & grasslike (GG)	62.6
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	63.8
	TOTAL 'HTE'	5

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.2%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	1%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF095

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5		*		HTE	
erag lept	*Eragrostis leptostachya*	Drooping Lovegrass	Poaceae	1			Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.1	10		Grass & grasslike (GG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	5		Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	10	50		Grass & grasslike (GG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.5	100		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	50		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10			Grass & grasslike (GG)	No	
junc	*Juncus spp.*	A Rush	Juncaceae	0.3	10		Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
trif dubi	*Trifolium dubium*	Yellow Suckling Clover	Fabaceae (Fab	10		*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	5		*		No	
aust bige	*Austrostipa bigeniculata*	Yanganbil	Poaceae	0.5	10		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.2	20		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	50	*		No	

cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.2	30		Forb (FG)	No	
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.1	10	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5		*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20			Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	10		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.5	1		Shrub (SG)	No	
acac ulic	*Acacia ulicifolia*	Prickly Moses	Fabaceae (Mi	0.2	1		Shrub (SG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	20			Grass & grasslike (GG)	No	
gera moll moll	*Geranium molle subsp. n*	Cranesbill Geranium	Geraniaceae	0.1	50	*		No	
eleu	*Eleusine spp.*		Poaceae	0.1	6	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF097	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF44	
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	MP/GX/CC		**PCT:**	567	Woodland				
GPS Easting	369224	**GPS Northing**	6579636		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF097

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**1**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	10%	**31.0%**	
	15m	15%		
	25m	45%		
	35m	75%		
	45m	10%		

	Other (OG)	0
	TOTAL	16

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	19.1
	Shrub (SG)	0.1
	Forb (FG)	1.3
	Grass & grasslike (GG)	7.3
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	27.8
	TOTAL 'HTE'	1

Bare ground cover	5m	45%	13.4%	
	15m	5%		
	25m	15%		
	35m	2%		
	45m	0%		
Cryptogam cover	5m	0%	2.0%	
	15m	10%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	1%	0.4%	
	15m	0%		
	25m	1%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		
50-79	1		1
30-49			
20-29	3		
10-19	1		
5-9			
<5			N/A
Length of logs (m)		14	

COMPOSITION & STRUCTURE

Species recorded for WWF097

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	12			Tree (TG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	7			Tree (TG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	20		*		No	
fest	*Festuca spp.*		Poaceae	7		*	Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5			Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	10		*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	3		*		No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1			Grass & grasslike (GG)	No	
ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.2				No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1			Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1			Forb (FG)	No	
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.1			Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.2			Grass & grasslike (GG)	No	
calo cune cune	*Calotis cuneifolia subsp.*	Purple Burr-Daisy	Asteraceae	0.1				No	
cotu aust	*Cotula australis*	Common Cotula	Asteraceae	0.1			Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1			Forb (FG)	No	

acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1		*		HTE	
medi arab	*Medicago arabica*	Spotted Burr Medic	Fabaceae (Fab	0.1		*		No	
dich repe ingl	*Dichondra repens subsp.*	Kidney Weed	Convolvulacea	0.1				No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1			Forb (FG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	0.5		*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1		*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1			Forb (FG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	0.1			Tree (TG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1		*		No	
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1		*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1		*		No	
cera vulg	*Cerastium vulgare*	Mouse-ear Chickweed	Caryophyllace	0.1		*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1			Shrub (SG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1			Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF098	**Pic 20x20**		**Pic 20x50**		WWF524
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				180	
Recorders	DP GX		**PCT:**	567	Woodland			
GPS Easting	368451	**GPS Northing**	6578298		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF098

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**1**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	70%	**49.0%**	
	15m	25%		
	25m	40%		
	35m	70%		
	45m	40%		

	Other (OG)	0
	TOTAL	15
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	1
	Forb (FG)	7
	Grass & grasslike (GG)	35.6
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	73.6
	TOTAL 'HTE'	5

Bare ground cover	5m	10%	25.0%	
	15m	75%		
	25m	30%		
	35m	0%		
	45m	10%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	5%	10.0%	
	15m	5%		
	25m	30%		
	35m	10%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	1
50-79	3	0	0
30-49	7	0	4
20-29	3	0	0
10-19	1	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		30	

COMPOSITION & STRUCTURE

Species recorded for WWF098

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	30	10		Tree (TG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	5	100		Forb (FG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	5	20		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	30		Grass & grasslike (GG)	No	
eina hast	*Einadia hastata*	Berry Saltbush	Chenopodiace	1	10		Forb (FG)	No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	5	20	*		HTE	
vitt muel	*Vittadinia muelleri*	A Fuzzweed	Asteraceae	0.1	2		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	5		Shrub (SG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	10	50		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	1	10	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.5	25		Forb (FG)	No	

medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	1	10	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	10		Forb (FG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.5	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.2	10		Forb (FG)	No	
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	0.5	10		Grass & grasslike (GG)	No	
anth scab	*Anthosachne scabra*	Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae				Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF099	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF1000
Survey date:	9/03/2021		**Compass Orientation (head of 20x20 plot)**				15	
Recorders	DP EE		**PCT:**	510	Woodland			
GPS Easting	368063	**GPS Northing**	6577638		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF099**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**10**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**4.0%**	
	15m	10%		
	25m	0%		
	35m	5%		
	45m	5%		
Bare ground	5m	0%		
	15m	5%		

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	40
	Shrub (SG)	0
	Forb (FG)	5.4
	Grass & grasslike (GG)	81
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	126.4
	TOTAL 'HTE'	0

Bare ground cover	25m	0%	1.0%	
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		
50-79	1		
30-49			1
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		9	

COMPOSITION & STRUCTURE

Species recorded for WWF099

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	20	2		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	20	1		Tree (TG)	No	
eina trig	*Einadia trigonos*	Fishweed	Chenopodiac	0.1	5		Forb (FG)	No	
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	2		Forb (FG)	No	
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.5	5	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	10	30	*		No	
cony suma	*Conyza sumatrensis*	Tall fleabane	Asteraceae	0.1	1	*		No	
malv parv	*Malva parviflora*	Small-flowered Mallow	Malvaceae	0.1	3	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	15	*		No	
dysp	*Dysphania spp.*		Chenopodiac	5	30		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	100		Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	50	100		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	1	1		Grass & grasslike (GG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.1	1	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	2		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF100	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF55	
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	997	Woodland				
GPS Easting	367505	**GPS Northing**	6577559		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	gravelly clay		**Slope**	10		
LandF Element	Crest		**Soil Colour**	grey		**Aspect**	s		
LandF Pattern	steeply undulating		**Soil Depth**	shallow		**Drainage**	good		
Microrelief			**Geology**			**Watercourses**	500m dam		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	1	0	Logging
Cultivation			
Soil erosion	2	R	Soil accumulation
Firewood	1	0	Some cut wood
Grazing	2	R	Sheep dung
Fire Damage			
Storm Damage	1	0	Trees down
Weediness			
Other	2	R	Drought > tree canopies

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF100

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**4**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**23.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	21

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	22.8
	Shrub (SG)	1
	Forb (FG)	1.6
	Grass & grasslike (GG)	55.4
	Fern (EG)	1
	Other (OG)	0.2
	TOTAL Native	82
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	27.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	3.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	1.2%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	3		2
30-49	5		
20-29	1		
10-19	2		
5-9	0		
<5	5		N/A
Length of logs (m)		71	

COMPOSITION & STRUCTURE

Species recorded for	WWF100								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	21	11		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	1	1		Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	0.6	4		Shrub (SG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	0.8	1		Tree (TG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	1	30		Fern (EG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	55	500		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.3	20		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	10		Forb (FG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.5	100		Forb (FG)	No	
sola semi	*Solanum semiarmatum*		Solanaceae	0.2	30		Shrub (SG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	3	*		No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	1	*		No	

paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.5	100	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.4	50		Forb (FG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	20		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1	1		Shrub (SG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	10		Forb (FG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.1	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	2		Forb (FG)	No	
amye pend	*Amyema pendula*		Loranthaceae	0.2	1		Other (OG)	No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	1		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	20		Forb (FG)	No	
indi aust	*Indigofera australis*	Australian Indigo	Fabaceae (Fab	0.1	1		Shrub (SG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF101	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF617
Survey date:	9/03/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DP EE		**PCT:**	997	DNG			
GPS Easting	367659	**GPS Northing**	6577437		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. caliginosa patches nearby

FUNCTION

Function attributes for WWF101

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**3**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	30%	**27.0%**	
	15m	40%		
	25m	30%		
	35m	15%		
	45m	20%		

	Other (OG)	0
	TOTAL	9

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	7.8
	Grass & grasslike (GG)	35
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	42.8
	TOTAL 'HTE'	5

Bare ground cover	5m	0%	3.0%	
	15m	0%		
	25m	5%		
	35m	10%		
	45m	0%		
Cryptogam cover	5m	0%	0.4%	
	15m	0%		
	25m	2%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		7	

COMPOSITION & STRUCTURE

Species recorded for	WWF101								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	30	50	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	2	15	*		No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10	20		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	15	30		Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	50	*		HTE	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	2	30		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	10		Forb (FG)	No	
stac vimi	*Stackhousia viminea*	Slender Stackhousia	Stackhousiace	5	50		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	10		Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	10	50		Grass & grasslike (GG)	No	

cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	5	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	20	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	2		Forb (FG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF102	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF616
Survey date:	9/03/2021		**Compass Orientation (head of 20x20 plot)**				17	
Recorders	DP EE		**PCT:**	997	DNG			
GPS Easting	367578	**GPS Northing**	6577151		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. caliginosa, A. filicifolia nearby

FUNCTION

Function attributes for WWF102

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**1**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	5%	**2.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	5%		

	Other (OG)	0
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	1
	Forb (FG)	2.6
	Grass & grasslike (GG)	120.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	123.7
	TOTAL 'HTE'	7

Bare ground cover	5m	5%	4.0%	
	15m	5%		
	25m	5%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		21	

COMPOSITION & STRUCTURE

Species recorded for WWF102

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	70	100		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	100		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	20		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	30	100		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	20	*		No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	2	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	5	25	*		HTE	
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	5		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	10		Forb (FG)	No	
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthacea	0.1	5		Forb (FG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	1		Grass & grasslike (GG)	No	

brom dian	*Bromus diandrus*	Great Brome	Poaceae	2	10	*		HTE	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	2		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	1	1		Shrub (SG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF103	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF59	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	565	DNG				
GPS Easting	367168	**GPS Northing**	6579686		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	clay		**Slope**			
LandF Element	crest		**Soil Colour**	grey		**Aspect**			
LandF Pattern	GU		**Soil Depth**	good		**Drainage**	shallow		
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	0	No trees
Cultivation			
Soil erosion			
Firewood	3	NR	No CWD
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF103

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**1**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**26.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	15

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	39
	Shrub (SG)	0.1
	Forb (FG)	2.9
	Grass & grasslike (GG)	65
	Fern (EG)	2
	Other (OG)	0
	TOTAL Native	109
	TOTAL 'HTE'	1.2

Bare ground cover	5m	0%	1.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	1.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79			
30-49			
20-29			
10-19	1		
5-9			
<5	12		N/A
Length of logs (m)		3	

COMPOSITION & STRUCTURE

Species recorded for WWF103

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	35	10		Tree (TG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	4	3		Tree (TG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	2	40		Fern (EG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	1000		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	100		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	20	200	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	1	100	*		HTE	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.5	20	*		No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	0.1	1		Shrub (SG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	1	200		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	5	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	

aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	5	40		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	10		Forb (FG)	No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.2	5	*		No	
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulace	0.1	10		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.2	50		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
rosa rubi	*Rosa rubiginosa*	Sweet Briar	Rosaceae	0.2	2	*		HTE	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.2	40		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.2	30	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	50		Forb (FG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.2	10	*		No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF104	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF200930-1
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	565				
GPS Easting	367110	**GPS Northing**	6580549		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	rocky clay		**Slope**	5	
LandF Element	crest		**Soil Colour**	grey		**Aspect**	e	
LandF Pattern	gently undulating		**Soil Depth**	shallow		**Drainage**	good	
Microrelief			**Geology**			**Watercourses**	200m dam	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	1	NR	Logging big trees
Cultivation			
Soil erosion			
Firewood	3	NR	no CWD
Grazing	1	R	Cattle dog
Fire Damage			
Storm Damage	2	R	Big trees down
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for WWF104

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**3**
	Forb (FG)	**11**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**30.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	24
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	24.5
	Shrub (SG)	0.3
	Forb (FG)	6.2
	Grass & grasslike (GG)	87.2
	Fern (EG)	5
	Other (OG)	0.4
	TOTAL Native	123.6
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	6.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		1
30-49	1		1
20-29			
10-19			
5-9			
<5	18		N/A
Length of logs (m)		5	

COMPOSITION & STRUCTURE

Species recorded for	WWF104								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	14	17		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	10	1		Tree (TG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	5	50		Fern (EG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60			Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	4	300		Forb (FG)	No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	0.5	1		Tree (TG)	No	
hibb obtu	*Hibbertia obtusifolia*	Hoary Guinea Flower	Dilleniaceae	0.1	2		Shrub (SG)	No	
bulb bulb	*Bulbine bulbosa*	Bulbine Lily	Asphodelacea	0.1	10		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	25			Grass & grasslike (GG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	10	60	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	1	100		Forb (FG)	No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.2	20	*		No	

cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	20		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	1	20		Grass & grasslike (GG)	No	
loma	*Lomandra spp.*	Mat-rush	Lomandracea	0.2	10		Grass & grasslike (GG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	5		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	2	*		No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	5		Shrub (SG)	No	
amye pend	*Amyema pendula*		Loranthaceae	0.4	3		Other (OG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	10	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.4	70		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.1	1		Shrub (SG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.6	40	*		No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	1		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	20		Forb (FG)	No	
cyno aust	*Cynoglossum australe*		Boraginaceae	0.1	2		Forb (FG)	No	
sile gall	*Silene gallica*	French Catchfly	Caryophyllace	0.1	5	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF105	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF201002-0
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	565				
GPS Easting	366820	**GPS Northing**	6580776		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Clay		**Slope**	8	
LandF Element	Upper slope		**Soil Colour**	Brown		**Aspect**	E	
LandF Pattern	gently undulating		**Soil Depth**	Shallow		**Drainage**	Good	
Microrelief			**Geology**			**Watercourses**	500m dam	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion	2	R	Sheet
Firewood			
Grazing	3	R	Sheep
Fire Damage			
Storm Damage	3	R	Many big trees down
Weediness			
Other	2	R	Drought

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for WWF105

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**3**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**32.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	17
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	43
	Shrub (SG)	1.2
	Forb (FG)	7.9
	Grass & grasslike (GG)	95
	Fern (EG)	2
	Other (OG)	0
	TOTAL Native	149.1
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	4.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	4		4
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		96	

COMPOSITION & STRUCTURE

Species recorded for WWF105

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca brid	*Eucalyptus bridgesiana*	Apple Box	Myrtaceae	18	1		Tree (TG)	No	
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	25	2		Tree (TG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	7	100		Forb (FG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	1	4		Shrub (SG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	2	50		Fern (EG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	35	500		Grass & grasslike (GG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.4	100	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	10	*		No	
sola brow	*Solanum brownii*	Violet Nightshade	Solanaceae	0.1	1		Shrub (SG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No	
cent	*Centaurea spp.*	Thistle	Asteraceae	0.1	5	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.2	100		Forb (FG)	No	

tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	10		Forb (FG)	No	
sola semi	*Solanum semiarmatum*		Solanaceae	0.1	20		Shrub (SG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.4	50	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	1	*		No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.1	1		Forb (FG)	No	
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulace	0.1	2		Forb (FG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	60	1000		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	10		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	2		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF106	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF605
Survey date:	10/03/2021		**Compass Orientation (head of 20x20 plot)**				4	
Recorders	DP EE		**PCT:**	565	DNG			
GPS Easting	366381	**GPS Northing**	6581439		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**euca leav**

FUNCTION

Function attributes for WWF106

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	5%	**5.0%**	
	15m	5%		
	25m	10%		
	35m	5%		
	45m	0%		

	Other (OG)	0
	TOTAL	14

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.7
	Grass & grasslike (GG)	78
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	78.7
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	3.0%	
	15m	5%		
	25m	0%		
	35m	10%		
	45m	0%		
Rock Cover	5m	0%	5.0%	
	15m	10%		
	25m	0%		
	35m	15%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		9	

COMPOSITION & STRUCTURE

Species recorded for WWF106

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
ryti pilo	*Rytidosperma pilosum*	Smooth-flowered Wallaby Gras	Poaceae	20	100		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	20	50		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	2	20		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	100		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	5	25		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
wahl plan	*Wahlenbergia planiflora*	Bluebell	Campanulace	0.1	10		Forb (FG)	No	
erag trac	*Eragrostis trachycarpa*	A Lovegrass	Poaceae	1	20		Grass & grasslike (GG)	No	
verb thap thap	*Verbascum thapsus subs*	Great Mullein	Scrophulariac	0.1	1	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	10		Forb (FG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	5	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	10	50		Grass & grasslike (GG)	No	

Gali mura	*Galium murale*	Small Bedstraw	Rubiaceae	0.1	5	*		No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	1	*		No	
dysp	*Dysphania spp.*		Chenopodiace	0.1	1		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	2		Forb (FG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF107	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF60	
Survey date:	2/10/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	565	Woodland				
GPS Easting	366088	**GPS Northing**	6582520		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Clay		**Slope**	1	
LandF Element	Crest		**Soil Colour**	Grey brown		**Aspect**	S	
LandF Pattern	Gently undulating		**Soil Depth**	Shallow		**Drainage**	Mod	
Microrelief			**Geology**			**Watercourses**	500m dam	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	No trees
Cultivation			
Soil erosion	2	R	Sheet erosion
Firewood	1	NR	Little CWD
Grazing	3	R	Sheep dung
Fire Damage			
Storm Damage	2	r	Trees down
Weediness	2	R	Nodding thistle
Other	2	R	Drought - tree canopies

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for WWF107

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**46.4%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	8
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	15
	Shrub (SG)	0
	Forb (FG)	8.5
	Grass & grasslike (GG)	80
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	103.5
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	22.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	1.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		
30-49	2		
20-29			
10-19	1		
5-9			
<5			N/A
Length of logs (m)		8	

COMPOSITION & STRUCTURE

Species recorded for WWF107

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	15	5		Tree (TG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	8	100		Forb (FG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.1	1	*		No	
malv negl	*Malva neglecta*	Dwarf Mallow	Malvaceae	0.8	50	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	2	70	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	30		Forb (FG)	No	
cyna card	*Cynara cardunculus*	Cardoon	Asteraceae	0.2	8	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	100		Grass & grasslike (GG)	No	
hord lepo	*Hordeum leporinum*	Barley Grass	Poaceae	0.1	2	*		No	
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1	10	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2	5		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.1	6	*		No	

sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	10		Forb (FG)	No	
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	1	*		No	
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.2	10	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.3	20	*		No	
loli	*Lolium spp.*	A Ryegrass	Poaceae	0.3	10	*		No	
sang mino muri	*Sanguisorba minor subsp*	Sheep's Burnet	Rosaceae	0.1	5	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	75	1000		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	3	*		No	
erod mosc	*Erodium moschatum*	Musky Crowfoot	Geraniaceae	0.2	5	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	1	50	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	20	*		No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF108	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF46	
Survey date:	1/01/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	510	Woodland				
GPS Easting	370108	**GPS Northing**	6583825		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	clay		**Slope**			
LandF Element	lower slope		**Soil Colour**	brown		**Aspect**	NE		
LandF Pattern	gently undulating		**Soil Depth**	mod		**Drainage**	Mod		
Microrelief			**Geology**			**Watercourses**	Dam 200m		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	0	Knocked-over trees and stumps, very old
Cultivation			
Soil erosion			
Firewood			
Grazing	1	R	Sheep dung
Fire Damage			
Storm Damage	1	R	Branches down
Weediness			
Other	3	R	Drought

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF108

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**2**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**42.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	19
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	27
	Shrub (SG)	0.8
	Forb (FG)	12.2
	Grass & grasslike (GG)	100.1
	Fern (EG)	0
	Other (OG)	0.3
	TOTAL Native	140.4
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	0.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		3
30-49			
20-29			
10-19			
5-9			
<5	43		N/A
Length of logs (m)		28	

COMPOSITION & STRUCTURE

Species recorded for WWF108

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	15	30		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	12	2		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	1000		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	25	500		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	5	200		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	5	200		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	5		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	10			Grass & grasslike (GG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.5	30	*		No	
dauc gloc	*Daucus glochidiatus*	Native Carrot	Apiaceae	1	100		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.2	10	*		No	

acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	
junc usit	*Juncus usitatus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	10		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	10		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	5	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.1	5	*		No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	5	100		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.7	5		Shrub (SG)	No	
pime curv	*Pimelea curviflora*	Rice Flower	Thymelaeacea	0.1	1		Shrub (SG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.3	100		Forb (FG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.5	100		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
amye pend	*Amyema pendula*		Loranthaceae	0.3	2		Other (OG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF109	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF57	
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC,CC		**PCT:**	567	Woodland				
GPS Easting	369498	**GPS Northing**	6584094		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	gravelly clay		**Slope**			
LandF Element	Upper slope		**Soil Colour**	brown		**Aspect**			
LandF Pattern	gently undulating		**Soil Depth**	shallow		**Drainage**	shallow		
Microrelief			**Geology**			**Watercourses**	500m dam		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	1	NR	Some logging
Cultivation			
Soil erosion	1	R	sediment accumulation
Firewood			
Grazing	1	R	Sheep during
Fire Damage			
Storm Damage			
Weediness			
Other	2	R	Drought affecting trees

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF109

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**1**
	Forb (FG)	**15**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**31.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	1
	TOTAL	24
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	52
	Shrub (SG)	1
	Forb (FG)	3.8
	Grass & grasslike (GG)	65.8
	Fern (EG)	0.3
	Other (OG)	0.1
	TOTAL Native	123
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	8.6%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	1.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79	3		1
30-49	12		
20-29	14		
10-19	17		
5-9	3		
<5	2		N/A
Length of logs (m)		47	

COMPOSITION & STRUCTURE

Species recorded for	WWF109								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	50	26		Tree (TG)	No	
olea visc	*Olearia viscidula*	Wallaby Weed	Asteraceae	1	6		Shrub (SG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	100		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	60	1000		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	100		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.2	40		Forb (FG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	5		Other (OG)	No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.7	200		Forb (FG)	No	
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiac	0.3	7		Fern (EG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	20		Grass & grasslike (GG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No	

sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	10	*		No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.5	60		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	10		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	10	*		No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	5		Forb (FG)	No	
eina nuta	*Einadia nutans*	Climbing Saltbush	Chenopodiace	0.4	100		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.6	200	*		No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	30		Forb (FG)	No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	0.3	10		Grass & grasslike (GG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.1	1	*		No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	0.1	3		Forb (FG)	No	
cyno aust	*Cynoglossum australe*		Boraginaceae	0.1	5		Forb (FG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	1		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	3	100	*		No	
acac deal	*Acacia dealbata*	Silver Wattle	Fabaceae (Mi	2	1		Tree (TG)	No	
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF110	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF201001-0
Survey date:	1/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	510				
GPS Easting	370150	**GPS Northing**	6584877		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	clay		**Slope**		
LandF Element	lower slope		**Soil Colour**	grey brown		**Aspect**		
LandF Pattern	valley floor		**Soil Depth**	poor		**Drainage**	Mud	
Microrelief			**Geology**			**Watercourses**	300m creek	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	2	R	Piled up trees, stumps
Cultivation			
Soil erosion			
Firewood	1	R	Log piles
Grazing	1	R	Sheep dung
Fire Damage			
Storm Damage	1	R	Some broken trees, limbs down
Weediness			
Other	3	R	Drought affecting trees

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF110

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**4**
	Shrub (SG)	**1**
	Forb (FG)	**11**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**32.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	24
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	47
	Shrub (SG)	0.4
	Forb (FG)	1.6
	Grass & grasslike (GG)	87.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	136.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	0.6%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	2.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79	2		1
30-49			
20-29			
10-19	1		
5-9	1		
<5	1		N/A
Length of logs (m)		40	

COMPOSITION & STRUCTURE

Species recorded for WWF110

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	13	6		Tree (TG)	No	
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	12	9		Tree (TG)	No	
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	18	2		Tree (TG)	No	
allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	4	2		Tree (TG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.4	4		Shrub (SG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	100		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	35	500		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.6	30		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	10	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	20		Forb (FG)	No	
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	2		Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	50		Forb (FG)	No	

medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.1	10	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	20	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	20		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	1	50		Grass & grasslike (GG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	10	*		No	
echi caes	*Echinopogon caespitosus*	Bushy Hedgehog-grass	Poaceae	0.5	30		Grass & grasslike (GG)	No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	20		Forb (FG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	
cype	*Cyperus spp.*		Cyperaceae	0.1	5		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	50		Forb (FG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	0.1	20	*		No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	5		Forb (FG)	No	
scle bifl	*Scleranthus biflorus*	Two-flowered Knawel	Caryophyllace	0.1	1		Forb (FG)	No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.4	20		Grass & grasslike (GG)	No	
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.1	1	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	3	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.2	50	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF111	**Pic 20x20**	QField SD	**Pic 20x50**		Previous Plot ID: WWF2013 (13)
Survey date:	1/04/2021		**Compass Orientation (head of 20x20 plot)**				342	N
Recorders	GY SD		**PCT:**	510	DNG			
GPS Easting	370245	**GPS Northing**	6585696		**Datum**	GDA 94	**Zone**	56

Landform		**Soils**		**Drainage & Slope**		
Morphology		**Soil Texture**	loam	**Slope**	2 degrees	
LandF Element	broad flat valley side rise	**Soil Colour**	dark brown	**Aspect**	242	SW
LandF Pattern		**Soil Depth**	mod	**Drainage**	moderate	
Microrelief		**Geology**		**Watercourses**	broad stream bog to SW	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	O	
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	2	R	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	2	O	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

cattle grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

no trees in plot

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. dalrympleana , E. bridgesiana* in drainage depression

FUNCTION

Function attributes for WWF111

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	4
	Grass & grasslike (GG)	7
	Fern (EG)	0
	Other (OG)	0
	TOTAL	11

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.6

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	19%	11.0%	
	15m	11%		
	25m	7%		
	35m	6%		
	45m	12%		
Bare ground cover	5m	6%	6.8%	
	15m	8%		
	25m	9%		
	35m	7%		
	45m	4%		
gam er	5m	0%		
	15m	0%		

Count of cover abundance (native vascular plants)		
	Grass & grasslike (GG)	55.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	56.1
	TOTAL 'HTE'	0.2

no trees no logs

Cryptogam cover	25m	0%	0.0%	
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF111

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	4000		Grass & grasslike (GG)	No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.3	1500	*		No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fal	5	3000	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.2	1500		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	10	500	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	500		Forb (FG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.2	300	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	600	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	3	1000		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	2	1000		Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.2	3000	*		No	
junc aust	*Juncus australis*	Rush	Juncaceae	0.2	50		Grass & grasslike (GG)	No	
junc brev	*Juncus brevibracteus*		Juncaceae	0.1	2		Grass & grasslike (GG)	No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	0.1	5	*		No	
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.1	2	*		No	
fest arun	*Festuca arundinaceae*	Tall Fescue	Poaceae	0.2	20	*		No	
gamo purp	*Gamochaeta purpurea*	Purple Cudweed	Asteraceae	0.1	40	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.5	500	*		No	
erag pilo	*Eragrostis pilosa*	Soft Lovegrass	Poaceae	0.1	1	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	15	*		HTE	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	200	*		No	
aspe conf	*Asperula conferta*		Rubiaceae	0.1	1		Forb (FG)	No	
junc fili	*Juncus filicaulis*		Juncaceae	0.1	10		Grass & grasslike (GG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.1	2	*		No	
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	3		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	4	*		HTE	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No	
gali lept	*Galium leptogonium*		Rubiaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF112	**Pic 20x20**	QField SD	**Pic 20x50**			Previous Plot ID: WWF2012 (12)
Survey date:	1/04/2021		**Compass Orientation (head of 20x20 plot)**				315	NW	
Recorders	GY SD		**PCT:**	534	DNG				
GPS Easting	370302	**GPS Northing**	6585984		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology	side slope		**Soil Texture**	loam		**Slope**	5 degrees	
LandF Element			**Soil Colour**	brown		**Aspect**	250	W
LandF Pattern	open valley		**Soil Depth**	med		**Drainage**	well drained	
Microrelief			**Geology**			**Watercourses**	50m west	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	O	
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	1	R	cattle
Fire Damage	0		
Storm Damage	0		
Weediness	2		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
cattle grazing
Age class of trees (DBH range) , Condition of Vegetation, Hollows
no trees inside plot
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	*E. bridgesiana, E. viminalis* in drainage depression

FUNCTION

Function attributes for WWF112

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**11**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	16%	**14.0%**	q field SDo
	15m	11%		
	25m	19%		
	35m	17%		
	45m	7%		

	Other (OG)	2
	TOTAL	18
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.4
	Grass & grasslike (GG)	76
	Fern (EG)	0
	Other (OG)	0.2
	TOTAL Native	77.6
	TOTAL 'HTE'	0.2

Bare ground cover	5m	5%	3.6%	
	15m	6%		
	25m	3%		
	35m	4%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

no trees inside plot

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF112

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	58	4000		Grass & grasslike (GG)	No	
trif subt	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Fab	5	1000	*		No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	1	3000		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	15	2000		Grass & grasslike (GG)	No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	100		Grass & grasslike (GG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	500		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	75	*		No	
scho	*Schoenoplectus spp.*		Cyperaceae	0.1	5		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	2	1500		Grass & grasslike (GG)	No	
cony parv	*Conyza parva*	Fleabane	Asteraceae	0.1	1	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	2	*		HTE	

fest	*Festuca spp.*		Poaceae	0.2	30	*	Grass & grasslike (GG)	No	
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.1	1	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	5	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	1	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	30	*		HTE	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	2		Forb (FG)	No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No	
junc fili	*Juncus filicaulis*		Juncaceae	0.1	5		Grass & grasslike (GG)	No	
poa sieb sieb	*Poa sieberiana var. siebe*	Snowgrass	Poaceae	0.1	3		Grass & grasslike (GG)	No	
junc aust	*Juncus australis*	Rush	Juncaceae	0.1	4		Grass & grasslike (GG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	1		Other (OG)	No	
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fab	0.1	1		Other (OG)	No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	300	*		No	

BAM Site Field Survey

Project:	20-250 WWF	**Plot Identifier**	WWF113	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF523	
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				176		
Recorders	DP GX		**PCT:**	567					
GPS Easting	370340	**GPS Northing**	6586076		**Datum**	UTM	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	E. bridgesiana along creek, E. caliginosa/obliqua to the west, E. melliodora/blakelyi on flats

FUNCTION

Function attributes for **WWF113**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**2**
	Grass & grasslike (GG)	**1**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%	**11.0%**	
	15m	15%		
	25m	20%		
	35m	5%		
	45m	5%		

	Other (OG)	0
	TOTAL	5

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	11
	Grass & grasslike (GG)	0.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	11.1
	TOTAL 'HTE'	0

Bare ground cover	5m	10%	3.4%	
	15m	5%		
	25m	0%		
	35m	2%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF113

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	0	2		Tree (TG)	No	
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	0	1		Tree (TG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	10	100		Forb (FG)	No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	40	100	*		No	
gamo	*Gamochaeta spp.*		Asteraceae	1	30	*		No	
modi caro	*Modiola caroliniana*	Red-flowered Mallow	Malvaceae	0.5	20	*		No	
euch	*Euchiton spp.*	A Cudweed	Asteraceae	1	30		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	1	20	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	10	*		No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.5	3	*		No	
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	1	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	2	*		No	

hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	20	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	30	100	*		No	
lepi bona	*Lepidium bonariense*	Argentine Peppercress	Brassicaceae	0.1	5	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	5	30	*		No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF114	**Pic 20x20**		**Pic 50x50**		Previous Plot ID: WWF200930-0
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	534				
GPS Easting	370475	**GPS Northing**	6586309		**Datum**		**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	clay		**Slope**		
LandF Element			**Soil Colour**	grey		**Aspect**		
LandF Pattern	gently undulating		**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF114

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**21.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	10
	Shrub (SG)	0
	Forb (FG)	1.5
	Grass & grasslike (GG)	36.6
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	48.1
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	3.4%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF114

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	10	2		Tree (TG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	50	1000	*		No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	4	50		Grass & grasslike (GG)	No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.2	10	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	500		Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.5	20	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.4	40	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	20	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	20		Forb (FG)	No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.4	100		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.3	100		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	1	100	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.5	20		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	2	20		Grass & grasslike (GG)	No	

oxal pere	*Oxalis perennans*		Oxalidaceae	0.5	50		Forb (FG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	1	20	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No	
stel medi	*Stellaria media*	Common Chickweed	Caryophyllace	0.1	20	*		No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.5	100	*		No	
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1	20	*		No	
malv negl	*Malva neglecta*	Dwarf Mallow	Malvaceae	0.1	2	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	10		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF115	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF9	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	534	DNG				
GPS Easting	370362	**GPS Northing**	6586421		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Clay		**Slope**	1	
LandF Element	Lower slope		**Soil Colour**	Grey brown		**Aspect**	NW	
LandF Pattern	Gently undulating		**Soil Depth**	mod		**Drainage**	Mod	
Microrelief			**Geology**			**Watercourses**	300m dam	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	No trees
Cultivation			
Soil erosion			
Firewood	3	NR	No CWD
Grazing	1	R	Cattle dung
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF115

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**23.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	12

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.9
	Grass & grasslike (GG)	61.3
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	62.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	3.8%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	15.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF115								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10	100		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.2	5		Grass & grasslike (GG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	2	100	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	20	200		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	300		Grass & grasslike (GG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.2	30		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	50	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	1	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	5	*		No	
ammo alat	*Ammobium alatum*		Asteraceae	0.1	1		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	5		Forb (FG)	No	

aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	10	70		Grass & grasslike (GG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	35	500	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.4	100		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	50		Grass & grasslike (GG)	No	
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	5	*		No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	4		Forb (FG)	No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	20	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF116	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF5	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DBC, CC		**PCT:**	534	DNG				
GPS Easting	370400	**GPS Northing**	6586680		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	heavy clay		**Slope**	0		
LandF Element	open depression		**Soil Colour**	grey		**Aspect**	n		
LandF Pattern	gently undulating		**Soil Depth**	deep		**Drainage**	poor		
Microrelief	Gully		**Geology**			**Watercourses**	50m dam		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	0	No trees, stumps
Cultivation			
Soil erosion			
Firewood	2	NR	No CWD
Grazing	1	R	cattle dung
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF116

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**22.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	11

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	24
	Shrub (SG)	0
	Forb (FG)	6.4
	Grass & grasslike (GG)	24
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	54.4
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	3.1%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF116								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	24	1		Tree (TG)	No	
them tria	*Themeda triandra*		Poaceae	1	20		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	10	200		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	3	100		Grass & grasslike (GG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	2	100	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	4	100	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	4	500		Forb (FG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	50	500	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	30	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.2	20	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	100		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	10	200		Grass & grasslike (GG)	No	

trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	3	100	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.3	20	*		No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	5	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	0.1	2	*		No	
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	1		Forb (FG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.1	1	*		No	
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	20	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	2	*		No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	1	20	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	10	*		No	
poa annu	*Poa annua*	Winter Grass	Poaceae	0.1	3	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	40		Forb (FG)	No	
amar	*Amaranthus spp.*	Amaranth	Amaranthace	0.1	1		Forb (FG)	No	
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF117	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF1
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	DBC, CC		**PCT:**	534	Woodland			
GPS Easting	370434	**GPS Northing**	6587158		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	clay		**Slope**		
LandF Element	mid slope		**Soil Colour**	grey		**Aspect**		
LandF Pattern	gently undulating		**Soil Depth**	mod		**Drainage**	poor	
Microrelief			**Geology**			**Watercourses**	400m dam	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	2	0	sparse trees, dieback
Cultivation			
Soil erosion	1	NR	sheet erosion patches
Firewood	3	R	No CWD
Grazing	1	R	Cattle dung
Fire Damage			
Storm Damage			
Weediness			
Other	2	R	Drought

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF117

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**13**

BAM Attribute (20x20m plot)

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %		Photos
Litter Cover	5m	0%	**24.0%**		
	15m	0%			
	25m	0%			
	35m	0%			
	45m	0%			
Bare ground cover	5m	0%	**2.6%**		
	15m	0%			
	25m	0%			

Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	10
	Shrub (SG)	0
	Forb (FG)	0.8
	Grass & grasslike (GG)	68.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	78.9
	TOTAL 'HTE'	0.2

cover	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	2.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79			
30-49			
20-29			
10-19			
5-9			
<5	55		N/A
Length of logs (m)		4	

COMPOSITION & STRUCTURE

Species recorded for	WWF117								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status	BCA Status
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	10	38		Tree (TG)	No		
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fab	0.2	10	*		No		
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	100		Grass & grasslike (GG)	No		
them tria	*Themeda triandra*		Poaceae	0.1	5		Grass & grasslike (GG)	No		
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No		
dian arme	*Dianthus armeria*	Deptford Pink	Caryophyllace	0.1	20	*		No		
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	50	*		HTE		
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	4	100	*		No		
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.2	40	*		No		
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.2	100		Forb (FG)	No		
stel	*Stellaria spp.*	Prickly Starwort	Caryophyllace	0.1	10	*		No		
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	20	300		Grass & grasslike (GG)	No		
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	4	50		Grass & grasslike (GG)	No		
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	30	400		Grass & grasslike (GG)	No		
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.2	30		Forb (FG)	No		
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.2	20	*		No		
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	4	30	*		No		
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	12	100		Grass & grasslike (GG)	No		

sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No		
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	50	*		No		
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	2		Forb (FG)	No		
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	2	*		No		
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	10	*		No		
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	2	*		No		
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No		
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No		
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	2		Forb (FG)	No		

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF118	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF2	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DBC, CC		**PCT:**	534	Woodland				
GPS Easting	370490	**GPS Northing**	6587436		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology	Metasediment		**Soil Texture**	Clay		**Slope**			
LandF Element	Mid slope		**Soil Colour**	Grey		**Aspect**	5		
LandF Pattern	Gently undulating		**Soil Depth**	Mod		**Drainage**	Poor		
Microrelief			**Geology**			**Watercourses**	200m dam		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	1	0	Stumps, logs
Cultivation			
Soil erosion	1	R	Bare soil
Firewood	2	R	No logs or CWD
Grazing	2	R	Cattle dung
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for **WWF118**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**3**
	Shrub (SG)	**3**
	Forb (FG)	**11**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**21.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	24

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	15.2
	Shrub (SG)	0.5
	Forb (FG)	2
	Grass & grasslike (GG)	62.4
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	80.1
	TOTAL 'HTE'	0.6

Bare ground cover	5m	0%	66.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	3		2
20-29			
10-19			
5-9			
<5	12		N/A
Length of logs (m)		2	

COMPOSITION & STRUCTURE

Species recorded for WWF118

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	0.1	1		Tree (TG)	No	
euca pauc	*Eucalyptus pauciflora*	White Sally	Myrtaceae	0.1	1		Tree (TG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.3	8		Shrub (SG)	No	
loma	*Lomandra spp.*	Mat-rush	Lomandracea	0.3	100		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	20		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	40	500		Grass & grasslike (GG)	No	
pult micr	*Pultenaea microphylla*	A Bush Pea	Fabaceae (Fab	0.1	2		Shrub (SG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.5	100		Forb (FG)	No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.2	50		Forb (FG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	10		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.4	200	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.5	100		Forb (FG)	No	

lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.3	20	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	20		Forb (FG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	15	200	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.4	5	*		HTE	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	30		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	50		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	12	200		Grass & grasslike (GG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.3	100	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	2	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	1		Forb (FG)	No	
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	15	5		Tree (TG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	8	100		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	1	50	*		No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.1	20	*		No	
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mi	0.1	2		Shrub (SG)	No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	5	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.1	20	*		No	
rosa rubi	*Rosa rubiginosa*	Sweet Briar	Rosaceae	0.2	3	*		HTE	
acae	*Acaena spp.*	Sheep's Burr	Rosaceae	0.1	5		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.7	2	*		No	
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	5		Forb (FG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	1	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	10		Forb (FG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF119	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211207-06	
Survey date:	7/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	534					
GPS Easting	370492	**GPS Northing**	6589228		**Datum**		**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF119

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**20.0%**	
	15m	15%		
	25m	20%		
	35m	30%		
	45m	10%		

	Other (OG)	0
	TOTAL	16
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	48
	Shrub (SG)	0
	Forb (FG)	2
	Grass & grasslike (GG)	28
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	78
	TOTAL 'HTE'	0.1

Bare ground cover	5m	1%	1.2%	
	15m	0%		
	25m	0%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		
30-49	1		
20-29	2		
10-19			
5-9			
<5	6		N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF119

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	48	11		Tree (TG)	No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	6	200	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	20	500	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	20	200	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.5	100	*		No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	1	200	*		No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	10	300	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	4	200		Grass & grasslike (GG)	No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	8	500	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	100	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	300		Grass & grasslike (GG)	No	

oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.4	100	*		No	
chry apic	*Chrysocephalum apiculat*	Common Everlasting	Asteraceae	0.2	20		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No	
calo cune	*Calotis cuneata*	Mountain Burr-Daisy	Asteraceae	0.1	10		Forb (FG)	No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	20	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulaceae				Forb (FG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.5	20		Grass & grasslike (GG)	No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	1	*		No	
brom	*Bromus spp.*	A Brome	Poaceae	0.3	10	*	Grass & grasslike (GG)	No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	1	*		No	
lach aemu	*Lachnagrostis aemula*	Blowngrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	2	200		Grass & grasslike (GG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.4	20		Forb (FG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	1	50		Forb (FG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No	
dich crin	*Dichelachne crinita*	Longhair Plumegrass	Poaceae	1	100		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.2	30		Forb (FG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	0.1	5	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF120	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF37	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	766	DNG				
GPS Easting	369988	**GPS Northing**	6591121		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	clay		**Slope**			
LandF Element	mid slope		**Soil Colour**	brown		**Aspect**			
LandF Pattern	gently undulating		**Soil Depth**	mud		**Drainage**			
Microrelief	rocky		**Geology**			**Watercourses**	50m int creek		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	0	No trees, sparse logs, trees nearby
Cultivation			
Soil erosion			
Firewood			
Grazing	1	R	Cattle dung
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF120

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**8**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**31.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	14

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	2
	Grass & grasslike (GG)	57
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	59
	TOTAL 'HTE'	0

Bare ground cover	5m	0%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.2%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for		WWF120							
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	25	500		Grass & grasslike (GG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	10	500		Grass & grasslike (GG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	400		Grass & grasslike (GG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	4	500	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	5	100	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	30	1000	*		No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.2	100		Forb (FG)	No	
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	0.5	50		Grass & grasslike (GG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	3	70	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	100		Forb (FG)	No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.5	40		Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.4	100		Forb (FG)	No	

hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	0.5	20		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	10	*		No	
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	1	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	1	*		No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	1	50		Grass & grasslike (GG)	No	
dian arme	*Dianthus armeria*	Deptford Pink	Caryophyllace	0.1	3	*		No	
acae	*Acaena spp.*	Sheep's Burr	Rosaceae	0.1	2		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	10	*		No	
prat	*Pratia spp.*		Lobeliaceae	0.1	1		Forb (FG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.5	50	*		No	
moen erec	*Moenchia erecta*	Erect Chickweed	Caryophyllace	0.1	2	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF121	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF36	
Survey date:	30/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DC, CC		**PCT:**	766	Riparian				
GPS Easting	369972	**GPS Northing**	6591255		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	heavy clay		**Slope**			
LandF Element	open depression		**Soil Colour**	grey-brown		**Aspect**			
LandF Pattern			**Soil Depth**	deep		**Drainage**	poor		
Microrelief	Creek		**Geology**			**Watercourses**	0m creek		

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	0	some dead trees
Cultivation			
Soil erosion			
Firewood			
Grazing	2	R	cattle dung, grazed plant, pugging in creek
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF121

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**7.8%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	11
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.1
	Grass & grasslike (GG)	67
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	68.1
	TOTAL 'HTE'	0.2

Bare ground cover	5m	0%	36.4%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	7.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF121

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
care appr	*Carex appressa*	Tall Sedge	Cyperaceae	2	30		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	10	100		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	0.3	10	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	1	500	*		No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	2	100		Grass & grasslike (GG)	No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.7	50	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	100		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	30	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	1	100		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.3	20		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.8	100	*		No	
anth odor	*Anthoxanthum odoratur*	Sweet Vernal Grass	Poaceae	0.1	3	*		No	
Rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	3		*		No	

fest elat	*Festuca elatior*	Tall Fescue	Poaceae	0.1	3	*		No	
rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	3		*		No	
card hirs	*Cardamine hirsuta*	Common Bittercress	Brassicaceae	1	100	*		No	
pers pros	*Persicaria prostrata*	Creeping Knotweed	Polygonaceae	0.1	5		Forb (FG)	No	
poa annu	*Poa annua*	Winter Grass	Poaceae	0.1	20	*		No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.2	30	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.5	50		Forb (FG)	No	
ranu inun	*Ranunculus inundatus*	River Buttercup	Ranunculacea	0.1	40		Forb (FG)	No	
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	1	*		No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	50	1000		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	5	*		HTE	
penn alop	*Pennisetum alopecuroid*	Swamp Foxtail	Poaceae	0.1	5			No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.3	10	*		No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.3	50	*		No	
loli	*Lolium spp.*	A Ryegrass	Poaceae	0.2	10	*		No	
lyth	*Lythrum spp.*		Lythraceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF122	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211207-02
Survey date:	7/12/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	DC, CC		**PCT:**	567				
GPS Easting	366984	**GPS Northing**	6592117		**Datum**		**Zone**	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF122

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**3**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**11**
	Fern (EG)	**1**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	25%	**32.0%**	
	15m	40%		
	25m	35%		
	35m	20%		
	45m	40%		

	Other (OG)	1
	TOTAL	28

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	1
	Shrub (SG)	1
	Forb (FG)	3
	Grass & grasslike (GG)	45.1
	Fern (EG)	0.5
	Other (OG)	0.1
	TOTAL Native	50.7
	TOTAL 'HTE'	0.3

Bare ground cover	5m	1%	0.6%	
	15m	0%		
	25m	0%		
	35m	1%		
	45m	1%		
Cryptogam cover	5m	5%	1.4%	
	15m	0%		
	25m	0%		
	35m	2%		
	45m	0%		
Rock Cover	5m	15%	5.0%	
	15m	0%		
	25m	10%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			1
30-49			
20-29	2		2
10-19	17		
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF122

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca vimi	*Eucalyptus viminalis*	Ribbon Gum	Myrtaceae	0.4	2		Tree (TG)	No	
euca nova	*Eucalyptus nova-anglica*	New England Peppermint	Myrtaceae	0.6	1		Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	50		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.4	20	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.3	200	*		HTE	
pime stri	*Pimelea stricta*	Gaunt Rice-flower	Thymelaeacea	0.1	1		Shrub (SG)	No	
brom	*Bromus spp.*	A Brome	Poaceae	1	100	*	Grass & grasslike (GG)	No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.7	10		Shrub (SG)	No	
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.2	1		Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	100		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	5	*		No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	4	200	*		No	
rapi rugo	*Rapistrum rugosum*	Turnip Weed	Brassicaceae	0.1	1	*		No	

aust scab	*Austrostipa scabra*	Speargrass	Poaceae	6	200		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	500		Grass & grasslike (GG)	No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	10	*		No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.5	100		Grass & grasslike (GG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	1	*		No	
acae agni	*Acaena agnipila*	Hairy Sheep's Burr	Rosaceae	0.2	20		Forb (FG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.4	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	20	*		No	
chry apic	*Chrysocephalum apiculatum*	Common Everlasting	Asteraceae	0.2	40		Forb (FG)	No	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.2	40		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	10		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	100	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	50	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulace	0.1	10		Forb (FG)	No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.5	100		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.2	30		Grass & grasslike (GG)	No	
lach aemu	*Lachnagrostis aemula*	Blowngrass	Poaceae	0.2	10		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.9	100		Grass & grasslike (GG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.2	30		Forb (FG)	No	
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fab	0.1	10		Other (OG)	No	
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.5	50		Fern (EG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.1	20		Forb (FG)	No	
abil ovat	*Abildgaardia ovata*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	1	100		Grass & grasslike (GG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.4	20		Forb (FG)	No	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.2	5		Grass & grasslike (GG)	No	
card nuta nuta	*Carduus nutans subsp. nutans*	Nodding Thistle	Asteraceae	0.1	1	*		No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF122a	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211207-01	
Survey date:	7/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	567					
GPS Easting	367129	**GPS Northing**	6592137		**Datum**		**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF122a**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**6**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%	**26.0%**	
	15m	25%		
	25m	25%		
	35m	30%		
	45m	40%		

	Other (OG)	0
	TOTAL	12
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	1
	Shrub (SG)	0
	Forb (FG)	1.9
	Grass & grasslike (GG)	42.6
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	45.5
	TOTAL 'HTE'	1

Bare ground cover	5m	10%	2.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	10%	2.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	51		1
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		12	

COMPOSITION & STRUCTURE

Species recorded for WWF122a

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	1	1		Tree (TG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	20	300		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	35	100	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	20	500		Grass & grasslike (GG)	No	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	10	40	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.8	100	*		HTE	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	20	*		No	
brom	*Bromus spp.*	A Brome	Poaceae	2	200	*	Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	50	*		No	
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	1	300		Forb (FG)	No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulacea	0.1	10		Forb (FG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.1	10		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.5	40	*		No	

gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.4	20		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.3	50	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.2	30	*		HTE	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.1	2	*		No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.2	10		Grass & grasslike (GG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.3	20		Forb (FG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.2	5		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.2	5		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF124	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211207-05	
Survey date:	7/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	567					
GPS Easting	366291	**GPS Northing**	6592472		**Datum**		**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF124

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**27.0%**	
	15m	30%		
	25m	30%		
	35m	15%		
	45m	40%		

	Other (OG)	0
	TOTAL	10
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1.5
	Grass & grasslike (GG)	8.7
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	10.2
	TOTAL 'HTE'	0.5

Bare ground cover	5m	5%	2.4%	
	15m	0%		
	25m	2%		
	35m	5%		
	45m	0%		
Cryptogam cover	5m	2%	1.6%	
	15m	0%		
	25m	6%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF124

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	6	100		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	1	50		Grass & grasslike (GG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	70	1000	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	100		Forb (FG)	No	
acae agni	*Acaena agnipila*	Hairy Sheep's Burr	Rosaceae	0.2	10		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	3	50	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	10	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	1	100		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	30	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.5	100	*		HTE	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No	
poly	*Polygonum spp.*		Caryophyllace	0.1	2	*		No	

paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.2	20	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulacea	0.1	10		Forb (FG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.1	20		Forb (FG)	No	
brom	*Bromus spp.*	A Brome	Poaceae	0.5	40	*	Grass & grasslike (GG)	No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	10	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	20	*		No	
junc usit	*Juncus usitatus*		Juncaceae	0.2	3		Grass & grasslike (GG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	1	40	*		No	

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF125	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211206-05	
Survey date:	6/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	567					
GPS Easting	366023	**GPS Northing**	6592628		**Datum**		**Zone**	56	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF125

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**13.0%**	
	15m	5%		
	25m	10%		
	35m	20%		
	45m	10%		

	Other (OG)	0
	TOTAL	10

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	2
	Grass & grasslike (GG)	14.2
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	16.2
	TOTAL 'HTE'	0.1

Bare ground cover	5m	1%	1.4%
	15m	0%	
	25m	0%	
	35m	1%	
	45m	5%	
Cryptogam cover	5m	0%	2.0%
	15m	5%	
	25m	0%	
	35m	0%	
	45m	5%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		13	

COMPOSITION & STRUCTURE

Species recorded for WWF125

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	500		Grass & grasslike (GG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.2	10		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	10	10	*		No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	60	1000	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	50	*		No	
junc usit	*Juncus usitatus*		Juncaceae	1	20		Grass & grasslike (GG)	No	
stel angu	*Stellaria angustifolia*	Swamp Starwort	Caryophyllace	0.2	10		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	8	500	*		No	
chry apic	*Chrysocephalum apiculat*	Common Everlasting	Asteraceae	0.8	100		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	200		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	1	100		Grass & grasslike (GG)	No	

gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.7	20		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	10		Forb (FG)	No	
elym scab	*Elymus scaber*	Common Wheatgrass	Poaceae	0.2	5		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.3	10	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	
brom	*Bromus spp.*	A Brome	Poaceae	5	100	*		No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.2	20	*		No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF126	**Pic 20x20**		**Pic 20x50**		Previous Plot ID:	
Survey date:	28/09/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	DBC, CC		**PCT:**	567					
GPS Easting	365783	**GPS Northing**	6592631		**Datum**		**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	Med clay		**Slope**			
LandF Element			**Soil Colour**	Grey		**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	1	0	Old regrowth
Cultivation			
Soil erosion	1	R	Patches of bare soil
Firewood			
Grazing	2	R	Low grass, cattle dung
Fire Damage			
Storm Damage	1	NR	Trees and branches down
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF126

BAM Attribute (20x20m plot)

	Stratum	Sum
	Tree (TG)	**1**
	Shrub (SG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	0%	
	15m	0%	

Count of Native Richness	Forb (FG)	12
	Grass & grasslike (GG)	2
	Fern (EG)	0
	Other (OG)	0
	TOTAL	15
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	8
	Shrub (SG)	0
	Forb (FG)	3.8
	Grass & grasslike (GG)	75.4
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	87.2
	TOTAL 'HTE'	0.1

	25m	0%	27.0%
	35m	0%	
	45m	0%	
Bare ground cover	5m	0%	20.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.2%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		2
30-49	3		
20-29	9		1
10-19	4		
5-9			
<5			N/A
Length of logs (m)		117	

COMPOSITION & STRUCTURE

Species recorded for WWF126

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	8	18		Tree (TG)	No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	75	1000		Grass & grasslike (GG)	No
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2	20		Forb (FG)	No
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.5	30	*		No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	200		Forb (FG)	No

cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	20	*		No
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.8	100	*		No
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.4	40	*		No
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.4	20	*		No
eina poly	*Einadia polygonoides*	Knotweed Goosefoot	Chenopodiace	0.3	20		Forb (FG)	No
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	50		Forb (FG)	No
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	0.5	100		Forb (FG)	No
dysp pumi	*Dysphania pumilio*	Small Crumbweed	Chenopodiace	0.1	2		Forb (FG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	50		Forb (FG)	No
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginacea	0.1	5		Forb (FG)	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.2	40	*		No
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.1	2	*		No
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	30		Forb (FG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.4	50		Grass & grasslike (GG)	No
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.1	10	*		No
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	0.1	5		Forb (FG)	No
wahl	*Wahlenbergia spp.*	Bluebell	Campanulacea	0.1	20		Forb (FG)	No
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	10	*		HTE
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	2	*		No
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	3	100	*		No
sole bell	*Solenogyne bellioides*	Solengyne	Asteraceae	0.1	5		Forb (FG)	No

BAM Site Field Survey

Project:	21-570	**Plot Identifier**	WWF127	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: 211206-04	
Survey date:	6/12/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	DC, CC		**PCT:**	510					
GPS Easting	365728	**GPS Northing**	6592860		**Datum**		**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	**WWF127**

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**9**
	Grass & grasslike (GG)	**5**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	25%	**25.0%**	
	15m	20%		
	25m	30%		
	35m	25%		
	45m	25%		

	Other (OG)	0
	TOTAL	16
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	20
	Shrub (SG)	0
	Forb (FG)	2.3
	Grass & grasslike (GG)	42.8
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	65.1
	TOTAL 'HTE'	1

Bare ground cover	5m	0%	0.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	1%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	95		1
50-79			
30-49	30		
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF127

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	18	1		Tree (TG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	30	500		Grass & grasslike (GG)	No	
brom	*Bromus spp.*	A Brome	Poaceae	10	500	*	Grass & grasslike (GG)	No	
loli pere	*Lolium perenne*	Perennial Ryegrass	Poaceae	50	1000	*		No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	100	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	20	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	30		Grass & grasslike (GG)	No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.2	40	*		No	
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.3	50	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	200		Forb (FG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.5	50	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.5	100		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.7	50	*		No	
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	4	200	*		No	

euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	1		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	20		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.8	50		Grass & grasslike (GG)	No	
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.1	2		Forb (FG)	No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.2	10	*		No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	1	100	*		HTE	
euca vimi	*Eucalyptus viminalis*	Ribbon Gum	Myrtaceae	2	1		Tree (TG)	No	
lami ampl	*Lamium amplexicaule*	Dead Nettle	Lamiaceae	0.1	2	*		No	
lepi bona	*Lepidium bonariense*	Argentine Peppercress	Brassicaceae	0.1	1	*		No	
wahl comm	*Wahlenbergia communis*	Tufted Bluebell	Campanulacea	0.1	1		Forb (FG)	No	
ryti rich	*Rytidosperma richardson*	Straw Wallaby-grass	Poaceae	1	50		Grass & grasslike (GG)	No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.2	10		Forb (FG)	No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.2	5	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	5	*		No	
fest elat	*Festuca elatior*	Tall Fescue	Poaceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF128	**Pic 20x20**		**Pic 20x50**	Previous Plot ID: WWF526	
Survey date:	3/12/2020		**Compass Orientation (head of 20x20 plot)**				325	
Recorders	DP GX		**PCT:**	510	Woodland			
GPS Easting	361791	**GPS Northing**	6593972		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF128

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**2**
	Shrub (SG)	**0**
	Forb (FG)	**4**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**10**

BAM Attribute (20x20m plot)

	Stratum	**Sum**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	35%	**29.0%**	
	15m	40%		
	25m	30%		
	35m	40%		
	45m	0%		
Bare ground cover	5m	5%	**7.0%**	
	15m	5%		
	25m	0%		
	35m	0%		

Count of cover abundance (native vascular plants)	Tree (TG)	15
	Shrub (SG)	0
	Forb (FG)	6.2
	Grass & grasslike (GG)	40
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	61.2
	TOTAL 'HTE'	5.1

	45m	25%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2	0	2
50-79	0	0	0
30-49	1	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		10	

COMPOSITION & STRUCTURE

Species recorded for WWF128

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5	1		Tree (TG)	No	
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	10	2		Tree (TG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	5	20	*		No	
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	20	100	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	20	100		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	10	50		Grass & grasslike (GG)	No	
hord lepo	*Hordeum leporinum*	Barley Grass	Poaceae	0.5	10	*		No	
brom dian	*Bromus diandrus*	Great Brome	Poaceae	5	30	*		HTE	
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulace	0.1	1		Forb (FG)	No	
cras sieb	*Crassula sieberiana*	Australian Stonecrop	Crassulaceae	5	50		Forb (FG)	No	
vulp myur	*Vulpia myuros*	Rat's Tail Fescue	Poaceae	10	50	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.1	20		Forb (FG)	No	
gamo	*Gamochaeta spp.*		Asteraceae	0.2	20	*		No	
ryti	*Rytidosperma spp.*		Poaceae	5	30		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	5	20		Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	5	*		HTE	
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	1	50		Forb (FG)	No	
medi poly	*Medicago polymorpha*	Burr Medic	Fabaceae (Fa	1	20	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF129	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF39
Survey date:	28/09/2020		**Compass Orientation (head of 20x20 plot)**				0	
Recorders	DBC, CC		**PCT:**	565	DNG			
GPS Easting	361433	**GPS Northing**	6593991		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	clay		**Slope**		
LandF Element	Midslope		**Soil Colour**	Grey		**Aspect**	w	
LandF Pattern	Gently undulating		**Soil Depth**	Mud		**Drainage**		
Microrelief			**Geology**			**Watercourses**	Dam 20m	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	No trees, old stumps
Cultivation			
Soil erosion	1	r	accumulated sediment
Firewood			
Grazing	2	r	Low grass. Sheep dung
Fire Damage			
Storm Damage			
Weediness	1	R	See list
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF129

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**0**
	Forb (FG)	**10**
	Grass & grasslike (GG)	**9**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	20%	**27.0%**	
	15m	40%		
	25m	20%		
	35m	15%		
	45m	40%		

	Other (OG)	0
	TOTAL	20
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	15
	Shrub (SG)	0
	Forb (FG)	4.2
	Grass & grasslike (GG)	62.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	81.7
	TOTAL 'HTE'	0.1

Bare ground cover	5m	2%	4.4%	
	15m	0%		
	25m	20%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.2%	
	15m	1%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.4%	
	15m	2%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		25	

COMPOSITION & STRUCTURE

Species recorded for WWF129

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca dalr	*Eucalyptus dalrymplean*	Mountain Gum	Myrtaceae	15	1		Tree (TG)	No	
them tria	*Themeda triandra*		Poaceae	25	500		Grass & grasslike (GG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	2	100		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	500		Forb (FG)	No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.2	20	*		No	
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	10	*		No	
dich repe	*Dichondra repens*	Kidney Weed	Convolvulacea	0.1	10		Forb (FG)	No	
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	5		Forb (FG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.6	100		Forb (FG)	No	
sily mari	*Silybum marianum*	Variegated Thistle	Asteraceae	0.1	2	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	1	50	*		No	
dact glom	*Dactylis glomerata*	Cocksfoot	Poaceae	0.1	10	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.5	30		Forb (FG)	No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.3	50		Forb (FG)	No	

micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	100		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	30	500		Grass & grasslike (GG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	1	200	*		No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	5		Grass & grasslike (GG)	No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	0.1	10		Grass & grasslike (GG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	10	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	20		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.3	20		Forb (FG)	No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	1		Forb (FG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae				Grass & grasslike (GG)	No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.2	5		Grass & grasslike (GG)	No	
lepi	*Lepidium spp.*	A Peppercress	Brassicaceae	0.1	2	*		No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	2		Forb (FG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.1	20	*		No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF131	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF32	
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	DBC, CC		**PCT:**	565	DNG				
GPS Easting	355761	**GPS Northing**	6598091		**Datum**	GDA 94	**Zone**	56	

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Heavy Clay		**Slope**		
LandF Element	Open depresion		**Soil Colour**	Black		**Aspect**		
LandF Pattern	Gently undulating		**Soil Depth**			**Drainage**	Good	
Microrelief			**Geology**			**Watercourses**	50m Dam	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	Stumps
Cultivation			
Soil erosion			
Firewood			
Grazing	1	r	Cattle dung
Fire Damage			
Storm Damage			
Weediness	2	R	See list
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for WWF131

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**3**
	Grass & grasslike (GG)	**9**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**55.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	12

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	2.7
	Grass & grasslike (GG)	89.9
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	92.6
	TOTAL 'HTE'	0.2

Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for WWF131

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	0.1	2	*		No	
Junc usit	*Juncus usitatus*		Juncaceae	1	50		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	300		Forb (FG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	8	100	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	1	200	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	200		Grass & grasslike (GG)	No	
penn alop	*Cenchrus purpurascens*	Swamp Foxtail	Poaceae	8	200		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	30	*		No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	45	500		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	10	*		HTE	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	15	200		Grass & grasslike (GG)	No	
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.4	20	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.6	100		Forb (FG)	No	
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.5	10		Grass & grasslike (GG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	2	200	*		No	
loli	*Lolium spp.*	A Ryegrass	Poaceae	0.8	50	*		No	

brom cath	*Bromus catharticus*	Praire Grass	Poaceae	1	50	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.3	20		Grass & grasslike (GG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	5		Forb (FG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	15	200		Grass & grasslike (GG)	No	
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.9	20	*		No	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No	

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF132	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF30	
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders			**PCT:**	565	Woodland				
GPS Easting	355834	**GPS Northing**	6598214		**Datum**	GDA 94	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	rocky clay		**Slope**			
LandF Element	Mid slope		**Soil Colour**	grey		**Aspect**			
LandF Pattern	Gently undulating		**Soil Depth**	shallow		**Drainage**	good		
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation			
Soil erosion	2	R	Accumulated sediment
Firewood	1	NR	Cut logs
Grazing	1	R	Cattle dung
Fire Damage			
Storm Damage	1	NR	Trunks and branches down
Weediness			
Other			Rabbit warren

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for WWF132

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**1**
	Shrub (SG)	**4**
	Forb (FG)	**15**
	Grass & grasslike (GG)	**12**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**39.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	32

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	2.7
	Forb (FG)	9.4
	Grass & grasslike (GG)	80.7
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	122.8
	TOTAL 'HTE'	0.1

Bare ground cover	5m	0%	1.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	3.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	2		
30-49	1		
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		102	

COMPOSITION & STRUCTURE

Species recorded for WWF132

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca laev	*Eucalyptus laevopinea*	Silver-top Stringybark	Myrtaceae	30	4		Tree (TG)	No	
cass quin	*Cassinia quinquefaria*		Asteraceae	0.3	4		Shrub (SG)	No	
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	10	200		Grass & grasslike (GG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	50	500		Grass & grasslike (GG)	No	
acac fili	*Acacia filicifolia*	Fern-leaved Wattle	Fabaceae (Mi	2	1		Shrub (SG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	4	500		Forb (FG)	No	
verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.7	100	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No	
wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	3	300		Forb (FG)	No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.2	10		Forb (FG)	No	
swai gale	*Swainsona galegifolia*	Smooth Darling Pea	Fabaceae (Fab	0.4	50		Forb (FG)	No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	50		Grass & grasslike (GG)	No	

pani effu	*Panicum effusum*	Hairy Panic	Poaceae	10	200		Grass & grasslike (GG)	No	
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	4	100		Grass & grasslike (GG)	No	
hibb ripa	*Hibbertia riparia*		Dilleniaceae	0.1	2		Shrub (SG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	200	*		No	
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No	
ryti	*Rytidosperma spp.*		Poaceae	0.1	5		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.4	50		Forb (FG)	No	
acae ovin	*Acaena ovina*	Acaena	Rosaceae	0.1	5		Forb (FG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No	
hydr laxi	*Hydrocotyle laxiflora*	Stinking Pennywort	Apiaceae	0.1	1		Forb (FG)	No	
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.1	2	*		No	
acet vulg	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0.1	40	*		HTE	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	2	30		Grass & grasslike (GG)	No	
cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	2		Forb (FG)	No	
ment satu	*Mentha satureioides*	Native Pennyroyal	Lamiaceae	0.1	10		Forb (FG)	No	
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	0.1	5		Forb (FG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	3	*		No	
loma	*Lomandra spp.*	Mat-rush	Lomandracea	0.3	20		Grass & grasslike (GG)	No	
gamo calv	*Gamochaeta calviceps*	Cudweed	Asteraceae	0.1	10	*		No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.1	5	*		No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.2	10	*		No	
paro bras	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian	Caryophyllace	0.2	100	*		No	
liss stri	*Lissanthe strigosa*	Peach Heath	Ericaceae	0.3	3		Shrub (SG)	No	
gali	*Galium spp.*		Rubiaceae	0.1	1		Forb (FG)	No	
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.5	5		Forb (FG)	No	
dian arme	*Dianthus armeria*	Deptford Pink	Caryophyllace	0.1	3	*		No	
junc usit	*Juncus usitatus*		Juncaceae	0.1	2		Grass & grasslike (GG)	No	
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	2	30		Grass & grasslike (GG)	No	
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginacea	0.1	2		Forb (FG)	No	
care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	1		Grass & grasslike (GG)	No	
wurm dioi dioi	*Wurmbea dioica subsp. d*	Early Nancy	Colchicaceae	0.1	5		Forb (FG)	No	
urti inci	*Urtica incisa*	Stinging Nettle	Urticaceae	0.1	1		Forb (FG)	No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF133	**Pic 20x20**		**Pic 20x50**	Previous Plot ID: WWF200929-0	
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DBC, CC		**PCT:**	565				
GPS Easting	355742	**GPS Northing**	6598498		**Datum**		**Zone**	56

Landform		**Soils**		**Drainage & Slope**	
Morphology		**Soil Texture**	Clay	**Slope**	
LandF Element	Open depression	**Soil Colour**	Brown	**Aspect**	
LandF Pattern		**Soil Depth**	deep	**Drainage**	Mod
Microrelief		**Geology**		**Watercourses**	50m dam

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	0	Stumps, no trees
Cultivation			
Soil erosion			
Firewood			
Grazing	1	R	Cattle dung
Fire Damage			
Storm Damage			
Weediness	2	R	See list
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for WWF133

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	0%	**48.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

	Other (OG)	0
	TOTAL	14

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.9
	Grass & grasslike (GG)	88
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	88.9
	TOTAL 'HTE'	0.5

Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

COMPOSITION & STRUCTURE

Species recorded for WWF133

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	0.8	10	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	60	5000		Grass & grasslike (GG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fab	0.6	20	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	200		Grass & grasslike (GG)	No	
junc usit	*Juncus usitatus*		Juncaceae	0.3	20		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.5	20	*		HTE	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fab	2	50	*		No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	1	60	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	2	*		No	
aspe conf	*Asperula conferta*	Common Woodruff	Rubiaceae	0.3	50		Forb (FG)	No	
spor creb	*Sporobolus creber*	Slender Rat's Tail Grass	Poaceae	2	30		Grass & grasslike (GG)	No	

verb virg	*Verbascum virgatum*	Twiggy Mullein	Scrophulariac	0.1	3	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.1	30	*		No	
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.7	50	*		No	
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	10		Forb (FG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	10	100		Grass & grasslike (GG)	No	
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.2	5		Grass & grasslike (GG)	No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	2		Forb (FG)	No	
amar	*Amaranthus spp.*	Amaranth	Amaranthace	0.2	50		Forb (FG)	No	
malv negl	*Malva neglecta*	Dwarf Mallow	Malvaceae	0.1	2	*		No	
dauc gloc	*Daucus glochidiatus*	Native Carrot	Apiaceae	0.1	5		Forb (FG)	No	
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	5	100		Grass & grasslike (GG)	No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	1	20	*		No	
fest	*Festuca spp.*		Poaceae	0.5	20		Grass & grasslike (GG)	No	
dauc caro	*Daucus carota*	Wild Carrot	Apiaceae	0.1	5	*		No	

BAM Site Field Survey

Project:	20-250	**Plot Identifier**	WWF134	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF200929-0
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	DBC, CC		**PCT:**	565				
GPS Easting	355734	**GPS Northing**	6598740		**Datum**		**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Clay		**Slope**		
LandF Element	Mid slope		**Soil Colour**	Brown		**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**	400m Dam	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	o	Stumps and logs
Cultivation			
Soil erosion	1	R	Sediment accumulation
Firewood			
Grazing	2	R	Plants grazed and trampled. Cattle dung
Fire Damage			
Storm Damage			
Weediness	3	R	See list
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot

FUNCTION

Function attributes for	WWF134

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	1
	Grass & grasslike (GG)	6
	Fern (EG)	0
	Other (OG)	0
	TOTAL	7

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	0
	Forb (FG)	0.1
	Grass & grasslike (GG)	42.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	42.2
	TOTAL 'HTE'	0.2

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	40%	57.0%	
	15m	30%		
	25m	50%		
	35m	85%		
	45m	80%		
Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	1.0%	
	15m	0%		
	25m	0%		
	35m	5%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			1
20-29			1
10-19			1
5-9			
<5			N/A
Length of logs (m)		29	

COMPOSITION & STRUCTURE

Species recorded for WWF134

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	30	100	*		No	
crat mono	*Crataegus monogyna*	Hawthorn	Malaceae	0.2	1	*		HTE	
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.5	20	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	15	300		Grass & grasslike (GG)	No	
phal aqua	*Phalaris aquatica*	Phalaris	Poaceae	3	100	*		No	
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	1	20		Grass & grasslike (GG)	No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	0.3	20	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	100		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fal	2	100	*		No	
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	20		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fal	1	30	*		No	
eleu tris	*Eleusine tristachya*	Goose Grass	Poaceae	0.2	20	*		No	
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	20		Grass & grasslike (GG)	No	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	2	*		No	
aven fatu	*Avena fatua*	Wild Oats	Poaceae	0.1	5	*		No	
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	20	100		Grass & grasslike (GG)	No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.2	50	*		No	
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey

Project:	20-250 Winterbourne	**Plot Identifier**	WWF135	**Pic 20x20**		**Pic 20x50**		Previous Plot ID: WWF34
Survey date:	29/09/2020		**Compass Orientation (head of 20x20 plot)**				180	
Recorders	DC, CC		**PCT:**	565	DNG			
GPS Easting	355732	**GPS Northing**	6599033		**Datum**	GDA 94	**Zone**	56

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Clay		**Slope**		
LandF Element	Mid slope		**Soil Colour**	Brown		**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**	Mod	
Microrelief	change of slope		**Geology**			**Watercourses**	400m dam	

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	Stumps, dead trees
Cultivation			
Soil erosion			
Firewood			
Grazing	3	r	Heavily grazed grasses, cattle dung
Fire Damage			
Storm Damage			
Weediness	2	R	Nodding thistle
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
possible hollows mod condition
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for WWF135

BAM Attribute (20x20m plot)

	Stratum	**Sum**
Count of Native Richness	**Tree (TG)**	**0**
	Shrub (SG)	**0**
	Forb (FG)	**1**
	Grass & grasslike (GG)	**7**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**8**

BAM Attribute (20x20m plot)

	Stratum	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0**

BAM Attributes (1 x 1m Plots)

	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	0%	**50.2%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Bare ground cover	5m	0%	**8.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
S	5m	0%		

Count of cover abundance (native vascular plants)	Forb (FG)	0.1
	Grass & grasslike (GG)	41.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	41.6
	TOTAL 'HTE'	1

Cryptogam cover	15m	0%	0.0%	
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

COMPOSITION & STRUCTURE

Species recorded for	WWF135								
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
card nuta nuta	*Carduus nutans subsp. n*	Nodding Thistle	Asteraceae	5	40	*		No	
plan lanc	*Plantago lanceolata*	Lamb's Tongues	Plantaginacea	0.5	10	*		No	
loli	*Lolium spp.*	A Ryegrass	Poaceae	1	30	*		No	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	20	500		Grass & grasslike (GG)	No	
erag lept	*Eragrostis leptocarpa*	Drooping Lovegrass	Poaceae	1	50		Grass & grasslike (GG)	No	
trif repe	*Trifolium repens*	White Clover	Fabaceae (Fal	12	100	*		No	
malv negl	*Malva neglecta*	Dwarf Mallow	Malvaceae	0.5	10	*		No	
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	5	*		No	
brom cath	*Bromus catharticus*	Praire Grass	Poaceae	50	1000	*		No	
junc usit	*Juncus usitatus*		Juncaceae	0.2	5		Grass & grasslike (GG)	No	
poa	*Poa spp.*		Poaceae	5	100	*	Grass & grasslike (GG)	No	
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	5	*		No	
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	15	100		Grass & grasslike (GG)	No	
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.2	5	*		No	
cype vagi	*Cyperus vaginatus*	Stiff Flat-sedge	Cyperaceae	0.1	2		Grass & grasslike (GG)	No	
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	1	30	*		HTE	
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.3	20	*		No	
fest	*Festuca spp.*		Poaceae	0.2	5	*	Grass & grasslike (GG)	No	
medi	*Medicago spp.*	A Medic	Fabaceae (Fal	0.1	1	*		No	
amar	*Amaranthus spp.*	Amaranth	Amaranthace	0.1	20		Forb (FG)	No	
trif camp	*Trifolium campestre*	Hop Clover	Fabaceae (Fal	0.2	10	*		No	
erod cicu	*Erodium cicutarium*	Common Crowfoot	Geraniaceae	0.1	5	*		No	

BAM Plot photos

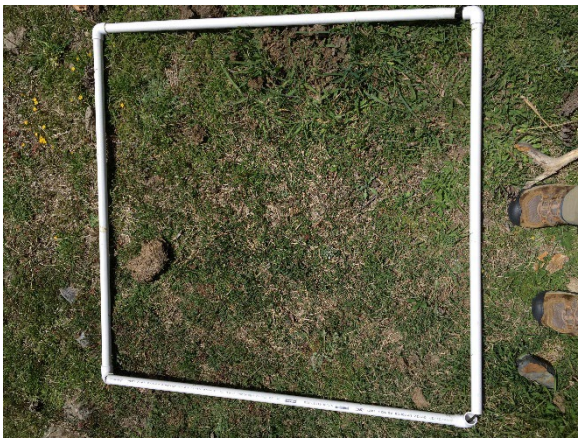
Plot 1	PCT 1194 DNG
	
Plot 2	PCT 526 DNG
	
Plot 3	PCT 526 Woodland

	
Plot 4	PCT 526 Woodland
	

Plot 5	PCT 526 Woodland
	
Plot 6	PCT 526 DNG
	

Plot 7	PCT 526 Woodland
	
Plot 8	PCT 970 Woodland
	

Plot 9	PCT 970 Woodland
	
Plot 10	PCT 1194 Woodland
NA	NA
Plot 11	PCT 1194 Woodland
	
Plot 12	PCT 1194 Woodland
NA	NA
Plot 13	PCT 1194 Woodland

	
Plot 14	PCT 997 DNG
NA	NA
Plot 15	PCT 571 Woodland
NA	NA
Plot 16	PCT 571 Woodland
NA	NA
Plot 17	PCT 571 Woodland
NA	NA
Plot 18	PCT 571 Woodland
NA	NA
Plot 19	PCT 571 DNG
NA	NA
Plot 20	PCT 997 Woodland

	
Plot 21	PCT 997 Woodland
	
Plot 22	

	
Plot 23	PCT 970 DNG
	
Plot 24	Not a PCT
NA	NA

Plot 25	PCT 970 Woodland
	
Plot 26	PCT 970 Woodland
	
Plot 27	PCT 1194 DNG

Plot 28	PCT 1194 DNG
	
Plot 29	PCT 526 Woodland
	
Plot 30	Not a PCT
NA	NA
Plot 31	PCT 970 Woodland

	
Plot 32	PCT 970 Woodland
	
Plot 33	PCT 526 Woodland

	
Plot 34	PCT 970 Woodland
	
Plot 35	PCT 970 DNG

	
Plot 36	PCT 970 DNG
	
Plot 37	PCT 526 Woodland

	
Plot 38	PCT 970 DNG
	
Plot 39	PCT 997 Woodland
NA	NA
Plot 40	PCT 997 Woodland
NA	NA
Plot 41	PCT 526 Woodland

	
Plot 42	PCT 526 Woodland
	
Plot 43	PCT 526 DNG

	
Plot 44	PCT 970 DNG
	
Plot 45	PCT 970 Woodland

	
Plot 46	PCT 526 DNG
	
Plot 47	PCT 526 Woodland

	
Plot 48	PCT 526 Woodland
	
Plot 49	PCT 526 DNG

	
Plot 50	PCT 567 Woodland
	
Plot 51	PCT 567 DNG

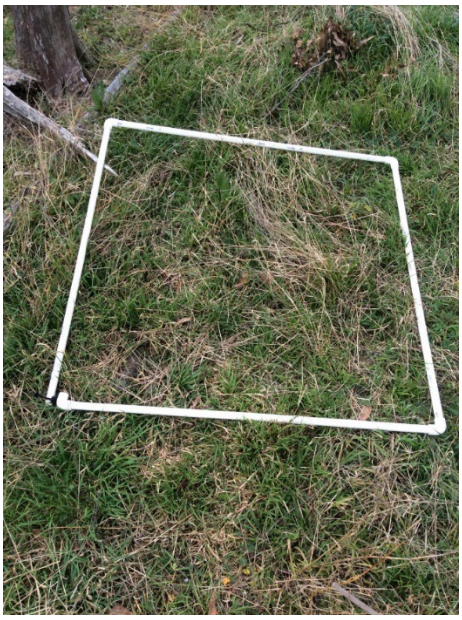
	
Plot 52	PCT 567 Woodland
	
Plot 53	PCT 766

	
Plot 54	PCT 567 DNG
	
Plot 55	PCT 567 Woodland

	
Plot 56	PCT 766
NA	NA
Plot 57	PCT 766
NA	NA
Plot 58	PCT 526 DNG
	
Plot 59	PCT 568 DNG

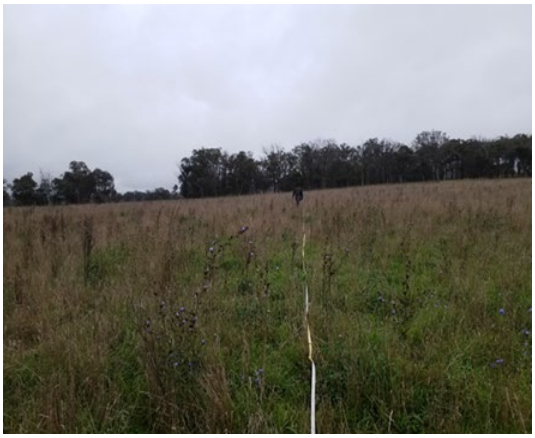
NA	NA
Plot 60	PCT 574 Woodland
NA	NA
Plot 61	PCT 574 Woodland
NA	NA
Plot 62	PCT 567 DNG
	
Plot 63	PCT 567 Woodland

	
Plot 64	PCT 568 Woodland
	
Plot 65	PCT 568 DNG

	
Plot 66	PCT 568 Woodland
	
Plot 67	PCT 568 DNG

	
Plot 68	PCT 568 DNG
	
Plot 69	PCT 568 Woodland

	
Plot 70	PCT 568 Woodland TEC
NA	NA
Plot 71	PCT 510 DNG
NA	NA
Plot 72	PCT 510 DNG
	

Plot 73	PCT 567 Woodland
	
Plot 74	PCT 510 DNG
	
Plot 75	PCT 510 Woodland

	
Plot 76	PCT 567 Woodland
	
Plot 77	PCT 567 Woodland

	
Plot 78	PCT 568 DNG
	
Plot 79	PCT 568 DNG

	
Plot 80	PCT 534 DNG
	
Plot 81	PCT 534 Woodland

	
Plot 82	PCT 567 DNG TEC
	
Plot 83	PCT 1194 Woodland

	
Plot 84	PCT 1194 Woodland
	
Plot 85	PCT 1194 DNG

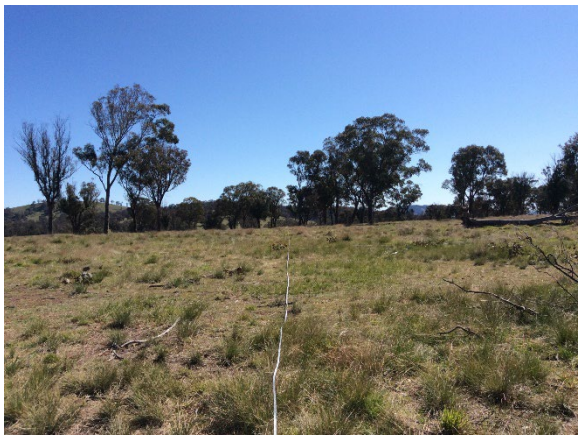
	
Plot 86	PCT 1194 DNG
	
Plot 87	PCT 1194 Woodland
NA	NA
Plot 88	PCT 1194 Woodland

	
Plot 89	PCT 1194 Woodland
	
Plot 90	PCT 510 Woodland

	
Plot 91	PCT 567 DNG
	
Plot 92	PCT 567 Woodland TEC

	
Plot 93	
	
Plot 94	PCT 567 Woodland

	
Plot 95	PCT 567 DNG
	
Plot 96	PCT 567 Woodland TEC

	
Plot 97	PCT 567 Woodland
	
Plot 98	PCT 567 Woodland

	
Plot 99	PCT 510 Woodland
	
Plot 100	PCT 997 Woodland
	
Plot 101	PCT 997 DNG

	
Plot 102	PCT 997 DNG
	
Plot 103	PCT 565 DNG
NA	NA
Plot 104	PCT 565 Woodland
	

Plot 105	PCT 565 Woodland
	
Plot 106	PCT 565 DNG
	
Plot 107	PCT 565 Woodland

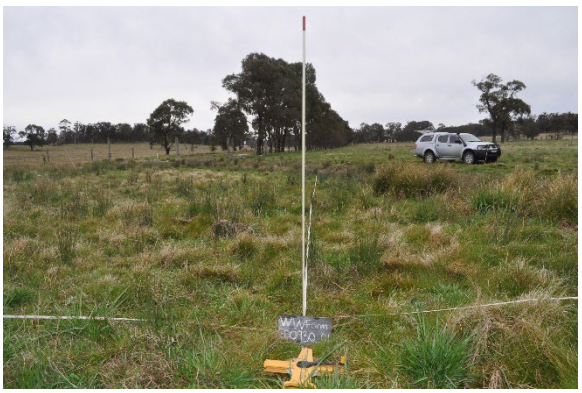
	
Plot 108	PCT 510 Woodland
	
Plot 109	PCT 567 Woodland

	
Plot 110	PCT 510 Woodland
N/A	N/A
Plot 111	PCT 510 DNG
	
Plot 112	PCT 534 DNG

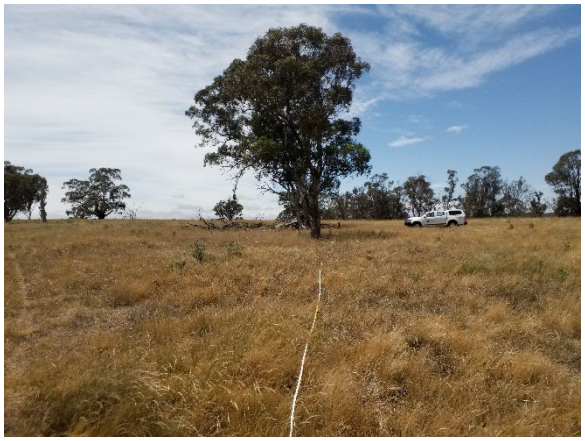
	
Plot 113	PCT 567 DNG
	
Plot 114	PCT 565 DNG

	
Plot 115	PCT 534 DNG
	
Plot 116	PCT 534 DNG

	
Plot 117	PCT 534 Woodland
	
Plot 118	PCT 534 Woodland

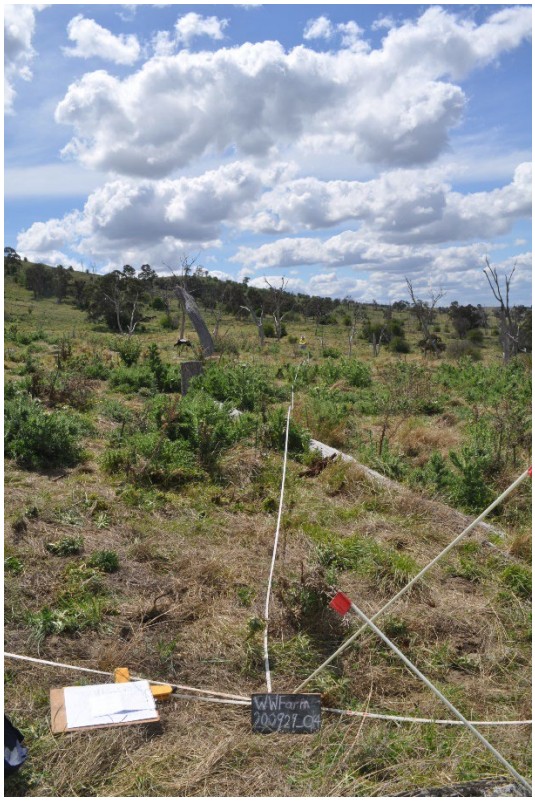
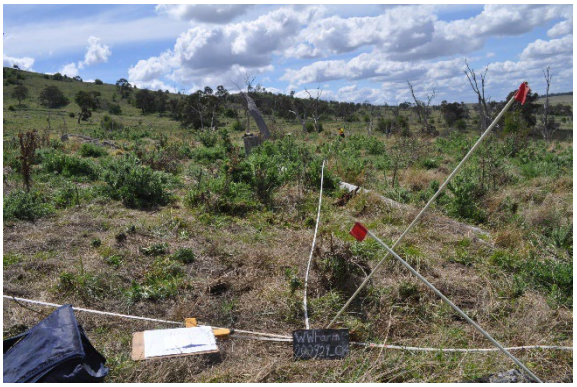
	
Plot 119	PCT 534 Woodland
NA	NA
Plot 120	PCT 766
	
Plot 121	PCT 766
	

Plot 122	PCT 567 DNG
NA	NA
Plot 122a	PCT 567 Woodland
NA	NA
Plot 123	PCT 567 DNG TEC
NA	NA
Plot 124	PCT 567 DNG
NA	NA
Plot 125	PCT 567 DNG
NA	NA
Plot 126	PCT 567 Woodland

	
Plot 127	PCT 510 Woodland
NA	NA
Plot 128	PCT 510 Woodland
	
Plot 127	
NA	NA

Plot 128	
	
Plot 129	PCT 565 DNG
	
Plot 130	
	

Plot 131	PCT 565 DNG
	
Plot 132	PCT 565 Woodland
	

Plot 133	PCT 565 DNG
	
Plot 134	PCT 565 DNG
	
Plot 135	PCT 565 DNG

	
Plot 136	PCT 571 DNG
	
Plot 137	PCT 571 DNG
NA	NA
Plot 138	PCT 571 DNG
NA	NA
Plot 139	PCT 571 DNG
NA	NA

Appendix H Assessment personnel

The assessment team have included the following key staff in the roles set out below:

Name	Title	Qualifications	Roles
Beth Noel	Technical Lead Ecology	• BAM Accredited Assessor (BAAS19015) • Master of Wildlife Management • B App. Sc. (Honours, Geology)	Accredited assessor Senior ecologist BDAR author – primary BAM calculations Impact area calculations
Matt Davis	ERM – Principal Ecologist	• Master of Environmental Management, Conservation Biology • Bachelor Science Ecology and Conservation Biology	Principal Ecologist BDAR review
Mitch Palmer	NGH Technical Lead Ecology	• BAM Accredited Assessor (BAAS17051) • MEIANZ BSc.	Senior field ecologist, directing survey and early avoidance advice, preliminary BAM calculations
Aleksei Atkin	NGH Technical Lead Ecology	• BAM Accredited Assessor (BAAS17093) • B Nat. Sci. M Wld. Mgmt.	Senior ecologist, directing survey, BAM calculations, technical oversight
Brendon True	NGH Senior Ecologist	• BAM Accredited Assessor (BAAS18155) • Master of Conservation Biology • Bachelor of Science (Ecology and Biodiversity)	Senior ecologist, BAM calculations BDAR co author
Giorginna Xu	NGH Ecologist	• BEnvSci	BDAR co author Ecologist and co author Nocturnal bird surveys August 2021 Threatened flora surveys Oct 2021
Jacqui Coughlan, EcoFocus Consulting	Principal Ecologist	• BSc, PhD, Grad Dip. Env. Law.	BDAR technical review and co-author (collision risks)
Vitaly Kolin	NGH Senior Spatial Analyst	• BSc (Earth Science) (Hons 1)	GIS mapping

Name	Title	Qualifications	Roles
Clancy Bowman	NGH Environmental Consultant Mapping coordinator	• Bachelor of Science (Resource & Environmental Management)	GIS coordinator and project manager
Brooke Marshall	NGH Principal – Renewable Energy Assessments	• Certified Environmental Practitioner (CEnvP) • B. Nat Res (First Class Honours)	Technical review
Beth Kramer	NGH Principal – ecologist, General Manager - Biodiversity	• B. Sci, • M Env Mgt	Technical review BDAR co author – wind farm impacts
Louiza Romane	NGH Regional Manager - Biodiversity	• BSc (Earth Science) (Hons 1)	Technical review
Gillian Young	NGH Senior Ecologist	• Accredited Assessor (BAAS17086)' • Bachelor of Natural Resources (Hons)	Senior Ecologist BAM plots Flora surveys Vegetation mapping
Rachel Buzio	NGH Ecologist	• Bachelor of Marine Science • Member of Australian Association of Bush Regenerators (AABR)	Frog surveys Dec 2021 Reptile surveys Dec 2021 Glossy Black surveys Aug 2021 Hair tubes, cameras Dec 2021
Teah Wills	NGH Ecologist	• Graduate Diploma Environmental Management • Bachelor Environmental Biology	Frog surveys Dec 2021 Reptile surveys Dec 2021 Glossy Black surveys Aug 2021 Hair tubes, cameras Dec 2021
Nick Weigner	NGH Ecologist	• Bachelor Science (Zoology & Ecology) (Hons)	Frog surveys Dec 2021 Reptile surveys Dec 2021 Hair tubes, cameras Dec 2021

Name	Title	Qualifications	Roles
Isaac Higgs	NGH Technical Assistant	• Field staff	Frog surveys Dec 2021 Reptile surveys Dec 2021 Hair tubes, cameras Dec 2021
Daniel Perkovic	NGH Senior Ecologist	• Accredited Assessor (BAAS21013) • Diploma Conservation Land management • Certificate III in Conservation Land Management • Bachelor Arts (LLB)	Initial field work BAM plots GIS mapping PCT mapping
Elijah Elias	NGH Senior Ecologist	• Accredited Assessor (BAAS21012) • Bachelor Biodiversity Conservation	BAM plots
Greg Ford	Director and Principal Consultant	• Specialist consultant – bat call analysis	Bat call analysis for Nature Advisory Bat Survey
Georgeanna Story	Consultant – specialist hair analysis	• Specialist consultant – hair analysis	Analysis of hair samples form hair tubes
Dr David Dique	Koala expert	• Specialist consultant – scat analysis	Analysis of scats for ERM
Barbara Triggs	Author of Tracks Scats and other traces	• Specialist consultant – scat analysis	Analysis of scats for ERM
Candice Larkin	Nature Advisory Ecologist	• Specialist ecological consultant	BUS survey October 2020
Dr Ahmad Barati	Nature Advisory Ecologist	• Specialist ecological consultant	BUS survey March and April 2021
Peter Lansley	Nature Advisory Ecologist	• Specialist ecological consultant	BUS survey January 2022

Name	Title	Qualifications	Roles
Ben Nottidge	Green Leafe Ecology Ecologist	• Specialist ecological consultant	Flora and Fauna surveys Oct 2021
Jacob White	NGH Technical Assistant	• Field staff	Flora and Fauna surveys Oct 2021
Wendy Hawes	JHT Ecologist	• Specialist ecological consultant	Pale Headed Snake + broad tailed Gecko surveys Dec 2021
John Hunter	JHT Ecologist	• Specialist ecological consultant	Threatened eucalypt, grey-headed flying fox, and Broad-tailed gecko surveys Dec 2021
Noah Bruce-Allen	NGH Technical Assistant	• Field staff	Threatened eucalypt, grey-headed flying fox, and Broad-tailed gecko surveys Dec 2021
Vanessa Hunter	JHT Ecologist	• Specialist ecological consultant	Threatened flora species surveys Dec 2021
James Mitchell Williams	Technical Assistant	• Specialist ecological consultant	Threatened flora species surveys Dec 2021
Cal Hunter	JHT Ecologist	• Specialist ecological consultant	Threatened flora species surveys Dec 2021
David Carr	Stringy Bark Ecology Ecologist	• Specialist ecological consultant – BAM accredited	BAM plots Dec 2021
Wendy Chapel	Stringy Bark Ecology Ecologist	• Specialist ecological consultant	BAM plots Dec 2021
Lorena Boyle	Environmental Resources Management	• Specialist ecological consultant	BUS survey March 2022

Appendix I Habitat tree inventory

The table below contains the hollow-bearing trees that would be removed as a result of the project.

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (361753.84595769515726715 6594009.24809723626822233 0 0)	2020-12-03T11:44:07.691	HBT	361753.85	6594009.25	Crimson Rosella nest		0	0	1	0	0	0			
PointZM (361791.30790236406028271 6593974.48685312364250422 0 0)	2020-12-03T11:45:50.505	HBT	361791.31	6593974.49	Galah nest		0	0	1	0	0	0			
PointZM (393624.43209158978424966 6565797.97416147124022245 1348.90087890625 0)	2021-03-10T09:11:15.313	HBT	393624.43	6565797.97			2	0	0	0	0	0			
PointZM (393625.97376699047163129 6565802.80702907778322697 1349.345458984375 0)	2021-03-10T09:15:04.119	HBT	393625.97	6565802.81			0	1	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (393321.71541903237812221 6565939.16377073340117931 0 0)	2021-03-10T09:41:21.968	HBT	393321.72	6565939.16	Trunk hollows at 2-3m off ground		1	2	0	0	0	0			
PointZM (355989.43911406514234841 6596860.58452905155718327 0 0)	2021-03-10T10:14:59.419	HBT	355989.44	6596860.58			0	0	0	0	0	0			
PointZM (391132.12800165463704616 6570429.35037295427173376 1335.629638671875 0)	2021-03-10T14:12:58.352	HBT	391132.13	6570429.35			0	0	0	0	0	0		2	
PointZM (391130.87101504375459626 6570425.19070045091211796 1334.345458984375 0)	2021-03-10T14:14:04.007	HBT	391130.87	6570425.19			0	0	1	0	0	0			
PointZM (391122.76741454418515787 6570418.41912330314517021 1335.62548828125 0)	2021-03-10T14:14:45.448	HBT	391122.77	6570418.42			0	0	1	0	0	0			
PointZM (391119.20852334459777921	2021-03-10T14:15:46.652	HBT	391119.21	6570407.05			2	2	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6570407.05185415968298912 1334.67333984375 0)															
PointZM (391110.11687775608152151 6570398.11305364407598972 1334.1922607421875 0)	2021-03-10T14:16:58.896	HBT	391110.12	6570398.11			0	0	2	0	0	0			
PointZM (391114.1869185296818614 6570382.71932490728795528 1330.9249267578125 0)	2021-03-10T14:21:05.298	HBT	391114.19	6570382.72			0	1	0	0	0	0			
PointZM (391119.83893544285092503 6570381.32517005689442158 1331.21728515625 0)	2021-03-10T14:22:37.437	Stag	391119.84	6570381.33			1	0	0	0	0	0			
PointZM (391130.67545115371467546 6570500.05067181028425694 0 0)	2021-03-11T10:24:42.205	HBT	391130.68	6570500.05			1	0	0	0	0	0			
PointZM (391131.05320242600282654 6570494.90592688042670488 0 0)	2021-03-11T10:26:12.649	HBT	391131.05	6570494.91			1	0	0	0	0	0			
PointZM (391135.54676868952810764	2021-03-11T10:27:10.128	HBT	391135.55	6570499.1			1	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6570499.09992206003516912 0 0)															
PointZM (391126.7035558606730774 6570434.44322978425770998 0 0)	2021-03-11T10:28:24.350	HBT	391126.7	6570434.44			0	0	1	0	0	0			
PointZM (381850.05232856923248619 6581347.96460326667875051 0 0)	2021-03-29T15:39:33.788	Stag	381850.05	6581347.96			0	0	1	0	0	0			
PointZM (370210.14297932048793882 6585645.42688396386802197 0 0)	2021-04-01T11:05:24.103	HBT	370210.14	6585645.43			3	1	1	0	0	0			
PointZM (369296.78462108137318864 6579977.7953582052141428 1214.3585205078125 0)	2021-08-26T10:52:55.002	HBT	369296.78	6579977.8	Multiple HBTs and stags adjacent		4	2	0	0	0	0		4	
PointZM (390189.95434867800213397 6567542.01153152715414762 1213.6151123046875 0)	2021-10-11T15:46:54.654	HBT	390189.95	6567542.01			0	0	1	0	0	0			
PointZM (369885.7170162902912125	2021-10-18T17:07:48.364	HBT	943638.17	6574529.7			3	0	0	0	0	0		2	

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582966.1963752806186676 0 0)															
PointZM (369988.88508616376202554 6583043.24400128517299891 0 0)	2021-10-18T17:20:27.170	HBT	943745.58	6574601.25			1	0	0	0	0	0		3	
PointZM (370030.3293398407404311 6583004.19165379740297794 0 0)	2021-10-18T17:24:17.625	Stag	943784.95	6574559.92	Excorticating bark		5	0	2	0	0	0		2	
PointZM (370090.53987947065616027 6582974.64405808039009571 0 0)	2021-10-18T17:29:53.078	Stag	943843.61	6574527.11	Excorticating bark		5	2	0	0	0	0			
PointZM (370096.0146610617521219 6582980.69241726957261562 0 0)	2021-10-18T17:31:25.103	Stag	943849.42	6574532.87	Excorticating bark		6	0	0	0	0	0			
PointZM (370085.52648757916176692 6582937.3303926158696413 1234.4073486328125 0)	2021-10-18T17:31:34.424	HBT	943836.58	6574490.04			2	0	0	0	0	0			
PointZM (370091.05623734812252223	2021-10-18T17:32:33.702	HBT	943843.5	6574515.37	Excorticating bark		5	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582962.93969230353832245 0 0)															
PointZM (370097.56352844077628106 6582945.51613024715334177 0 0)	2021-10-18T17:33:40.257	HBT	943849.07	6574497.58	Excorticating bark		2	0	0	0	0	0			
PointZM (370098.94706975668668747 6582920.96430864278227091 1238.7576904296875 0)	2021-10-18T17:34:10.325	HBT	943849.13	6574472.93			0	1	0	0	0	0			
PointZM (370094.02265071275178343 6582921.38767600245773792 1236.5152587890625 0)	2021-10-18T17:35:16.722	HBT	943844.23	6574473.62			1	0	0	0	0	0			
PointZM (370100.91162315139081329 6582929.73834889568388462 0 0)	2021-10-18T17:35:29.244	HBT	943851.57	6574481.61	Excorticating bark		0	0	0	0	0	0			
PointZM (370104.24005947884870693 6582905.81731786392629147 1235.3531494140625 0)	2021-10-18T17:36:05.313	HBT	943853.61	6574457.49			1	0	0	0	0	0			
PointZM (370111.51132483646506444	2021-10-18T17:37:04.761	Stag	943861.79	6574473.8	Excorticating bark		0	0	1	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582922.50555948354303837 0 0)															
PointZM (370122.12556216260418296 6582888.75286557245999575 1234.583251953125 0)	2021-10-18T17:38:31.298	HBT	943870.59	6574439.45			1	0	0	0	0	0			
PointZM (370122.13835030794143677 6582909.72815875895321369 0 0)	2021-10-18T17:39:14.595	HBT	943871.73	6574460.44	Excorticating bark		10	0	0	0	0	0			
PointZM (370131.88734511646907777 6582880.75937385112047195 1234.2274169921875 0)	2021-10-18T17:39:31.753	HBT	943879.93	6574430.92			2	1	0	0	0	0			
PointZM (370132.00622197892516851 6582882.4613264175131917 1235.6875 0)	2021-10-18T17:40:05.523	HBT	943880.14	6574432.62			1	0	0	0	0	0			
PointZM (370137.05543785716872662 6582885.92268880736082792 1233.743408203125 0)	2021-10-18T17:40:35.516	HBT	943885.38	6574435.81			2	2	1	0	0	0			
PointZM (370149.12386920384597033	2021-10-18T17:43:34.684	HBT	943896.39	6574415.27	Excorticating bark		2	0	7	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582866.04499068018049002 0 0)															
PointZM (370148.64309872302692384 6582850.53713017515838146 1236.555419921875 0)	2021-10-18T17:44:47.984	HBT	943895.07	6574399.78			1	2	2	0	0	0			
PointZM (370154.66914549592183903 6582863.31340837851166725 0 0)	2021-10-18T17:45:10.615	HBT	943901.79	6574412.24	Excorticating bark		5	0	0	0	0	0			
PointZM (370141.99401584605220705 6582854.71966003347188234 1238.2628173828125 0)	2021-10-18T17:46:42.022	HBT	943888.64	6574404.32			2	1	0	0	0	0			
PointZM (370155.51978764624800533 6582856.26788285374641418 0 0)	2021-10-18T17:46:47.726	Stag	943902.26	6574405.14	Excorticating bark		0	0	1	0	0	0		3	
PointZM (370158.00136590813053772 6582853.48127568326890469 0 0)	2021-10-18T17:47:56.142	HBT	943904.59	6574402.21	Excorticating bark		10	0	0	0	0	0			
PointZM (370158.58359211205970496	2021-10-18T17:48:37.896	Stag	943904.89	6574396.92	Excorticating bark		4	0	0	0	0	0		3	

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582848.22167219128459692 0 0)															
PointZM (370161.23326237755827606 6582840.2456625159829855 1235.835693359375 0)	2021-10-18T17:48:58.743	HBT	943907.11	6574388.8			2	0	0	0	0	0			
PointZM (370171.76546479837270454 6582844.38246452249586582 0 0)	2021-10-18T17:50:22.985	HBT	943917.88	6574392.37	Excorticating bark		5	0	0	0	0	0			
PointZM (370168.29586569441016763 6582821.40877708420157433 1236.4073486328125 0)	2021-10-18T17:51:01.989	HBT	943913.17	6574369.56			12	0	0	0	0	0			
PointZM (374677.03696306073106825 6588326.48582131415605545 1328.858642578125 0)	2021-10-19T10:30:17.044	Stick Nest	948722.14	6579636.19			0	0	0	0	0	0			
PointZM (374713.62909706856589764 6587748.22634700872004032 1297.3685302734375 0)	2021-10-19T12:16:23.676	HBT	948727.63	6579055.47			1	0	0	0	0	0			
PointZM (366719.46257105434779078	2021-10-19T14:09:39.499	HBT	940963.14	6583874.81			2	1	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6592133.92698641121387482 1151.38232421875 0)															
PointZM (366657.12524199258768931 6592050.48901958577334881 0 0)	2021-10-19T14:15:24.487	HBT	940896.27	6583794.67			0	0	0	0	0	0			
PointZM (366662.09086843079421669 6592052.92277056910097599 1163.71142578125 0)	2021-10-19T14:15:47.871	HBT x30	940901.37	6583796.83			10	0	0	0	0	0			
PointZM (366686.10912099643610418 6592114.50896913558244705 1159.4521484375 0)	2021-10-19T14:19:10.476	HBT	940928.72	6583857.17			3	2	0	0	0	0			
PointZM (366589.17958525917492807 6592296.83217009156942368 1161.017333984375 0)	2021-10-19T14:26:37.589	HBT	940841.52	6584044.84			2	0	0	0	0	0			
PointZM (366616.13531131064519286 6592322.60585855506360531 1164.7750244140625 0)	2021-10-19T14:26:50.326	HBT	940869.89	6584069.18			2	0	0	0	0	0			
PointZM (366668.4209696602774784	2021-10-19T14:27:17.093	HBT	940923.06	6584082.14			2	2	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6592338.36777481436729431 1161.14990234375 0)															
PointZM (366666.50193247781135142 6592338.15985493734478951 1164.1544189453125 0)	2021-10-19T14:27:42.137	Stag x4	940921.13	6584082.04			0	0	0	0	0	0			
PointZM (366708.7047227545408532 6592378.37907032016664743 1169.6531982421875 0)	2021-10-19T14:28:29.074	Stag x15	940965.52	6584120.02			5	4	0	0	0	0			
PointZM (366690.00438435724936426 6592433.00588436797261238 1167.0860595703125 0)	2021-10-19T14:29:34.812	Stag x5	940949.75	6584175.69			4	2	0	0	0	0			
PointZM (366613.34571907034842297 6592411.92982478626072407 1162.039306640625 0)	2021-10-19T14:31:11.492	Stag	940871.9	6584158.72			1	0	0	0	0	0			
PointZM (380322.47842128452612087 6580031.9938802644610405 0 0)	2021-10-19T17:38:49.218	HBT	953925.45	6571030.1	Stick nest		2	0	0	0	0	0			
PointZM (380294.5306265142862685	2021-10-19T17:41:39.969	Stag	953895.92	6571002.71			5	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6580003.12392257340252399 0 0)															
PointZM (380291.4946733625838533 6580006.55388935655355453 0 0)	2021-10-19T17:42:43.746	Stag	953893.07	6571006.31			5	0	0	0	0	0			
PointZM (380087.25934185786172748 6580125.23765691556036472 0 0)	2021-10-19T17:54:43.211	Stag	953695.05	6571136.12			5	2	0	0	0	0			
PointZM (380365.18593627226073295 6580103.44743858836591244 0 0)	2021-10-19T18:11:07.725	Stag	953972.06	6571099.32			5	3	2	0	0	0		3	
PointZM (380431.52563420165097341 6580077.88826583418995142 0 0)	2021-10-19T18:13:19.305	HBT	954037.08	6571070.16			3	2	1	0	0	0		2	
PointZM (382014.76581794593948871 6582574.41636440344154835 0 0)	2021-10-20T09:01:52.353	Stag	955756.47	6573483.59			0	3	0	0	0	0			
PointZM (382020.7248431007610634	2021-10-20T09:03:42.990	HBT	955762.57	6573485.86			0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582577.00408410374075174 0 0)															
PointZM (382043.93532460852293298 6582510.77326885052025318 0 0)	2021-10-20T09:16:50.799	HBT	955782.23	6573418.31			2	0	0	0	0	0		1	
PointZM (382006.81264865008415654 6582645.23357287794351578 1159.6868896484375 0)	2021-10-20T09:17:52.496	Stick nest	955752.33	6573554.9			0	0	0	0	0	0			
PointZM (382039.48354324721731246 6582486.69864069484174252 0 0)	2021-10-20T09:18:08.016	Stag x2	955776.48	6573394.46			0	0	0	0	0	0			
PointZM (382075.42307802964933217 6582478.60275986511260271 0 0)	2021-10-20T09:19:16.927	HBT	955812.01	6573384.41			0	0	0	0	0	0			
PointZM (382073.13939561962615699 6582478.45430414192378521 1159.6376953125 0)	2021-10-20T09:19:21.536	Casuarinas	955809.72	6573384.38			0	0	0	0	0	0			
PointZM (381999.49189844832289964	2021-10-20T09:20:06.046	Stag x20	955746.74	6573587.6			15	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582677.50386150926351547 1155.82275390625 0)															
PointZM (382002.28860653674928471 6582751.81355533562600613 1155.8375244140625 0)	2021-10-20T09:23:22.216	HBT	955753.54	6573661.82			1	1	0	0	0	0			
PointZM (382004.04521946900058538 6582777.19521753210574389 1157.601318359375 0)	2021-10-20T09:25:42.670	HBT	955756.67	6573687.14			1	1	0	0	0	0			
PointZM (382150.36006758938310668 6582410.99151986092329025 1191.021240234375 0)	2021-10-20T09:26:18.344	Stag	955883.37	6573312.69			0	0	0	0	0	0			
PointZM (381989.49475226452341303 6582776.27163396868854761 1153.977783203125 0)	2021-10-20T09:28:18.043	Stag x20	955742.06	6573686.99			20	5	0	0	0	0			
PointZM (382207.07577899016905576 6582394.72208270244300365 0 0)	2021-10-20T09:40:18.422	Stag	955939.27	6573293.35			0	0	0	0	0	0			
PointZM (382203.48755477298982441	2021-10-20T09:40:33.023	Stag	955935.61	6573292.27			0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6582393.44981830567121506 0 0)															
PointZM (382187.57302505051484331 6582412.46643812581896782 0 0)	2021-10-20T09:41:26.541	Stick nest	955920.7	6573312.16	30-40cm diameter		0	0	0	0	0	0			
PointZM (382189.10812618676573038 6582415.00077098794281483 0 0)	2021-10-20T09:43:04.748	HBT stag	955922.38	6573314.62			0	0	0	0	0	0			
PointZM (382183.79759953136090189 6582430.30688363686203957 0 0)	2021-10-20T09:43:29.114	HBT stag	955917.89	6573330.22			0	0	0	0	0	0			
PointZM (382144.57454642513766885 6582477.87261155433952808 0 0)	2021-10-20T09:44:48.939	HBT stag	955881.19	6573379.95			0	0	0	0	0	0			
PointZM (382303.78697077906690538 6582072.73416067473590374 1178.1370849609375 0)	2021-10-20T10:00:14.168	HBT	956018.7	6572965.85	Stick Nest		0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (381562.68735388841014355 6581619.76543490309268236 1251.655029296875 0)	2021-10-20T10:16:17.029	Stick nest	955252.47	6572552.43	- approx. 70cm diam 30cm		0	0	0	0	0	0		2	
PointZM (378646.33743770531145856 6582879.84375948831439018 1170.631103515625 0)	2021-10-20T11:12:15.061	Stick nest	952401.42	6573970.94	30cm diameter		0	0	0	0	0	0			
PointZM (378650.78788971836911514 6582882.12136480025947094 1175.5596923828125 0)	2021-10-20T11:13:09.492	Stick nest	952406	6573972.98	small x 2		0	0	0	0	0	0			
PointZM (378634.96277972619282082 6582891.62746306601911783 1171.412353515625 0)	2021-10-20T11:13:41.217	Stick nest	952390.67	6573983.35	20cm diameter		0	0	0	0	0	0			
PointZM (378651.38523309078300372 6582903.99450558982789516 1173.558349609375 0)	2021-10-20T11:14:14.352	Stick nest	952407.78	6573994.84	small/medium		0	0	0	0	0	0			
PointZM (378632.05799194180872291 6582906.52264108508825302 1177.2017822265625 0)	2021-10-20T11:15:30.243	Stick nest	952388.57	6573998.41	small/medium		0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (378636.46374761854531243 6582891.4532471802085638 0 0)	2021-10-20T11:18:13.381	Stick nest	952392.16	6573983.1	20cm diameter		0	0	0	0	0	0			
PointZM (378739.35589262552093714 6582949.09874560870230198 1138.793212890625 0)	2021-10-20T11:23:26.454	Stag	952498.26	6574035.24			2	0	0	0	0	0		4	
PointZM (378874.43247205932857469 6583402.12391514703631401 1160.56640625 0)	2021-10-20T11:30:11.718	Stag	952657.88	6574481.39			3	6	0	0	0	0		8	
PointZM (378923.62766692345030606 6583401.47062812745571136 1163.4053955078125 0)	2021-10-20T11:32:13.822	Stick nest	952707.09	6574478.09	20cm diameter		0	0	0	0	0	0			
PointZM (378938.98679041810100898 6583465.18863922916352749 1155.660400390625 0)	2021-10-20T11:35:04.578	HBT	952725.89	6574541.03			2	0	1	0	0	0		3	
PointZM (379072.98752951971255243 6583434.03382985014468431 1159.7867431640625 0)	2021-10-20T11:37:42.999	HBT	952858.33	6574502.63			0	28	0	0	0	0		5	

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (378971.47603370802244172 6583268.41715572215616703 0 0)	2021-10-20T11:39:30.922	Stick nest	952747.8	6574342.33		Stick nest 30cm diameter	0	0	0	0	0	0			
PointZM (379174.08636981633026153 6583406.24828022718429565 1157.6544189453125 0)	2021-10-20T11:41:12.658	Stick nest	952958.03	6574469.36		Stick nest 30cm diameter	0	0	0	0	0	0			
PointZM (379130.8262905206065625 6583415.3069852776825428 1159.567626953125 0)	2021-10-20T11:42:20.878	HBT	952915.22	6574480.76			1	0	0	0	0	0		3	
PointZM (379006.73820609832182527 6583422.41366555448621511 0 0)	2021-10-20T11:46:13.517	HBT stag	952791.4	6574494.57			0	0	0	0	0	0			
PointZM (379012.31581616634503007 6583419.49947182089090347 0 0)	2021-10-20T11:46:51.186	Stick nest	952796.82	6574491.34	25cm diameter		0	0	0	0	0	0			
PointZM (379031.75510293047409505 6583410.69998385943472385 0 0)	2021-10-20T11:47:30.467	Stag	952815.81	6574481.49			0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (379059.92649168451316655 6583353.06797139532864094 0 0)	2021-10-20T11:53:09.078	Stag	952840.9	6574422.29			3	0	2	0	0	0			
PointZM (379005.41458670049905777 6583380.04094249289482832 1166.599365234375 0)	2021-10-20T11:56:51.081	Stag	952787.79	6574452.23			1	2	0	0	0	0			
PointZM (379021.03007333044661209 6583368.13976223766803741 1163.87890625 0)	2021-10-20T11:58:21.288	HBT	952802.78	6574439.47			3	1	0	0	0	0			
PointZM (379019.32372073770966381 6583357.30553476139903069 0 0)	2021-10-20T11:58:28.438	HBT	952800.49	6574428.72			0	3	3	0	0	0			
PointZM (379020.26917411404429004 6583349.48724991269409657 1162.634521484375 0)	2021-10-20T11:59:31.961	Stag	952801.01	6574420.84			2	0	0	0	0	0			
PointZM (379013.64857930212747306 6583329.70857191551476717 1163.599853515625 0)	2021-10-20T12:00:11.810	Stag	952793.32	6574401.4			1	1	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (379015.78667980816680938 6583335.1731204790994525 0 0)	2021-10-20T12:00:12.268	HBT	952795.75	6574406.76			3	3	0	0	0	0		1	
PointZM (379012.95355560886673629 6583324.64259905926883221 1162.6973876953125 0)	2021-10-20T12:00:50.754	HBT	952792.35	6574396.37			1	1	0	0	0	0			
PointZM (378992.19959118950646371 6583315.4159858413040638 0 0)	2021-10-20T12:01:38.793	Stag	952771.08	6574388.26			0	0	2	0	0	0		1	
PointZM (379028.68327772838529199 6583316.31983999907970428 1161.736083984375 0)	2021-10-20T12:02:00.865	Stag	952807.64	6574387.19			0	0	0	0	0	0			
PointZM (378979.69985633547184989 6583316.0446350947022438 0 0)	2021-10-20T12:02:21.633	HBT	952758.6	6574389.56			3	0	0	0	0	0			
PointZM (379033.52781108958879486 6583324.67854554019868374 1161.69384765625 0)	2021-10-20T12:02:47.086	HBT	952812.94	6574395.29			1	1	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (378959.32380658143665642 6583286.64085174817591906 0 0)	2021-10-20T12:04:54.756	HBT	952736.62	6574361.22			2	1	0	0	0	0		2	
PointZM (379022.73985972657101229 6583264.39010525401681662 1169.7867431640625 0)	2021-10-20T12:05:41.244	Stag	952798.9	6574335.53			1	0	0	0	0	0			
PointZM (378956.68686509563121945 6583292.62345289811491966 0 0)	2021-10-20T12:05:48.179	Stag	952734.31	6574367.36	decorticating bark		0	3	0	0	0	0		2	Yes
PointZM (379006.35084154410287738 6583275.54868386127054691 1165.4620361328125 0)	2021-10-20T12:06:54.304	Stick nest	952783.09	6574347.59	Active nest - black faced cuckoo shrike		0	0	0	0	0	0			
PointZM (378957.97355736693134531 6583309.83867134898900986 0 0)	2021-10-20T12:06:58.265	HBT	952736.52	6574384.52			0	0	2	0	0	0			
PointZM (378972.64049347210675478 6583338.15100453607738018 0 0)	2021-10-20T12:07:49.859	HBT	952752.73	6574412.07			8	1	1	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (378975.4138435028726235 6583336.14101112820208073 0 0)	2021-10-20T12:08:40.209	HBT	952755.4	6574409.91			0	0	0	0	0	0			
PointZM (379007.70816067600389943 6583382.39695074502378702 0 0)	2021-10-20T12:09:23.423	HBT	952790.21	6574454.46			0	0	0	0	0	0			
PointZM (378999.44112535601016134 6583371.80902659147977829 0 0)	2021-10-20T12:09:26.995	HBT stag	952781.37	6574444.31			0	0	0	0	0	0			Yes
PointZM (378994.18865908228326589 6583383.50740878470242023 1170.3026123046875 0)	2021-10-20T12:10:01.558	HBT	952776.74	6574456.3			1	1	0	0	0	0			
PointZM (386185.81014463637256995 6587304.96348054241389036 0 0)	2021-10-20T13:53:49.529	Stick nest	960186.55	6577993.92	20cm diameter		0	0	0	0	0	0			
PointZM (386127.23987201135605574 6587305.48990757018327713 0 0)	2021-10-20T13:59:45.646	Stag	960127.95	6577997.59			10	0	0	0	0	0		1	

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (386024.13408946432173252 6587261.34780252538621426 1188.4871826171875 0)	2021-10-20T14:12:32.995	Stick nest	960022.36	6577958.97	30cm diameter		0	0	0	0	0	0			
PointZM (385992.9177469820715487 6587267.64229988027364016 1172.134521484375 0)	2021-10-20T14:16:23.271	stick nest	959991.45	6577966.95	30 diameter		0	0	0	0	0	0			
PointZM (369176.93511770066106692 6576957.3625287152826786 1266.2164306640625 0)	2021-10-21T08:19:45.931	Stag	942604.67	6568554.54			1	0	0	0	0	0			
PointZM (369181.19330486637772992 6577067.56111410725861788 1264.9527587890625 0)	2021-10-21T08:23:49.210	HBT	942614.88	6568664.58			1	1	0	0	0	0		1	
PointZM (369186.1023148613749072 6577107.22242032736539841 1256.58251953125 0)	2021-10-21T08:25:41.901	Stick nest 20cm diameter	942621.94	6568704.01			0	0	0	0	0	0			
PointZM (369164.79102399118710309 6577097.59990324266254902 1257.1329345703125 0)	2021-10-21T08:27:49.596	Stick nest	942600.09	6568695.53	20cm diameter		0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (369048.93124373076716438 6577124.39499285817146301 1268.18701171875 0)	2021-10-21T08:32:09.732	Stag	942485.59	6568728.6			1	1	0	0	0	0			
PointZM (369030.94811891409335658 6577122.48768404312431812 1268.513427734375 0)	2021-10-21T08:33:09.058	Stag	942467.49	6568727.66			2	1	0	0	0	0			
PointZM (368987.21519478160189465 6577045.47575414180755615 1256.9937744140625 0)	2021-10-21T08:34:52.215	stick nest	942419.57	6568652.95	40cm diameter		0	0	0	0	0	0			
PointZM (391055.21372736181365326 6570262.30881336145102978 1324.5277099609375 0)	2021-10-21T10:09:36.955	Stag	964140.76	6560670.82			1	1	0	0	0	0			
PointZM (391044.11869173322338611 6570236.26453028433024883 1318.5821533203125 0)	2021-10-21T10:11:42.225	HBT	964128.25	6560645.35			2	2	0	0	0	0			
PointZM (391003.28790554916486144 6570182.19112094864249229 1321.2781982421875 0)	2021-10-21T10:15:21.609	HBT	964084.45	6560593.43			3	1	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (390992.39192325109615922 6570144.40345083363354206 1324.9366455078125 0)	2021-10-21T10:17:19.684	HBT and stick nest	964071.5	6560556.19	approx 30cm diameter		1	4	1	0	0	0			
PointZM (390971.26346040680073202 6570140.29804611578583717 1320.59619140625 0)	2021-10-21T10:20:36.731	HBT	964050.12	6560553.22			3	1	0	0	0	0			
PointZM (393135.18865965737495571 6566191.75253398716449738 1342.0008544921875 0)	2021-10-21T12:19:27.286	HBT	966002.54	6556483.31			2	0	0	0	0	0		1	
PointZM (393133.39001082093454897 6566174.45226442068815231 1342.45068359375 0)	2021-10-21T12:20:50.101	Stick nest	965999.8	6556466.09	20cm diameter		0	0	0	0	0	0			
PointZM (393276.34934006596449763 6566072.28218115027993917 1324.3883056640625 0)	2021-10-21T12:23:59.298	Stick nest	966137.38	6556356.06	60cm diameter		0	0	0	0	0	0			
PointZM (393240.70259437395725399 6565714.0917388591915369 1307.4151611328125 0)	2021-10-21T13:08:04.030	Stick nest	966082.29	6555999.42	x 2 approx 30cm each		0	0	0	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (366129.1215000000083819 6581859.24849999975413084 0 0)		HBT	366129.122	6581859.25			0	0	0	0	0	0			
PointZM (389036.57346733118174598 6566155.75088605098426342 0 0)		HBT	389036.573	6566155.75			3	0	0	0	0	0		1	
PointZM (389026.8481160377850756 6566139.23338531702756882 0 0)		Stag	389026.848	6566139.23			0	0	1	0	1	0			
PointZM (389042.87960613728500903 6566183.72372373752295971 0 0)		HBT	389042.88	6566183.72			2	0		0	0	0		1	Yes
PointZM (390587.61938911303877831 6569723.11299631558358669 0 0)		HBT	390587.619	6569723.11			0	0	1	0	0	0		3	
PointZM (390880.5190953912679106 6568253.8942828681319952 0 0)		HBT	390880.519	6568253.89			0	0	1	0	0	0		1	

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (389030.21584240038646385 6566132.70230456814169884 0 0)		HBT	389030.216	6566132.7			0	0	1	0	1	0			
PointZM (390632.36247678590007126 6569765.17768345959484577 0 0)		HBT	390632.362	6569765.18			0	0	1	0	0	0	10	1	
PointZM (390881.08554288034792989 6570262.00001638289541006 0 0)		HBT	390881.086	6570262	Raptor stick nest		0	0	0	0	0	0			
PointZM (390618.85445054020965472 6569740.38653908669948578 0 0)		Stag	390618.854	6569740.39			0	0	1	0	0	0			
PointZM (389094.95439311064546928 6572027.54581586364656687 0 0)		HBT	389094.954	6572027.55			2	0	0	0	0	0		1	
PointZM (389104.74708973080851138 6572024.00763393193483353 0 0)		HBT	389104.747	6572024.01			3	0	0	1	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (388979.34215772338211536 6572170.17204668279737234 0 0)		HBT	388979.342	6572170.17			0	0	1	0	1	0	7	1	
PointZM (389041.46818913862807676 6572011.21253936924040318 0 0)		HBT	389041.468	6572011.21			0	1	0	0	0	0			
PointZM (389041.49352164776064456 6572008.78589487355202436 0 0)		Stag	389041.494	6572008.79			0	0	1	0	0	0			
PointZM (389033.77250233793165535 6566108.11595841590315104 0 0)		HBT	389033.773	6566108.12			1	0	0	1	0	0		1	
PointZM (389038.15540488820988685 6572094.90692147612571716 0 0)		HBT	389038.155	6572094.91			2	1	0	0	0	0	10	1	
PointZM (388671.17727546801324934 6571828.78117433935403824 0 0)		HBT	388671.177	6571828.78			1	1	0	0	0	0	8	1	Yes

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (388721.8317158175050281 6571926.22371653094887733 0 0)		Stag	388721.832	6571926.22			0	0	1	0	0	0			
PointZM (389043.93219808931462467 6572008.81135642807930708 0 0)		HBT	389043.932	6572008.81			0	1	0	0	0	0			
PointZM (388631.03994534659432247 6571949.67498723790049553 0 0)		HBT	388631.04	6571949.67			0	1	0	0	0	0	6	1	
PointZM (388542.6798055573599413 6572169.06334036402404308 0 0)		HBT	388542.68	6572169.06			0	1	3	0	0	0		1	
PointZM (388592.86008704651612788 6572117.68160763382911682 0 0)		HBT	388592.86	6572117.68			3	0	0	0	0	0		1	
PointZM (390878.44977164710871875 6568255.91149908676743507 0 0)		Stag	390878.45	6568255.91			0	0	1	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (386871.2159817031933926 6569514.13948307186365128 0 0)		HBT	386871.216	6569514.14			0	1	0	0	1	0		1	
PointZM (389033.65227926836814731 6566119.60569280758500099 0 0)		HBT	389033.652	6566119.61			0	0	1	0	0	0		1	
PointZM (389030.3532427396858111 6566119.57118184398859739 0 0)		Stag	389030.353	6566119.57			0	0	1	0	0	0		1	
PointZM (388643.78049580188235268 6571960.46705303713679314 0 0)		HBT	388643.78	6571960.47			2	1	0	0	0	0	4	1	Yes
PointZM (389023.63495556637644768 6566130.99188589304685593 0 0)		HBT	389023.635	6566130.99			0	0	1	0	0	0		1	
PointZM (386910.48090000002412125 6585810.29030000045895576 0 0)		HBT	386910.481	6585810.29			0	0	1	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (383607.63780000002589077 6577431.9988000001758337 0 0)		HBT	383607.638	6577432		Large	0	0	1	0	0	0			
PointZM (389152.41230000002542511 6565069.59460000041872263 0 0)		HBT	389152.412	6565069.59			0	0	2	0	0	0			
PointZM (374424.09330000000772998 6588081.598000000230968 0 0)		HBT	374424.093	6588081.6			0	0	1	0	0	0			
PointZM (379174.64120000001275912 6583204.18589999992400408 0 0)		HBT	379174.641	6583204.19		Medium hollow bearing tree	0	0	1	0	0	0			
PointZM (380151.05749999999534339 6585051.10580000001937151 0 0)		HBT	380151.057	6585051.11		4 x medium limb hollw 1 x potential trunk hollow (large)	0	4	1	0	0	0			
PointZM (379953.49800000002142042		HBT	379953.498	6587150.67		Large	0	0	2	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
6587150.66689999960362911 0 0)															
PointZM (374156.27549999998882413 6582885.93950000032782555 0 0)		HBT	374156.276	6582885.94	nesting habitat little lori. g glider habitat	Little lorikeet- (abundant small trunk hollows in living trees)	1	0	0	0	0	0			
PointZM (379318.55920000001788139 6583378.97099999990314245 0 0)		HBT	3871110.41	56567252.7			0	0	2	0	0	0			
PointZM (391062.18910000001778826 6569766.17420000024139881 0 0)		HBT	391062.189	6569766.17		2xlarge pot. Hollows approx. 4xmedium hollows. E. Obliqua DBH 130 height 35 - 40.	0	4	2	0	0	0			
PointZM (388920.33769999997457489 6564973.79769999999552965 0 0)		HBT	388920.338	6564973.8		Multiple hollows	0	0	5	0	0	0			

wkt_geom	Date-Time	Type	Easting	Northing	Notes1	Comments	Small Holl	Medium Hol	Large Holl	Small Ho_1	Medium H_1	Large Ho_1	Hollow Hei	Fissuring	Decorticat
PointZM (391493.61869999999180436 6569014.2346000000834465 0 0)		HBT	391493.619	6569014.23		Large stag w to 2xlarge >30 1xsmall<1 0	1	0	2	0	0	0			

Appendix J EPBC Protected Matters Search

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

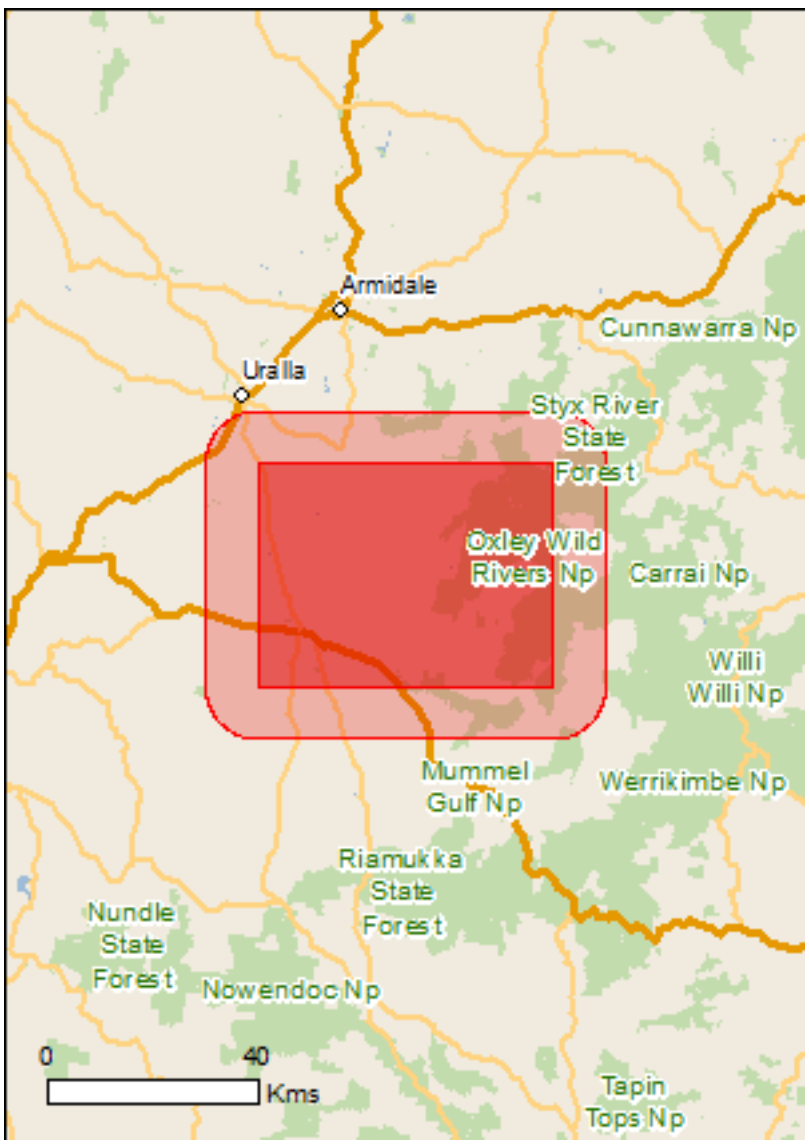
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 25/11/21 15:41:14

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

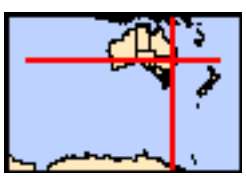
Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	59
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	34
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Gondwana Rainforests of Australia	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
Gondwana Rainforests of Australia	NSW	Listed place

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	1000 - 1100km
Gwydir wetlands: gingham and lower gwydir (big leather) watercourses	200 - 300km upstream
Riverland	1000 - 1100km
The coorong, and lakes alexandrina and albert wetland	1200 - 1300km

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community likely to occur within area
Upland Wetlands of the New England Tablelands (New England Tableland Bioregion) and the Monaro Plateau (South Eastern Highlands Bioregion)	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Atrichornis rufescens Rufous Scrub-bird [655]	Endangered	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area
Litoria piperata Peppered Tree Frog [1827]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pseudomys oralis		
Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Bertya ingramii		
a shrub [21383]	Endangered	Species or species habitat known to occur within area
Callistemon pungens		
[55581]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Diuris eborensis		
[88275]	Endangered	Species or species habitat likely to occur within area
Diuris pedunculata		
Small Snake Orchid, Two-leaved Golden Moths, Golden Moths, Cowslip Orchid, Snake Orchid [18325]	Endangered	Species or species habitat likely to occur within area
Eucalyptus mckieana		
McKie's Stringybark [20199]	Vulnerable	Species or species habitat may occur within area
Eucalyptus nicholii		
Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat known to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat likely to occur within area
Grevillea beadleana		
Beadle's Grevillea [22002]	Endangered	Species or species habitat known to occur within area
Grevillea guthrieana		
[64521]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Hakea fraseri Gnarled Corkbark, Fraser's Hakea [16093]	Vulnerable	Species or species habitat known to occur within area
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat known to occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat likely to occur within area
Pimelea cremnophila [89742]	Critically Endangered	Species or species habitat known to occur within area
Prostanthera cineolifera [11233]	Vulnerable	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Tylophora woollsii [20503]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat may occur within area
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area
Wollumbinia belli Bell's Turtle, Western Sawshelled Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle [86071]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat likely to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Aberbaldie	NSW
Cunnawarra	NSW
Forestry Management Areas in Styx River (FMZ2)	NSW
LNE Special Management Zone No1	NSW
Oxley Wild Rivers	NSW
Oxley Wild Rivers	NSW
UNE_LNE_OldGrowth	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
New England Wetlands	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.73942 151.52307,-30.73942 152.02569,-31.06464 152.02569,-31.06464 151.52307,-30.73942 151.52307

Acknowledgements

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

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

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

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

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Appendix K EPBC habitat assessment

Entities highlighted in blue have been determined to be present onsite or potentially impacted by the proposal.

Scientific Name	Common Name	EPBC ACT	Presence of habitat	Likelihood of Occurrence	SEARs requirement	Impacts likely, species presence, AOS results
Litoria castanea	Yellow-spotted Tree Frog	E	Present	Moderate	NA	Absent – not detected during targeted surveys in December 2021(See sect.4.2).
Litoria piperata	Peppered Tree Frog	V	Present	Moderate	NA	Absent – not detected during targeted surveys in December 2021 (See sect.4.2).
Anthochaera phrygia	Regent Honeyeater	CE	Marginal	Moderate	NA	Potential foraging habitat. AoS – Nonsignificant.
Apus pacificus	Fork-tailed Swift	M	Present	Moderate	Impact Likely	AoS – Significant. Risk stated as moderate by NA for collision risk,
Gallinago hardwickii	Latham's Snipe	M	Marginal	Moderate	NA	Potential foraging habitat. AoS – Nonsignificant.
Grantiella picta	Painted Honeyeater	V	Present	Moderate	NA	Potential foraging habitat. AoS – Nonsignificant.
Lathamus discolor	Swift Parrot	CE	Marginal	Moderate	NA	Potential foraging habitat. AoS – Nonsignificant.
Arthraxon hispidus	Hairy Jointgrass	V	Marginal	Moderate	NA	Absent – not detected during targeted surveys in March 2021; April 2021; November 2020 & 2021; December 2021 (See sect.4.2).
Bertya ingramii	Narrow-leaved Bertya	E	Marginal	Moderate	Potential Impact	Absent – not detected during targeted surveys in March 2021; April 2021; September 2020; October 2020 & 2021;

Scientific Name	Common Name	EPBC ACT	Presence of habitat	Likelihood of Occurrence	SEARs requirement	Impacts likely, species presence, AOS results
						November 2020 & 2021; December 2021 (See sect.4.2).
Callistemon pungens		V	Marginal	Moderate	NA	Absent – not detected during targeted surveys in September 2020; October 2020 & 2021; November 2020 & 2021; December 2021 (See sect.4.2).
Dichanthium setosum	Bluegrass	V	Present	Recorded	NA	AoS – Significant. Species detected. Offsets have been generated under the BOS.
Diuris eborensis		E	Marginal	Moderate	NA	Absent – not detected during targeted surveys in November 2020 & 2021; December 2021 (See sect.4.2).
Diuris pedunculata	Small Snake Orchid	E	Present	High	NA	Absent – not detected during targeted surveys in September 2020; October 2020 & 2021 (See sect.4.2).
Eucalyptus mckieana	McKie's Stringybark	V	Present	Moderate	NA	Absent – not detected during targeted surveys in March 2021; April 2021; September 2020; October 2020 & 2021; November 2020 & 2021; December 2021 (See sect.4.2).
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	Present	Recorded	Impact Likely	AoS – Detected. Offsets have been generated under the BOS.
Euphrasia arguta		CE	Marginal	Moderate	NA	Absent – not detected during targeted surveys (See sect.4.2).
Grevillea beadleana	Beadle's Grevillea	E	Marginal	Moderate	NA	Absent – not detected during targeted surveys in November 2020 & 2021; December 2021; March 2021 (See sect.4.2).

Scientific Name	Common Name	EPBC ACT	Presence of habitat	Likelihood of Occurrence	SEARs requirement	Impacts likely, species presence, AOS results
Hirundapus caudacutus	White-throated Needletail	M	Present	Assumed Present	Impact Likely	AoS – Significant. Risk stated as moderate by NA for collision risk, not detected during surveys but multiple EBird records
Persicaria elatior	Tall Knotweed	V	Marginal	Moderate	NA	Absent – not detected during targeted surveys in March 2021; April 2021; & December 2021 (See sect.4.2).
Picris evae	Hawkweed	V	Present	High	NA	Absent – not detected during targeted surveys (See sect.4.2).
Thesium australe	Austral Toadflax	V	Present	High	Transport route	Absent – not detected during targeted surveys (See sect.4.2).
Dasyurus maculatus maculatus	Spotted-tailed Quoll	E	Present	Recorded	Impact Likely	AoS – Significant,. Detected, is an ecosystem credit generating species, and credits have been generated under the BOS.
Petauroides volans	Greater Glider	V	Present	Recorded	Impact likely	AoS – Species detected. Species credits have been generated under the BOS.
Petrogale penicillata	Brush-tailed Rock-Wallaby		Present	Moderate	Potential Impact	Absent – not detected during targeted surveys (See sect.4.2).
Phascolarctos cinereus	Koala	V	Present	Recorded	Impact likely	AoS – Species detected. Species credits have been generated under the BOS.
Pseudomys oralis	Hastings River Mouse	E	Marginal	Moderate	NA	Absent – not detected during targeted surveys in December (See sect.4.2).
Pteropus poliocephalus	Grey-headed Flying-fox	V	Marginal	Moderate	NA	–Absent – breeding habitat not detected during surveys, however foraging habitat is present. AOS nonsignificant.

Scientific Name	Common Name	EPBC ACT	Presence of habitat	Likelihood of Occurrence	SEARs requirement	Impacts likely, species presence, AOS results
Uvidicolus sphyrurus	Border Thick-tailed Gecko	V	Present	Moderate	NA	Absent – not detected during targeted surveys (See sect.4.2).
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands		CE	Present	Known	Impact likely	AoS – Ecosystem credits have been generated under the BOS.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE	Present	Known	Transport Route	AoS – Ecosystem credits have been generated under the BOS.

Appendix L EPBC Assessment of significant impact

The EPBC Act specifies factors to be taken into account in deciding whether a development is likely to significantly affect EEC, threatened species and migratory species, listed at the Commonwealth level. Section 7.5 details the EPBC species that were required to be assessed as part of the BDAR. The following assesses the significance of the likely impacts associated with the proposed works on species that were either detected onsite or are considered at risk due to the proposed wind farm operation:

- New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands ecological community (critically endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered)
- Spotted-tail Quoll *Dasyurus maculatus* (Endangered)
- Koala *Phascolarctos cinereus* (Vulnerable)[7]
- Greater Glider *Petauroides volans* (Vulnerable)
- Narrow-leaved Black Peppermint *Eucalyptus nicholii* (Vulnerable)
- Swift Parrot *Lathamus discolor* (Critically Endangered)
- Regent Honeyeater *Anthochaera phrygia* (Critically Endangered)
- Painted Honeyeater *Grantiella picta* (Vulnerable)
- Bluegrass *Dichanthium setosum* (Vulnerable)
- White-throated Needletail *Hirundapus caudacutus* (Vulnerable)
- Fork-tailed Swift *Apus pacificus* (Vulnerable)
- Latham's Snipe *Gallinago hardwickii* (Migratory)
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable)

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

In the context of the assessments below, 'the action' refers to 'the proposal' as described in Section 1.1. All MNES entities proposed to be impacted by the proposal are mapped in Figure 7-2.

Significant impact criteria

a) An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
    - *reduce the area of occupancy of the species*
    - *fragment an existing population into two or more populations*
    - *adversely affect habitat critical to the survival of a species*
    - *disrupt the breeding cycle of a population*

[7] Koala has since been up-listed from Vulnerable to Endangered, however under the EPBC Act the project was declared a controlled action when Koala was vulnerable, and therefore this assessment continues to assess Koala as vulnerable.

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

b) A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- *a geographically distinct regional population, or collection of local populations, or*
- *a population, or collection of local populations, that occurs within a particular bioregion.*

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

- *lead to a long-term decrease in the size of an important population of a species*
- *reduce the area of occupancy of an important population*
- *fragment an existing important population into two or more populations*
- *adversely affect habitat critical to the survival of a species*
- *disrupt the breeding cycle of an important population*
- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*
- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*
- *introduce disease that may cause the species to decline, or*
- *interfere substantially with the recovery of the species.*

d) Each of these criteria are addressed below. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

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

L.1 New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands

a) reduce the extent of an ecological community?

New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodland CEEC in the New England Tableland Bioregion is considered to be very poorly reserved throughout its range, with less than 3% of the remaining area thought to occur within the conservation estate (Benson & Ashby, 2000; Benson et al. 2010). Reserves containing the community include Bolivia Hill, Booroolong, Duval, Imbota and Yina Nature Reserves.

There is native vegetation within the development site which conforms to New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands, with 143.45ha occurring in the Development site. This CEEC was a key focus during project design to best avoid impacts (see Section 6). Less than 1% of the CEEC within the Development site (1.42ha) will be removed due to the project. Of this, all of it is woodland.

The project is not likely to significantly reduce the local extent of the community.

b) fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The CEEC occurring within the development site has poor connectivity generally. Historical clearing for agricultural (predominantly livestock grazing) has meant that most areas of the CEEC that exist within and outside of the development footprint do not connect with one another. As much of the community that would be removed constitutes small patches with an already sparse, poorly connected canopy, the project would result in only minor further fragmentation of the community.

c) Will modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

Whilst surface flows will be temporarily altered during construction, it is considered unlikely that the abiotic factors necessary for the community's survival would be modified or destroyed by the project with standard controls put into place (i.e., see Section 8).

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

The project will remove an area of 1.42ha of New England Peppermint Grassy Woodland CEEC. These areas are already influenced by the invasion of exotic improved pasture species but contain enough native understory to be considered analogous with this community.

There are three discrete patches of New England Peppermint Grassy Woodland CEEC within the Development site. Of these, one is already bisected by Bark Hut Road and all three are currently under grazing.

Weed management and other mitigation measures will limit impacts from edge effects and the project is not expected to exasperate the invasion of exotic improved pasture species within CEEC outside of the development footprint.

As such, the project will not cause a substantial change in the species composition of the CEEC within the Development site.

e) cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

- **assisting invasive species, that are harmful to the listed ecological community, to become established, or**
- **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or**
- **interfere with the recovery of an ecological community**

The project is not considered likely to generate an increase in invasive species harmful to the ecological community. Mitigation measures implemented during construction will manage and restrict weed movement through the project site.

It is considered unlikely that project would kill or inhibit the growth of the community from the regular mobilisation of fertilisers, herbicides or other chemicals. Weed control will be done in accordance with the project BMP and will be sensitive to CEEC presence within the Development site and beyond.

The New England Peppermint Grassy Woodland CEEC that occurs within the development site is already highly modified and subject to ongoing land use pressures, lowering its overall conservation value.

Conclusion

The project will impact on 1.42ha of New England Peppermint Grassy Woodland CEEC. This is considered unlikely to generate a significant impact to the community and impacts to this community will be managed by the BOS under the NSW Bilateral Agreement.

L.2 White Box – Yellow Box – Blakely's Red Gum grassy woodland and derived native grassland

a) reduce the extent of an ecological community?

Australia-wide, there are an estimated 416,325ha of EPBC Act listed White Box-Yellow Box Blakley's Red Gum Grassy Woodland and Derived Native Grassland remaining, which is only 8% of its original pre-1750 extent (Threatened Species Scientific Committee, 2006). Within NSW, there are an estimated 250,729ha of this TEC remaining, 7% of the pre-1750 extent (Threatened Species Scientific Committee, 2006). As these are 15-year-old estimates, the current extent within NSW and Australia-wide is likely to be lower.

This community is considered to be critically endangered under the EPBC Act.

Native vegetation that is considered to conform to White Box – Yellow Box – Blakeley's Red Gum – Grassy Woodland and Derived Native Grassland (Box-gum Woodland and grasslands CEEC) occurs within the development site. This represents areas of both PCT 510, which occurs within the development site as a woodland and derived native grassland, and of PCT 567 that have co-dominance of Yellow Box and Blakely's Red Gum.

There is 217.19ha of White Box-Yellow Box Blakley's Red Gum Grassy Woodland and Derived Native Grassland CEEC within the development site. The total area of the CEEC to be directly impacted by the proposal is 36.1ha (17% of the extent within the broader development site).

As such, the project is likely to reduce the local extent of the community

b) fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The Box-gum Woodland and grasslands CEEC occurring within the development site has low connectivity generally. Historical clearing for agricultural livestock grazing has meant that most areas of the CEEC that exist within and outside of the development footprint do not connect with one another. As much of the community that would be removed constitutes small patches with a sparse, poorly connected canopy, the project would result in only minor additional fragmentation of the community.

c) Will modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

Whilst surface flows will be temporarily altered during construction, it is considered unlikely that the abiotic factors necessary for the community's survival would be modified or destroyed by the project with standard controls put into place (i.e., see Section 8).

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

The project will remove an area of approximately 36.1ha of Box-gum Woodland and grasslands CEEC. These areas are already influenced by the invasion of exotic improved pasture species but contain enough native understory to be considered analogous with this community.

Weed management and other mitigation measures will limit impacts from edge effects and the project is not expected to exacerbate the invasion of exotic improved pasture species within CEEC outside of the development footprint.

As such, the project will not cause a substantial change in the species composition of the CEEC within the Development site.

f) cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

assisting invasive species, that are harmful to the listed ecological community, to become established, or

causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or

interfere with the recovery of an ecological community

The project is not considered likely to generate an increase in invasive species harmful to the ecological community. Mitigation measures implemented during construction will manage and restrict weed movement through the project site.

It is considered unlikely that project would kill or inhibit the growth of the community from the regular mobilisation of fertilisers, herbicides or other chemicals. Weed control will be done in accordance with the project BMP and will be sensitive to CEEC presence within the Development site and beyond.

The Box-gum Woodland and grasslands CEEC that occurs within the development site is already highly modified and subject to ongoing land use pressures, lowering its overall conservation value.

Conclusion

The project will impact on 36.1ha of Box-gum Woodland and grasslands CEEC. This is considered likely to generate a significant impact to the community and impacts to this community will be managed by the BOS under the NSW Bilateral Agreement.

L.3 Spotted-tail Quoll (*Dasyurus maculatus maculatus)*

a) Lead to a long-term decrease in the size of a population of a species?

Evidence of the EPBC Act endangered Spotted-tail Quoll was observed twice in November 2019, both times within dense patches of woodland outside of the development footprint in the centre of the development boundary. The project contains approximately 426ha of suitable habitat for this species. Suitable habitat for Spotted-tail Quoll includes mature, wet forest with greater than 600 mm rainfall per annum (Belcher, 2000; Edgar & Belcher, 2008). Belcher (2000) also identified that this species prefers cliffs, caves, escarpments and other rocky habitat.

Areas of denser vegetation contain an abundance of fallen logs and some rocky areas. 426ha of potential habitat will be removed or modified as a result of the project. This includes isolated areas of rock outcrop within the development site, mostly consisting of largely embedded rock and sporadic loose rock. This area represents approximately 7% of suitable habitat available to this species in the wider development site.

The risk of direct mortality as a result of clearing is considered unlikely given the mitigation measures which will be applied (Section 8, i.e., clearing will be undertaken with supervision by an ecologist or trained spotter catcher to allow for resident fauna to relocate). The other associated impacts including habitat fragmentation and direct removal of potential foraging habitat are likely to have significant residual impact to the species.

b) Reduce the area of occupancy of a population

As noted above, 426ha of potential habitat will be removed or modified as a result of the project. Whilst the project has been designed to minimise impacts to areas of good quality vegetation where possible, impacts to potential Spotted-tail Quoll habitat cannot be avoided. However, large stands of protected, good quality habitat are available within the wider development site and the adjacent Oxley Wild Rivers.

As such, the project is likely to reduce the local area of occupancy of this species but not the total range of the population.

c) Fragment an existing population into two or more populations;

The project will result in the direct loss of foraging habitat and shelter which may interrupt the species ability to move freely throughout the landscape, however areas of clearing and hardstand associated with access tracks to wind turbines will not present a significant barrier to this mobile species.

Intact patches of dense vegetation and higher condition vegetation have been preferentially avoided through design.

Due to the above, the linear nature of the project and the species being highly mobile, the project is unlikely to fragment an existing important population into two or more populations.

d) Adversely affect habitat critical to the survival of a species

While there is no current critical habitat declared for this species, Spotted-tail Quolls are known to depend on woodland areas with an abundance of rocky areas and fallen logs to provide potential den sites.

Approximately 426ha of suitable habitat would be removed, this does not represent continuous habitat but rather fragmented portions. This species has a substantial home range, with an estimate of 620–2,560ha for males, and 90–650ha for females (Claridge, et al., 2005). Spotted-tail Quoll range has reduced significantly over the years, and in NSW is now limited to within 200km of the coast between Kosciuszko

National Park and the Queensland border, including gorges and escarpments of the New England Tableland (Maxwell, Burbidge, & Morris, 1996).

Considering the large home range and distribution of the Spotted-tail Quoll, along with the availability of quality habitat adjacent to the development site, it is unlikely that the habitat to be impacted by the project is critical to the survival of this species, though is likely to be valuable to local individuals.

e) Disrupt the breeding cycle of a population

Research by Belcher and Darrant (2004) show that Spotted-tail Quoll require suitable den sites for breeding. Where available, complex rocky outcrops and large hollow logs are preferentially used as denning sites for Spotted-tail Quoll (Belcher & Darrant, 2004; Glen & Dickman, 2006). Where preferred denning habitat is absent, Spotted-tail Quoll have been recorded using HBTs. Spotted-tail Quoll are known to occupy very large home ranges (up to several thousand hectares) and use multiple dens (up to 20) (Long & Nelson, 2010; Claridge, et al., 2005).

426ha of potential breeding habitat would be removed, however, the availability of quality habitat adjacent to the development site would remain untouched. As such, the project is considered unlikely to disrupt the breeding cycle of an important population.

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

It is considered that the project will not impact the availability of quality of habitat to the extent that the species is likely to decline. However, the direct loss of 426ha may contribute to the local population declining.

g) Result in invasive species that are harmful to an vulnerable species becoming established in the endangered species' habitat

Dietary overlap between Spotted-tail Quoll and invasive species such as the Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*) and Wild Dog (*Canis lupus ssp*.) presents strong competition for resources, with small-medium mammals being an important prey item for all of them. Glen & Dickman (2006) found the most important prey for all these predators were small to medium-sized mammals, with Greater Glider the most frequently consumed mammal by Spotted-tail Quoll.

The invasive Red Fox, Feral Cat and Feral Dog are known to already exist within the development site. The Biodiversity Management Plan (see Section 8) will include weed and pest management measures to reduce the likelihood of spreading and increasing the number of invasive fauna. As such, it is considered unlikely that the project will result in invasive species that are harmful to Spotted-tail Quoll.

h) Introduce disease that may cause the species to decline;

Ectoparasites have been recorded on Spotted-tail Quoll within NSW, causing a mange-like skin condition when coupled with environmental stressors (Vilcins, Old, Kortner, & Deane, 2008). Feral cats may spread disease which affects Spotted-tail Quoll (Department of Planning and Environment, 2022).

With the implementation of pest animal management measures, it is considered unlikely that diseases will be introduced as a result of the project.

i) Interfere substantially with the recovery of the species;

The National Recovery Plan for the Spotted-tailed Quoll evaluates success of the recovery plan against a number of criteria with the follow of particular relevance:

- Reduce the rate of habitat loss and fragmentation on private land.
- Determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations.

Introduced predators will be actively managed across the development site through both construction and operation. Habitat within the development site is already fragmented, and patches of dense and/or higher condition habitat has preferentially been avoided by the project design. Notwithstanding this, the project will result in the loss of up to 426ha potential habitat for this species and therefore is inconsistent with the objectives of the recovery plan and may interfere with the recovery of this species.

Conclusion

The project will result in the loss of up to 426ha potential habitat for this species which may lead to a long-term decrease in the local population, reduce the area of occupancy for the local population and interfere with the recovery of the species.

Considering the above, a significant residual impact is considered likely. Impacts to this species will be managed by the BOS under the NSW Bilateral Agreement.

L.4 Koala (*Phascolarctos cinereus)*

a) Lead to a long-term decrease in the size of an important population

Targeted surveys undertaken revealed evidence of the EPBC Act Vulnerable[8] Koala via scats at three (3) locations within the development site. Despite more than 2,600 survey hours spent on site by the NGH ecology team over 2021 and 2022, no other sign was recorded and there was no direct sighting (see section 4.2.5 for information on targeted surveys).

As such, this species is considered to exist on site, albeit in low numbers or potentially in a transient manner. The Project is located at the edge of an area of much larger and well-connected Koala habitat, which forms a contiguous landscape across the adjacent protected areas, with patchy connectivity in the flats through agricultural lands.

It is acknowledged that the severe bushfires of 2019/20 significantly impacted the combined Koala population of Qld, NSW and the ACT, with 12% of the Koala population within the fire extent (Department of Agriculture, Water and the Environment, 2020a). As a result, Koala has been identified as high priority mammal species recommended for urgent management intervention to support ecological recovery (Department of Agriculture, Water and the Environment, 2020b).

There is 1,605.59ha of Koala habitat across the development site, with 206.73ha in the development footprint directly impacted (13% of the available habitat in immediate proximity).

Given the linear nature of the proposed project and the minimisation, avoidance and mitigation measures which will be applied (see Sections 6 and 8), a long-term decrease in the local population size is considered unlikely.

b) Reduce the area of occupancy of an important population

[8] Koala status was Vulnerable at the time of the controlled action decision on the EPBC referral. Despite up-listing to Endangered in February 2022, this species will be assessed against the Vulnerable criteria.

Koalas are known to be associated with all PCTs recorded on site, as such up to 206.73ha of suitable koala habitat will be cleared. Whilst the project has been designed to minimise impacts to areas of good quality vegetation where possible, impacts to Koala habitat cannot be avoided. However, large stands of protected, good quality habitat is available within Oxley Wild Rivers.

As such, the project is likely to reduce the local area of occupancy of this species but not the extent of occurrence of the population.

c) Fragment an existing important population into two or more populations;

Large remnant vegetation patches occur to the east outside of the development site, which provide opportunities for long-term Koala habitat and movement.

The Project will result in localised loss of habitat from areas immediately adjacent to the existing tracks, but also from the construction of new tracks/roads through the ridge lines. Project design has sought to minimize clearing widths.

Construction activities may disturb Koalas and have a short-term impact on their movement. This impact will be mitigated by education and awareness campaigns for site personnel and visitors, signage, and enforced speed limits. While roads and turbine hardstand could disrupt movement during operation, access to these will be restricted to private use only (for farmers and wind farm staff) and will have strict speed limits. With these measures in place, it is not expected that the roads will pose a physical barrier to Koala movement. Koalas will be able to move across roads without being injured or killed due to the low number and slow movement of vehicles, particularly at night when Koalas are more likely to move (although daytime movements are also undertaken by Koala), and when there would be almost no vehicle movements unless in the event of an emergency or urgent maintenance matter.

Ecological connectivity for this species will therefore not be impacted by the development.

d) Adversely affect habitat critical to the survival of a species

The habitat assessment tool was applied to the proposed site and resulted in the entire proposal site being considered critical habitat for this species (score of 8).

206.73ha of potential habitat would be removed. Considering this, it is likely that the proposal will adversely affect habitat critical to the survival of the species.

e) Disrupt the breeding cycle of an important population

Outside of quality habitat with the capacity to support population growth, Koalas appear to have no specific microhabitats required for breeding. As such, and considering the lack of isolation impacts on the species, the project is unlikely to disrupt the breeding cycle of this species.

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

The distribution of Koala occurs from Queensland to South Australia, as such, it is considered that the project will not impact the availability of quality of habitat to the extent that the species is likely to decline. However, the direct loss of 206.73ha may contribute to the local population declining.

g) Result in invasive species that are harmful to an vulnerable species becoming established in the vulnerable species' habitat

Predation by dogs is one of the key threats facing Koala (Threatened Species Scientific Committee, 2012), and Wild Dog is known to occur in the area. There is potential for their impact on Koala to increase because of the project. Clearing vegetation may require Koala to become grounded as they move through the landscape, where they are more susceptible to dog attack. Predators (such as dogs) also hunt more efficiently in cleared areas, however it is noted that much of the development site is already cleared or partially cleared.

Active pest animal management (see Section 8) throughout the project will address the risk from feral dogs and it is considered unlikely that the project will result in the establishment of invasive species that are harmful to Koalas.

h) Introduce disease that may cause the species to decline;

Two diseases are known to affect Koalas which are Chlamydia and Koala retro virus.

Chlamydia is harmless in populations with unlimited resources, but manifests in times of stress, which happens when habitat is reduced (Australian Koala Foundation, 2020). The proposed clearing of vegetation may cause some stress to existing Koala located within the development footprint. However, the site will clear approximately 12.88% of the vegetation available to Koala in the development site, and an extensive area of additional habitat will be retained outside of this.

Mitigation measures will be put in place to reduce or manage the risk of disease for Koala. Measures involving washing down vehicle and equipment that may carry vegetation pathogens known to affect Koala food trees will be enforced. Quarantine and biosecurity procedures will be maintained throughout the life of the action's impact and a procedure will be in place for Koalas which are found to be affected by disease to manage the spread of disease through the site from wind farm activities.

Additional mitigation measures include those designed to reduce stress to Koalas during vegetation clearing, including the use of a fauna spotter during all clearing activities. The fauna spotter team will include staff with wildlife health experience, who can identify suffering individuals and transport them to a wildlife vet for treatment. It is unlikely that the proposed clearing will stress existing Koalas and increase the occurrence of chlamydia within the area.

i) Interfere substantially with the recovery of the species

The National Recovery Plan for the Koala is yet to be finalised, however, an interim recovery objective for this species is:

Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas.

The impacts of the proposed project will result in the loss of up to 206.73ha potential habitat for this species, as such, the project is inconsistent with this objective and may exacerbate this threat to the local population resulting in the potential interference with the recovery of this species.

Conclusion

The project will result in the loss of up to 206.73ha of potential habitat for this species which may lead to a long-term decrease in the local population, reduce the area of occupancy for the local population and interfere with the recovery of the species.

Considering the above, a significant residual impact is considered likely. Impacts to this species will be managed by the BOS under the NSW Bilateral Agreement.

L.5 Greater Glider *(Petauroides volans)* [9]

a) **Lead to a long-term decrease in the size of an important population of a species?**
Targeted nocturnal surveys undertaken in February 2020 detected 13 Vulnerable Greater Gliders within a vegetated area connected to bushland outside of the development site, near the development site's south-eastern boundary. The Greater Glider are known to occur along the east coast of mainland Australia, from central Queensland to central Victoria. Within NSW, the species is known to exist as far west as Mount Kaputar National Park. This indicates Greater Glider may inhabit suitable habitat from the coast to Mount Kaputar National Park, such that the development site is not near the limit of the species' range. Oxley Wild Rivers State Conservation Area (Conservation Area) borders the eastern boundary of the development site, with numerous Bionet records existing within the Conservation Area. The individuals recorded within the development site are likely to form part of the population present within the Conservation Area, whose range includes connected bushland which enters the development along the eastern boundary. This population is considered important as it may be a source population for breeding or dispersal. Habitat for Greater Glider within the development footprint is limited to treed areas with good connectivity as the species are unable to traverse large disconnects in canopy. Up to 205.7ha of foraging habitat would be removed, which is 12% of the total available within the development site (1,487.55 ha). Although foraging resources are poor in quality due to historical disturbance (i.e., bushfire and drought), they may contain forage species preferred by Greater Glider which provide seasonally important resources and provide shelter for the population to move across the landscape. Given the above, the project is unlikely to lead to a long-term reduction in the population, though has the potential to impact the local population by removing seasonally important resources and limiting safe-passage for individuals moving across the landscape.
b) Reduce the area of occupancy of an important population
While there will be habitat removal as above, this unlikely to reduce the area of occupancy for this population.
c) Fragment an existing important population into two or more populations;
Due to historical land use and clearing, connectivity of Greater Glider habitat across the development site is relatively poor. However, some good condition corridors within the development site remain. Where possible, habitat corridors will be avoided and opportunities for post-works restoration of habitat connectivity will be explored as part of the final design. Given the mitigation measures and nature of the project, it is considered unlikely to fragment an existing important population into two or more populations. Linear clearing associated with the project design is typically only 25m wide. There is potential for reduced connectivity between habitat patches in areas where clearing widths are greater than 50m (see Section 7.3.1 for a discussion of average glide distances for this species). Given the current design, it is unlikely that linear clearing will exceed 40m. If landscape constraints necessitate clearing widths in excess of 40m (not currently planned), the project will commit to the installation of crossing infrastructure, including glider poles and removeable rope bridges to ensure that Greater Glider can safely move across the project footprint. This would not be expected to occur to the extent that it would result in fragmentation of a population.

[9] Greater Glider has been up-listed from Vulnerable to Endangered, however as it was declared a controlled action when this species was Vulnerable, it will continue to be assessed under EPBC as Vulnerable.

d) Adversely affect habitat critical to the survival of a species

There is currently no specific definition of habitat critical to the survival of Greater Glider (Threatened Species Scientific Committee, 2016).

Greater Glider are typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Greater Glider prefer forests with a diversity of eucalypt species, and the habitat within the project site is likely to be important to this species.

205.7ha of habitat will be impacted by the project. The project will avoid removing large tree hollows wherever possible through detailed design. To date, the project has been designed to avoid intact patches of mature vegetation with dense HBTs. The habitat to be impacted is unlikely to be critical for the survival of this species though is likely to be important to individuals within the locality.

e) Disrupt the breeding cycle of an important population

Females give birth to a single young between March and June, with sexual maturity reached in the second year. Generation length is likely to be 7−8 years. A low reproductive rate means that isolated populations in small remnant vegetation patches are prone to extinction (TSSC, 2016).

Greater Gliders depend on hollows for breeding. During the day they shelter in tree hollows, with a particular selection for large hollows in large, old trees (TSSC, 2016). Greater Glider require at least 2-4 live den trees for every 2ha of suitable forest habitat (Eyre, 2002). In northern NSW, this species is absent from forests with less than 6 hollows per ha (Smith, Mathieson, & Hogan, 2007).

Numerous trees with large hollows occur throughout the development site. Large trees with hollows will be avoided where possible, though many will be unavoidable.

Due to the protected, good quality, contiguous habitat available adjacent to the site, the project is considered unlikely to disrupt the breeding cycle of an important population, however, has the potential to disrupt the breeding cycle for the local population.

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

The distribution of the Greater Glider occurs from Central Queensland to Central Victoria, as such, it is considered that the project will not impact the availability of quality of habitat to the extent that the species is likely to decline. However, given the small home range and low dispersal ability of this species, it is likely that this habitat is relied upon by local Greater Gliders and would generate a significant residual impact for local populations.

g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Several invasive flora and fauna species have been recorded within the development site. Mitigation measures such as a Biodiversity Management Plan will include weed and pest management which will outline mitigation and monitoring measures to reduce the likelihood of spreading and increasing the number of invasive flora and fauna. As such, it is considered unlikely that the project will result in invasive species that are harmful to the Greater Glider becoming established in its habitat.

h) Introduce disease that may cause the species to decline;

Chlamydia has been recorded in Greater Gliders in the past (Bodetti, Viggers, & Swan, 2003; Maloney, 2007). Although not debilitating, the disease has the potential to decrease the vigour of the population. Stress is regarded as a major factor in an animal's susceptibility to Chlamydia (Maloney, 2007). The Development would impact up to 144.73ha of suitable habitat which has the potential to cause a stress response in individuals within the immediate vicinity.

Spread of Root-rot Fungus *Phytophthora cinnamomi* causing tree dieback is another potential threat to the Greater Glider by reducing available foraging and nesting habitat.

These threats will be mitigated through hygiene protocols applied throughout the project and ongoing management. No other diseases are considered likely to be introduced as a result of the project. As such, the introduction of disease that may cause the decline of this species is considered unlikely.

i) Interfere substantially with the recovery of the species;

There is currently no recovery plan for this species but known threats to the species includes habitat removal, loss of hollow bearing trees and inappropriate fire regimes. The project will impact up to 205.7ha of habitat for Greater Glider, which may interfere with the recovery of this species.

Conclusion

Considering the small home range and low dispersal ability of this species, the habitat to be removed may provide an important resource and ongoing shelter for the species to move safely across the landscape. This may lead to malnourishment or decreased reproductive output reducing the carrying capacity of the population.

Considering the above, a significant residual impact is considered likely. Impacts to this species will be managed by the BOS under the NSW Bilateral Agreement.

L.6 Narrow-leaved Black Peppermint (*Eucalyptus nicholii)*

a) Lead to a long-term decrease in the size of an important population of a species?

Targeted flora surveys throughout 2020 and 2021 detected 13 Narrow-leaved Black Peppermint individuals within the development footprint.

Narrow-leaved Peppermint is known from less than 40 localities on the NSW Northern Tablelands (Peacock, 1996), stretching northwards from the Walcha–Niangala district just east of Tamworth, to just north of Glen Innes (CHAH, 2008). The development footprint is located within the eastern extent for this species. The individuals recorded within the development site are likely to form part of the population present within the Oxley Wild Rivers State Conservation Area whose range includes connected bushland which enters the development along the eastern boundary. This population is considered an important population as it may be a source population for breeding or dispersal and a population key to maintaining genetic diversity to the eastern extent of this species.

Due to historical clearing for agricultural practices, habitat for this species within the development footprint is limited to areas of poor connectivity and individuals often exist in the form of paddock trees. Whilst the project would aim to avoid the removal of individuals where possible, up to 13 individuals may be removed as a result of the project. The project has been able to avoid over 85 individuals.

Considering the above, the project is likely to lead to a long-term decrease in the size of an important population.

b) Reduce the area of occupancy of an important population
This species is known from only 40 locations in the tablelands, with majority of trees occurring on private property, with the exception of a small population within Oxley Wild Rivers National Park and Single National Park (Copeland 2001, cited in (Department of the Environment, Water, Heritage and the Arts, 2008). Up to 13 individual trees would be removed as a result of the project. As such, the project will reduce the area of occupancy of this species.
c) Fragment an existing important population into two or more populations;
Due to historical land use and clearing, connectivity of habitat for Narrow-Leaved Black Peppermint across the development site and immediate surrounds is poor. Although the project has aimed to avoid impacts to this species (Section 6), 13 individuals would be removed as a result of the project. As the removal of individuals and habitat would be in a linear fashion and the existing project site is already subject to relatively poor connectivity, the project is unlikely to fragment the local population.
d) Adversely affect habitat critical to the survival of a species
No habitat critical for the survival of the species has been declared, however, the species typically grows in dry grassy woodland, on shallow soils of slopes and ridges. It is found primarily on infertile soils derived from granite or metasedimentary rock. The project will result in the loss of up to 13 individuals. As such, the project is likely to adversely affect habitat critical to the survival of this species.
e) Disrupt the breeding cycle of an important population
Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. The species is likely to regenerate well after soil disturbance, but over grazing and fire frequencies of more than one per decade may inhibit long-term seedling recruitment (Binns 1995). As the nature of the project is restricted and linear in nature, although a reduction in an area of occupancy and individuals is considered to occur, the significance of this in regard to disrupting the breeding cycle is considered negligible. Stringent mitigation measures will be implemented to ensure no direct and indirect impacts to individuals of this species outside of the development.
f) Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The project will result in the loss of up to 13 individuals of this species. Given the current population is not well represented in reserves, private property occurrences are therefore particularly relevant to conserving representative populations of the species (Peacock, 1996). As such, the project is considered likely to contribute to the loss of habitat and this species could be at risk of further decline.
g) Result in invasive species that are harmful to an vulnerable species becoming established in the vulnerable species' habitat
This species is at risk to invasion and spread of exotic grasses, such as Coolatai and African love grass, which outcompete juveniles and increase the frequency and intensity of fires.

Several invasive flora species have been recorded within the development site. The Biodiversity Management Plan (Section 8) will include weed and pest management measures to reduce the likelihood of spreading and increasing the number of invasive flora. As such, it is considered unlikely that the project will result in invasive species that are harmful to Narrow-leaved Black Peppermint becoming established in its habitat.

h) Introduce disease that may cause the species to decline;

The project is not considered likely to introduce disease harmful to this species. Mitigation measures implemented during construction such as strict hygiene protocols applied throughout the project and ongoing management.

i) Interfere substantially with the recovery of the species;

The Approved Conservation Advice for the Narrow-leaved Black Peppermint states the following Regional Priority Actions which are relevant to the project include: Habitat Loss, Disturbance and Modification in order to address this the following is recommended:

- Monitor known populations to identify key threats.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Manage threats to areas of vegetation that contain populations/occurrences/remnants of Narrow-leaved Peppermint.
- Ensure road widening and maintenance activities (and other infrastructure or development activities involving substrate or vegetation disturbance) in areas where Narrow-leaved Peppermint occurs do not adversely impact on known populations.
- Develop and implement a suitable fire management strategy for Narrow-leaved Peppermint.
- Raise awareness of Narrow-leaved Peppermint within the local community, particularly among land-holders with this species on their properties.

The project will result in the loss of up to 13 individuals of this species, as such, the project is inconsistent with the objectives of the priority actions and may interfere with the recovery of this species.

Conclusion

The project will result in the loss of up to 13 individuals of this species which may lead to a long-term decrease in the local population, reduce the area of occupancy for the local population and interfere with the recovery of the species.

Considering the above, a significant residual impact to Narrow-leaved Black Peppermint is considered likely. Impacts to this species will be managed by the BOS under the NSW Bilateral Agreement.

L.7 Swift Parrot (*Lathamus discolor*) & Regent Honeyeater (*Anthochaera phrygia*)

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

a) Lead to a long-term decrease in the size of a population

Up to 286ha (Regent Honeyeater) and 426ha (Swift Parrot) of potential habitat (marginal foraging resources) for these species would be cleared. Potential habitat for both Swift Parrots and Regent Honeyeaters occurs throughout the site with these species being associated with the following PCTs :

- Swift Parrot (PCTs: 1194, 997, 970, 954, 766, 571, 568, 567, 565, 554, 534, 526 & 510) and
- Regent Honeyeater (PCTs: 997, 970, 766, 571, 567 & 510)

Despite this, few records of either species exist in the Walcha area suggesting the region is not a critical foraging area. Additionally, this habitat is plentiful in the surrounding areas, such that clearing is considered unlikely to lead to a long-term decrease in the size of a population of Swift Parrot and Regent Honeyeaters.

b) Reduce the area of occupancy of the species

Swift Parrots area of occupancy spans both Tasmania and the mainland as far north as Southern Queensland, and therefore the proposal is considered unlikely to reduce the area of occupancy of Swift Parrot. Similarly, Regent Honeyeaters occur throughout the western slopes of the Great Dividing Range within NSW and VIC. Both species have large areas of occupancy which would not be reduced significantly by this proposal.

c) Fragment an existing population into two or more populations

Due to the narrow linear nature of the development footprint and the strong dispersal ability of these two species, the proposal would not fragment an existing population.

d) Adversely affect habitat critical to the survival of a species

Habitat critical to the survival of the Swift Parrot and Regent Honeyeater is known generally. When in NSW, Swift Parrots inhabit a wide range of plant community types but do show an affinity for inland box-gum woodlands. Regent Honeyeaters occupy a similar habitat niche to the Swift parrot, which occurs throughout the subject site. Despite this, few records of these species occur in the surrounding area indicating the study site does not represent significantly important habitat for these species. In the NSW planning system, the study area is not considered important habitat for these species. Approximately 7% of suitable habitat for these species within the development site will be impacted by this project. Considering the large extent of vegetation being retained, the similar extensive habitat within adjacent National Parks and the linear nature of the proposed works, even though a sizeable amount of potential habitat would be impacted, large patches of the existing habitat remain unimpacted and fragmentation of these patches would not be considered significant to these species. Considering this, the proposal is considered unlikely to adversely affect habitat critical to the survival of Swift Parrot or Regent Honeyeater.

e) Disrupt the breeding cycle of a population

Swift Parrot breed in Tasmania only and no important foraging habitat for this species is noted within the study site. Therefore, the proposal would not disrupt the breeding cycle of this species.

The subject area is not known to be a significant breeding area for Regent Honeyeaters, however, pre-clearance surveys will be employed to ensure any nests within the subject site are identified and avoided. As such, the proposal would not disrupt the breeding cycle of this species.

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

The habitat that would be removed represents a marginal foraging resource in a locality that has ample mount of similar resources. The removal of this vegetation is considered unlikely to cause these species to decline.

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

Mitigation measures during the proposal is proposed which would reduce the potential establishment of exotic species.

h) Introduce disease that may cause the species to decline, or

Mitigation measures during the proposal is proposed which would reduce the potential establishment of disease.

i) Interfere with the recovery of the species

Recovery objectives for Regent honeyeater are listed as:

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

Recovery objectives for Swift parrot are:

- Identify the extent and quality of habitat.
- Manage and protect Swift Parrot habitat at the landscape scale.
- Monitor and manage the impact of collisions, competition and disease.
- Monitor population and habitat.

The proposal would not directly impact on any of the recovery objectives listed in the National recovery guidelines for both species. As such, the proposal is considered unlikely to interfere with the recovery of Swift Parrot or the Regent Honeyeater.

Conclusion

The proposal would linearly remove 426ha of marginal foraging habitat for Swift Parrot and 286ha of marginal foraging habitat for Regent Honeyeaters. Through avoidance and preclearance surveys no individuals would be directly impacted. While the extent of habitat that would be removed appears extensive, contextually it is far outweighed by the habitat that would remain untouched that is contiguous with the subject site.

The application of safeguards concerning pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.

In light of the above, the proposal is considered unlikely to generate a significant impact to the Swift Parrot or the Regent Honeyeater.

L.8 Painted Honeyeater (*Grantiella picta*)

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

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

Up to 426ha of potential habitat for this species would be removed under this proposal, and this habitat contains marginal foraging resources for this species associated with the following PCTs: 1194, 997, 970, 954, 766, 571, 568, 567, 565, 534, 526 & 510. Despite this, few records of either species exist in the Walcha area suggesting the region is not a critical foraging area. Additionally, this habitat is plentiful in the surrounding areas, such that clearing is considered unlikely to lead to a long-term decrease in the size of a population of Painted Honeyeaters.

b) Reduce the area of occupancy of an important population

Painted Honeyeaters occur throughout the western slopes of the Great Dividing Range within NSW and VIC and QLD. This species has large areas of occupancy which would not be reduced significantly by this proposal.

c) Fragment an existing important population into two or more populations

Due to the narrow linear nature of the development footprint and the strong dispersal ability of this species, the proposal would not fragment an existing population.

d) Adversely affect habitat critical to the survival of a species

Critical habitat for this species is listed in the National Recovery Plan. The nearest critical area is the Pilliga Forest 250km to the west.

Given this context, the proposal is considered unlikely to adversely affect habitat critical to the survival of this species.

e) Disrupt the breeding cycle of an important population

The subject area is not known to be a significant breeding area for Painted Honeyeaters, which favour woodland on the inland slopes of the Great Dividing Range as opposed to the hills and ridgelines rising out of the Walcha Platea. Despite this, pre-clearance surveys will be employed to ensure any nests within the subject site are identified and avoided. As such, the proposal would not disrupt the breeding cycle of this species.

f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Due to the linear design of the project large areas of vegetation will remain on site. The habitat that would be removed has been estimated at up to 426 ha. Despite this, habitat is plentiful within the subject site and the study area. The vegetation impacted represents 7% of suitable habitat within the development site. Given this context, the proposal is considered unlikely to decrease the availability or quality of habitat as such that these species are likely to decline.
g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The application of safeguards and mitigation measures outlined in Section 8 of the BDAR, concerning feral animals, pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.
h) Introduce disease that may cause the species to decline
The application of safeguards concerning pest plant and pathogen management outline in Section 8 of the BDAR, would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.
i) Interfere substantially with the recovery of the species
The relevant recovery objectives for Painted Honeyeater is: • Protect, manage and restore Painted Honeyeater breeding and foraging habitats at the local regional and landscape scales . The proposal would have only minor impacts to the recovery objectives listed in the National recovery guidelines for this species, with the study area considered marginal foraging habitat . As such, the proposal is considered unlikely to interfere with the recovery of the Painted Honeyeater.
Conclusion
The proposal would linearly remove up to 426ha of marginal foraging habitat for Painted Honeyeaters Through avoidance, no individuals would be removed. While the extent of habitat that would be removed is extensive, it is far outweighed by what would remain untouched that is contiguous with the subject site. The application of safeguards concerning pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised. In light of the above, the proposal is considered unlikely to generate a significant impact to Painted Honeyeaters.

L.9 Bluegrass (*Dichanthium setosum*)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
j) Lead to a long-term decrease in the size of an important population of a species
An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: key source populations either for breeding or dispersal populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range. Bluegrass populations in the subject site do not meet any of the above stated criteria and there is not considered part of an important population. The species is widely distributed in the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW as well as south QLD. Considering the narrow and linear nature of the vegetation being removed, and considering the completed surveys for this species, direct and indirect impacts are considered minor and not likely to result in a long term decrease in population size.
k) Reduce the area of occupancy of an important population
Any local populations of this species are not considered to represent important populations within the study area. An important population, or part thereof, is not considered to have its area of occupancy reduced.
l) Fragment an existing important population into two or more populations
Any local populations of this species are not considered to represent important populations within the study area. An important population, or part thereof, is not considered to be fragmentated. Regardless, the width of the project design is considered narrow enough that gene flow between either side is highly likely to remain intact.
m) Adversely affect habitat critical to the survival of a species
Whilst vegetation on site may provide habitat for this species it is not considered critical habitat due to the widespread distribution in the region and the condition status of the vast majority of vegetation on site. Given this context, the proposal is considered unlikely to adversely affect habitat critical to the survival of this species.
n) Disrupt the breeding cycle of an important population
Any local populations of this species are not considered to represent important populations within the study area. Regardless, the width of the project boundary is narrow enough to reasonably expect that pollination and seed dispersal would not be significantly impacted for each of these species. As individuals of each species would still be able achieve pollination and setting of seed, none of the above species is considered to have breeding cycles inhibited.

o) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Due to the linear design of the project large areas of vegetation will remain on site. The habitat that would be removed has been estimated at up to 13.2ha of the 1693ha of suitable habitat on site. This represents <1% of the areas of suitable habitat on site. Despite this, habitat is plentiful within the subject site and the study area. Given this context, the proposal is considered unlikely to decrease the availability or quality of habitat as such that this species is likely to decline.
p) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The application of safeguards and mitigation measures outline in Section 8 of the BDAR, concerning, feral animals, pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.
q) Introduce disease that may cause the species to decline
The application of safeguards concerning pest plant and pathogen management outline in Section 8 of the BDAR, would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.
r) Interfere substantially with the recovery of the species
The proposal would not result in the direct loss of individuals of this species through avoidance. However, the proposal would remove up to 13.2ha of potential habitat. Contextually, extensive amounts of habit would remain untouched that is contiguous with that of the subject site. As such, the proposal is considered unlikely to interfere substantially with the recovery of this species.
Conclusion
The proposal would linearly remove habitat up to 13.2ha for Bluegrass. No-go zones would limit the potential for indirect or inadvertent impacts to known locations of these species. While the extent of habitat that would be removed is extensive, it is far outweighed by what would remain untouched that is contiguous with the subject site. The application of safeguards concerning pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised. In light of the above, the proposal is considered unlikely to generate a significant impact to Bluegrass.

L.10 White-throated Needletail (*Hirundapus caudacutus*) & Fork-tailed Swift (*Apus pacificus*)

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

a) substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
Given site habitat conditions and the lack of observations, the site is considered to provide less favourable habitat for foraging and few opportunities for roosting by needletails. As such habitat on site is not considered important habitat for this species (See Appendix Q). As such the project will not substantially modify, destroy or isolate an area of important habitat.
b) result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
The application of safeguards and mitigation measures outlined in Section 8 of the BDAR, concerning, feral animals, pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised. The BBAMP to be developed should manage any future risks of turbine strike.
c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
The White-throated Needletail is known to fly at heights within the range of the RSA (Appendix Q). As such direct strike from wind turbines is a possibility for this species. Direct mortality of these species is considered likely to seriously disrupt the lifecycle of these species populations due to unknown population numbers and little understood migratory patterns..
Conclusion
Although the proposed vegetation clearing is insignificant to these species and the application of safeguards concerning pest plant and pathogen management would ensure that the risk of spread is minimal, the risk of direct mortality of individuals from turbine strike is a possible threat. In light of the above, the proposal is considered likely to generate a significant impact to both the White-throated Needletail and the Fork-tailed Swift.

L.11 Latham's Snipe (Gallinago hardwickii)

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:
d) substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species

Potential habitat for this species occurs throughout the development footprint in the form of Dams and small lagoons of streams. Despite this these habitat features will not be directly impacted by the proposal and indirect impacts are unlikely to modify this habitat to a point that it is unsuitable. Given this, habitat for this species on site is unlikely to be significantly modified, destroy or isolated.
e) result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
The application of safeguards and mitigation measures outline in Section 8of the BDAR, concerning, feral animals, pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised.
f) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
Temporary indirect disturbance to water features on site may result from the construction of the proposed development, and these areas are considered potential foraging habitat for this species. Short term disturbance is considered minor due to the extensive number of similar water features in the broader area. Long term impacts on the water features, and therefore this species, are expected to be negligible. This species is not identified as likely to be impacted directly by wind turbines. The lifecycle of this species is unlikely to seriously disrupted by the proposal.
Conclusion
The proposal is expected to have minor, temporary impacts on the potential feeding habitat for this species however surrounding areas of similar habitat would minimise any potential impacts. The application of safeguards concerning pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the subject site are not compromised. In light of the above, the proposal is considered unlikely to generate a significant impact to Latham's Snipe.

L.12 Grey-headed Flying-fox (*Pteropus poliocephalus*)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
a) Lead to a long-term decrease in the size of an important population of a species
This species was not recorded on site but is assumed present due to potential foraging habitat occurring on site and proximity (<50km) from a known roost site in Armidale (Not listed as a Nationally important camp). All PCTs within the study area (bar PCT 766) are considered suitable foraging habitat for this species however none support a significant composition of primary feed species listed in the National Recovery

Plan for Grey-headed Flying-fox. Although the camp in Armidale is within foraging distance of the site, no Nationally important camp location occurs within 20km of the site. As such the subject site is not considered important habitat for this species. In light of the above, and the stringent mitigation measures in place, the proposal is considered unlikely to lead to long-term decrease in the size of an important population of this species.
b) Reduce the area of occupancy of an important population
Due to the linear nature of the project there is no expected reduction in the area of occurrence of this species in the region
c) Fragment an existing important population into two or more populations
Due to the linear nature of this proposal and the dispersal ability of this species, it is considered unlikely to fragment an existing important population into two or more populations. The already fragmented landscape will not be altered significantly in relation to fragmentation with the proposal avoiding treed areas where possible.
d) Adversely affect habitat critical to the survival of a species
All native vegetation within the study area (with the exception of PCT 766) are considered suitable habitat for this species, however, no PCTs on site support a significant composition of primary feed species listed in the National Recovery Plan for Grey-headed Flying-fox. Some Melliodora is present but does not dominate the PCTs within the proposal area. Although the camp in Armidale is within foraging distance of the site, no Nationally important camp location occurs within 20km of the site. As such the subject site is not considered critical habitat for this species.
e) Disrupt the breeding cycle of an important population
It is not considered likely, due to the linear nature of the works and the vegetation to remain throughout the area, that the removal of 426ha of foraging habitat will lead to disruption of the breeding cycle for either this species considering that none of the site is known breeding habitat. If mitigation measures are adequately followed, breeding habitat for these species would not be impacted and the proposal would not prevent any individuals from traversing their range for the purpose of completing their life cycle.
f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Given that the vegetation on site is considered marginal foraging habitat as well as the relatively small amount of vegetation clearing required (426ha) when considering the extent of suitable habitat in the surrounding area (3188ha within the development site), the proposal is considered unlikely to decrease the availability or quality of habitat such that either species is likely to decline.
g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Mitigation measures during the proposal is proposed which would reduce the potential establishment of exotic species.

h) Introduce disease that may cause the species to decline

Mitigation measures during the proposal is proposed which would reduce the potential establishment of disease.

i) Interfere substantially with the recovery of the species

Relevant specific objectives for this species include:

- Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox. No foraging habitat is considered critical.
- Identify, protect and increase roosting habitat of Grey-headed Flying-fox camps – none are present within the proposal area.
- Reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire. This can be done by ensuring adequate clearance around any above ground electrical transmission cables between GHFF food source and infrastructure.

Habitat on site is not considered critical to the survival of the species, nor does the site support any known camps. The project therefore does not directly conflict relevant objectives for the recovery of this species. Given the above, the proposal is considered unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposal would linearly remove up to 426ha of marginal potential foraging habitat for Grey-headed Flying-fox (approximately 7% of the suitable vegetation available and suitable for this species on site). While the extent of habitat that would be removed appears extensive, contextually it is far outweighed by what would remain within the surrounding area. This habitat is not considered critical to the survival of the species. No breeding habitat for this species is known on site.

The application of safeguards concerning pest plant and pathogen management would ensure that adjacent areas of viable habitat adjacent to the proposal site are not compromised.

In light of the above, the proposal is considered unlikely to generate a significant impact to Grey-headed Flying-fox.

Appendix M Example tables of contents for post approval management plans

M.1 Construction environmental management plan

Heading	Description of content
Introduction	Context Project background Certification process (if any), approval and review Distribution
Project description	Detail of works to be undertaken during construction, including but not limited to access tracks, underground and overhead transmission lines, concrete batch plants, met masts, turbines and crane hardstand, substation and switchyard. Detail of construction activities.
Planning framework	Project environmental obligations Legal and other requirements Approvals, permits and licences Objectives and targets
Risk identification and assessment	Environmental risk assessment Identification of potential impacts Risk assessment, including mitigated risk rating
Implementation and operation	Documentation Relationship to sub-plans and strategies Environmental work method statements Procedures, forms and other documents
Resources, roles, responsibility and authority	Flow chart depicting relationships between key personnel, including regulator Environmental management team and their roles Sub-contractor roles and management
Competence, training and awareness	Environmental induction process Toolbox talks, training and general awareness opportunities Environmental awareness training commitment
Communication	Internal External, including with government authorities Stakeholder and community engagement

Heading	Description of content
Incidents and emergencies	Incident management procedure
Inspections, monitoring and auditing	Environmental inspections Daily pre-start inspections Compliance audits Non-conformity, corrective and preventative actions
CEMP review and improvement	Continuous improvement process
Documentation	Environmental records Document control
Appendix: Applicable legislation	Requirement under relevant legislation Applicabiilty to the Project Relevant approvals/permits/licences Responsibility to comply
Appendix: Environmental policy	
Appendix: Forms, checklists and procedures register	
Appendix: Environmental aspects, impacts and mitigation measures	
Appendix: Template checklists	

M.2 Biodiversity management plan

Heading	Description of content
Introduction	Context Background Project description Key infrastructure components Schedule (pre-construction, construction, operation, decommissioning) Objectives: both project, as well as environmental objectives and performance indicators Environmental legislation
Relevant conditions of approval	i.e., Commonwealth, State
Existing environment	Overview of surveys and assessment to date Flora species and plant community types Fauna species and habitat, including habitat features such as HBT Matters of national environmental significance, as well as state threatened species and communities
Impacts	Key aspects and impacts
Management actions and risk assessment	Avoid and minimise actions Pre-clearance management actions Clearing phase management actions Operational/post clearing management actions Risk assessment, identifying residual risk, trigger detection, and contingency response/corrective action(s)
Monitoring and reporting	Monitoring schedule, including performance indicators, timing and frequency Environmental inspections Data management Reporting, including for any permits and licences
Compliance	Non-conformity, corrective, and preventative actions Training Relevant permits and licences Roles and responsibilities Audit and review Adaptive management approach

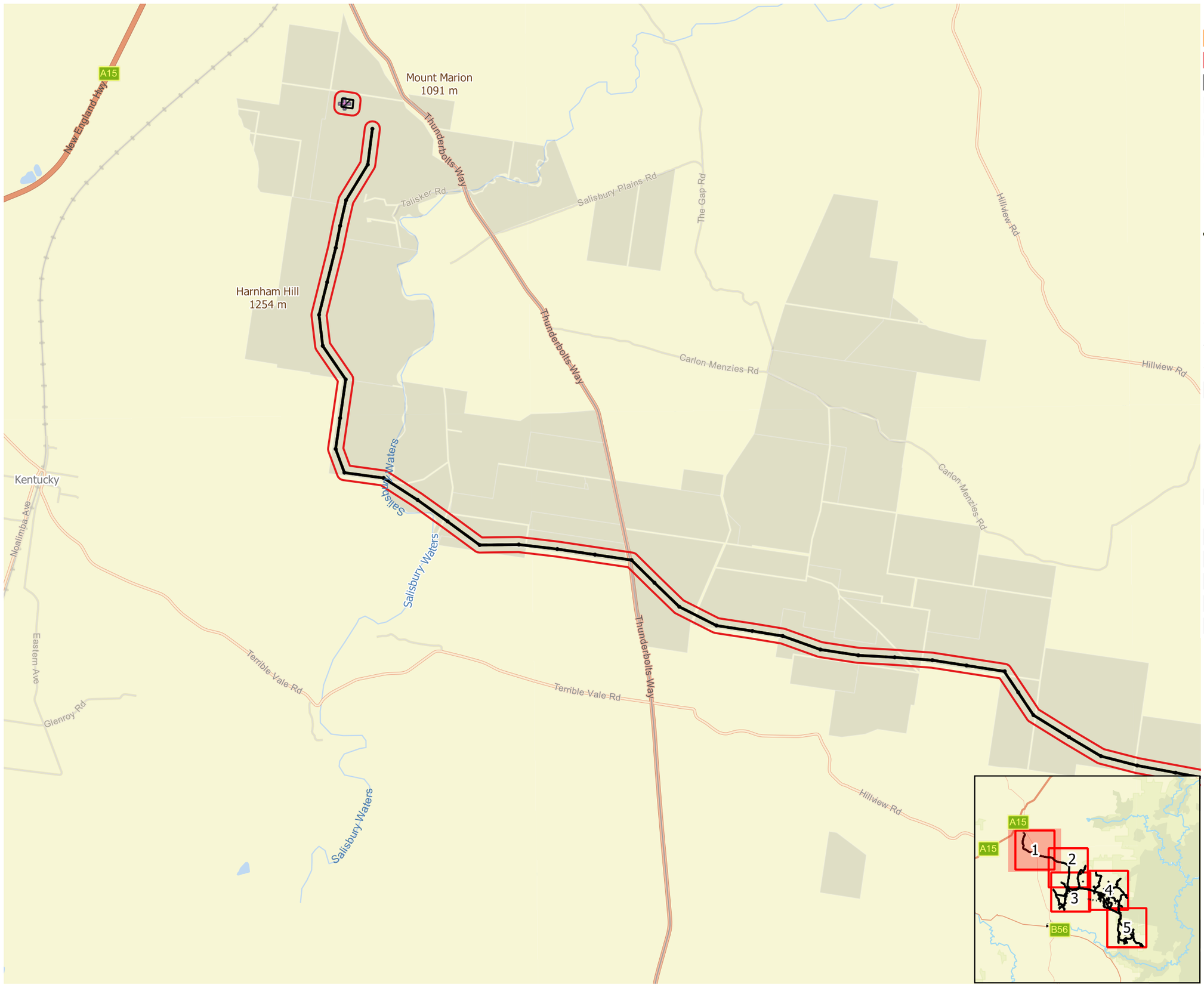
Heading	Description of content
Training and personnel	Definition of suitably qualified personnel Required training and competencies.

M.3 Bird and bat adaptive management plan

Heading	Description of content
Project description	Background, overview of project
Legislative requirements	Specific condition(s) of approval, guidelines.
Environmental outcomes	BBAMP objectives
Existing environment	Site description Description of survey effort to date At-risk species present or likely to be present
Risk assessment	Method Results
Monitoring program	BUS Collision monitoring (turbine selection, search protocol, carcass detection protocol, incidental carcass protocol, scavenger rates and trials, detectability [searcher efficiency] trials, analysis of results and mortality estimation, injured wildlife handling protocol).
Adaptive management approach	Defined impact triggers Corrective actions
Roles and responsibilities	Key roles and required tasks
Reporting	Annual Incident notification Investigation reports Audit and review
Training and personnel	Definition of suitably qualified personnel Required training and competencies.

Appendix N Detailed Mapping

N.1 Figure 1-1 Development site Subject Land



Legend

- Project Boundary
- Development Site
- Development Footprint
- NPWS Reserve
- State Forest
- Turbine Hosts
- Easement Hosts

Proposed Infrastructure Layout

- Turbines
- Transmission Line
- Temporary Masts
- Installed Masts
- Mast
- Access Roads
- Additional Reticulation
- Collector System
- Hardstands & Crane Pads

Substation Locations

- North Substation
- South Substation
- Uralla Switchyard
- Uralla Hub Lot

Ancillary Infrastructure

- Batch Plant
- BESS
- Laydown
- O&M Building
- Temporary Sites

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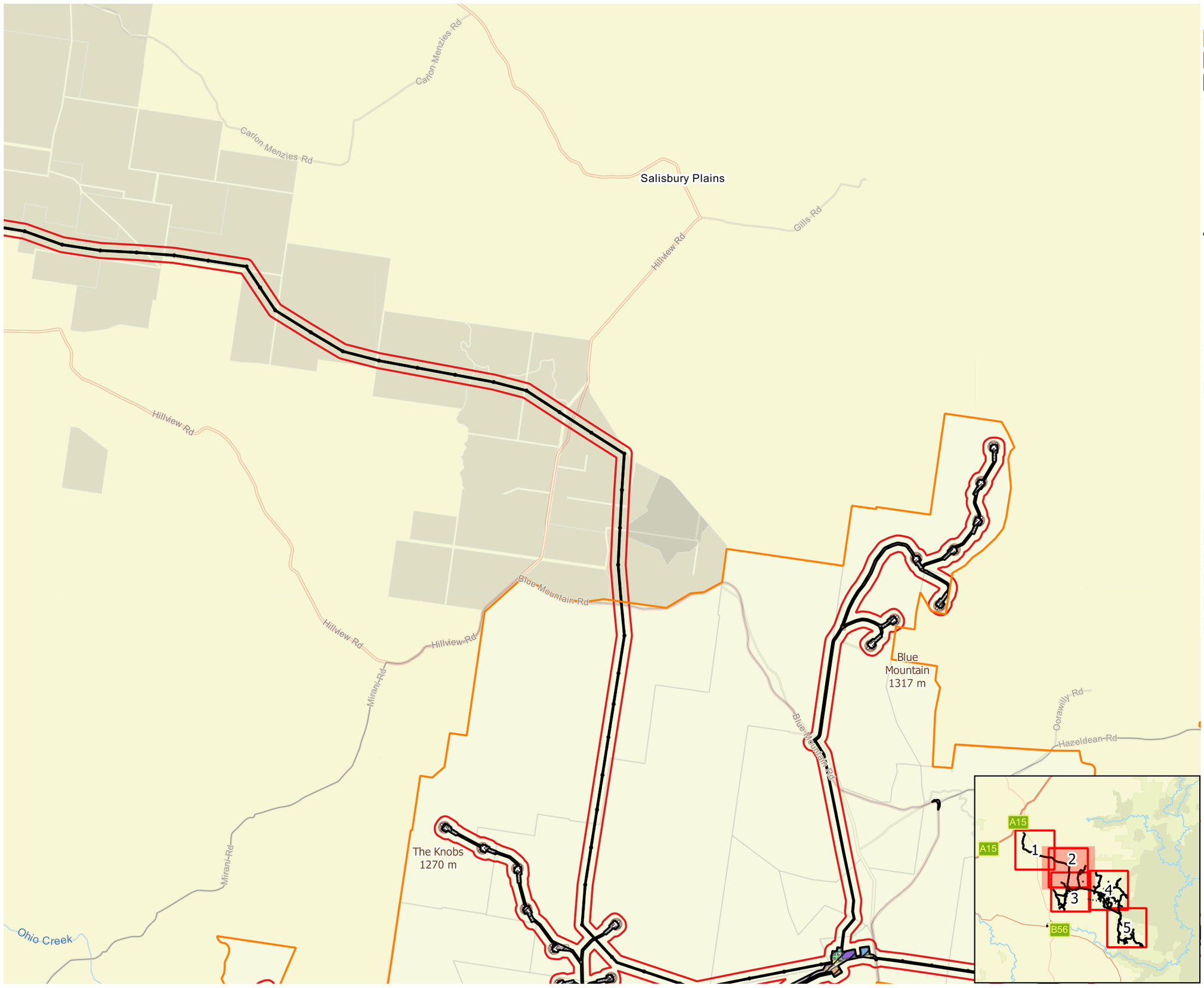

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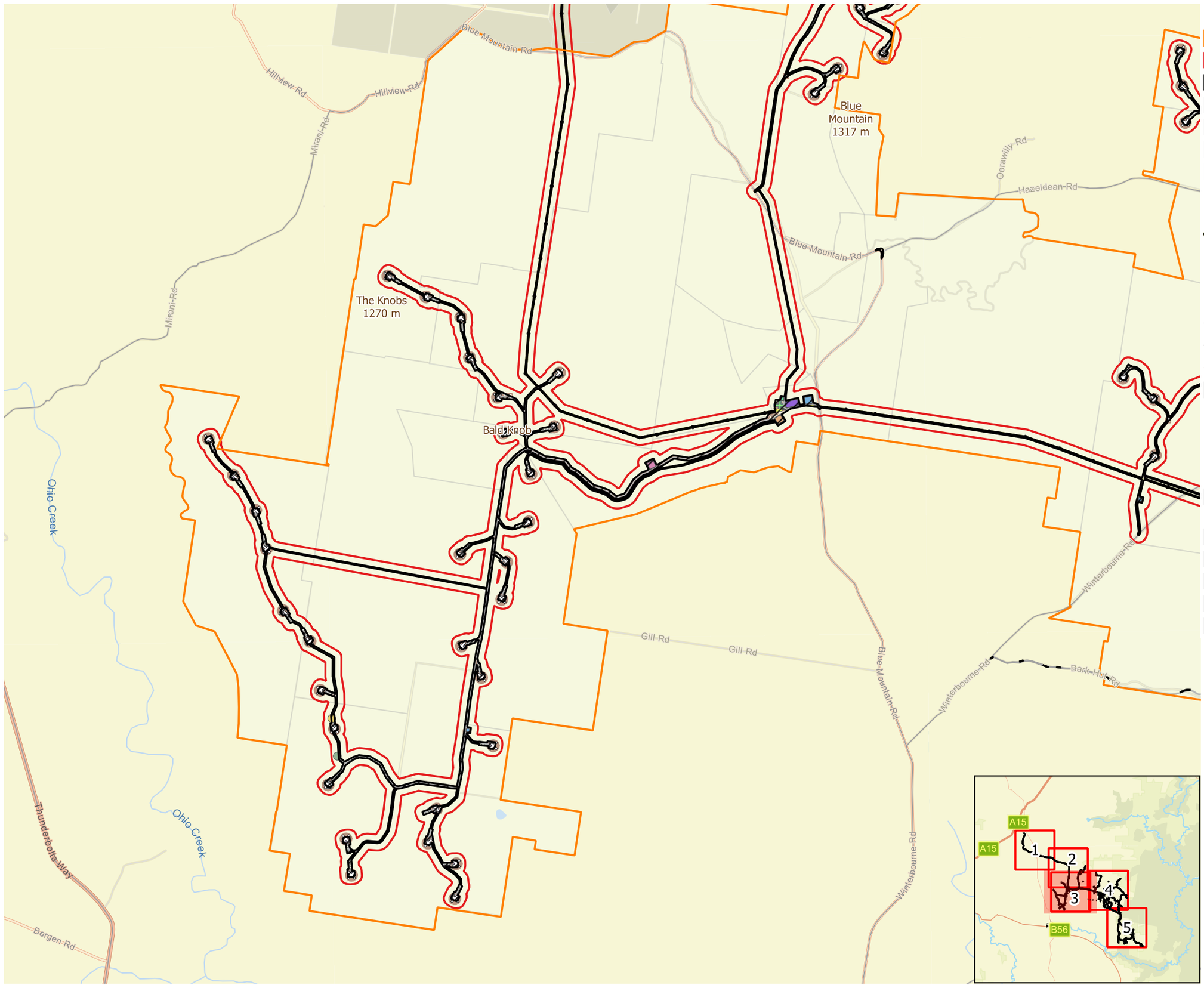

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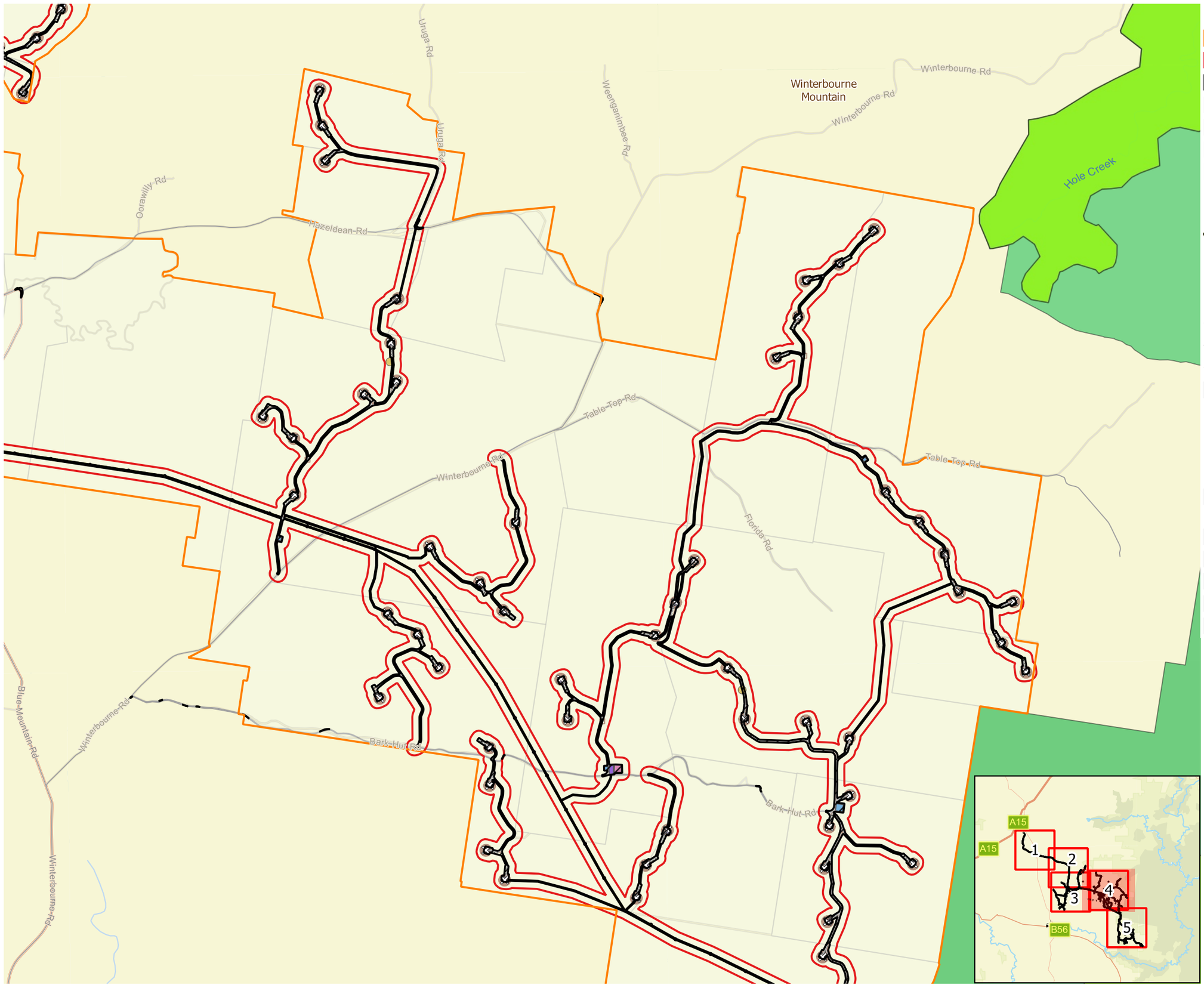

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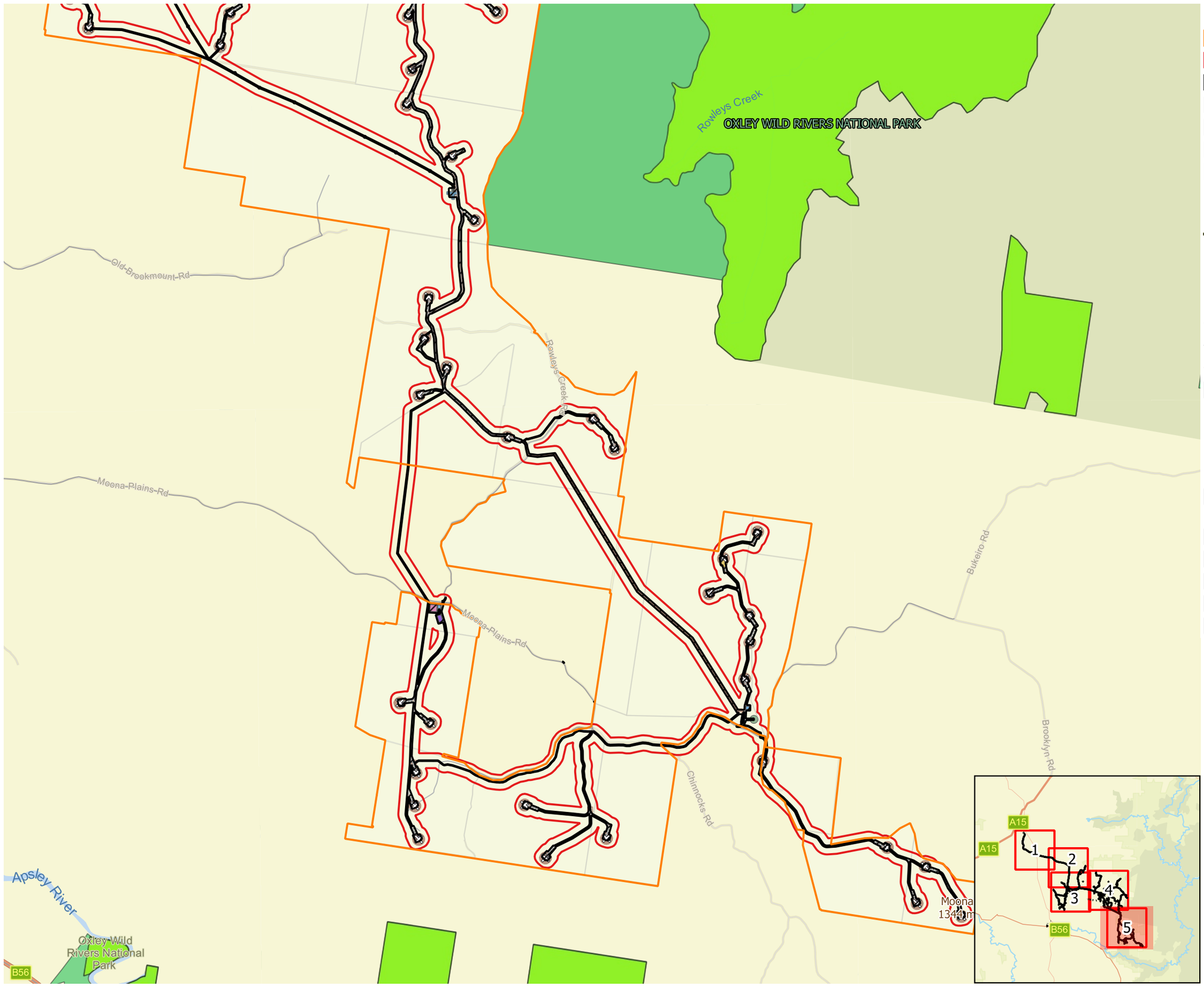

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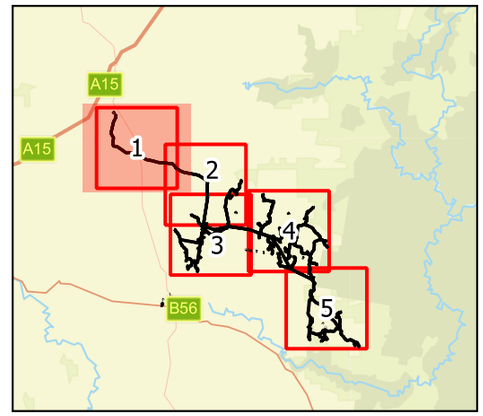
N.2 Figure 2-6 Biodiversity corridors

Legend

- Project Boundary
- Development Site
- Development Footprint
- Riparian Corridors
- StateForest
- Biodiveristy corridors
- World Heritage Area
- NPWSReserve
- StateForest



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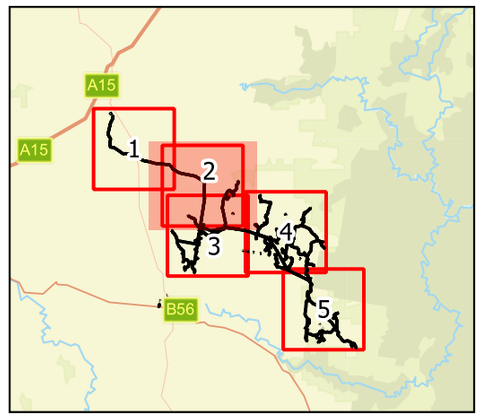
Legend

- Project Boundary
- Development Site
- Development Footprint
- Riparian Corridors
- StateForest
- Biodiveristy corridors
- World Heritage Area
- NPWSReserve
- StateForest



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Legend

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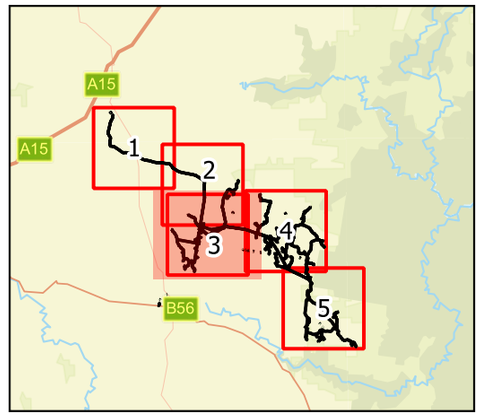
- NPWSReserve
- StateForest



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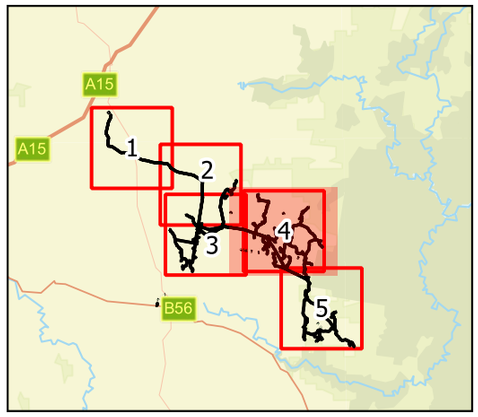
- Riparian Corridors
- StateForest
- Biodiveristy corridors
- World Heritage Area
- NPWSReserve
- StateForest

OXLEY WILD RIVERS NATIONAL PARK



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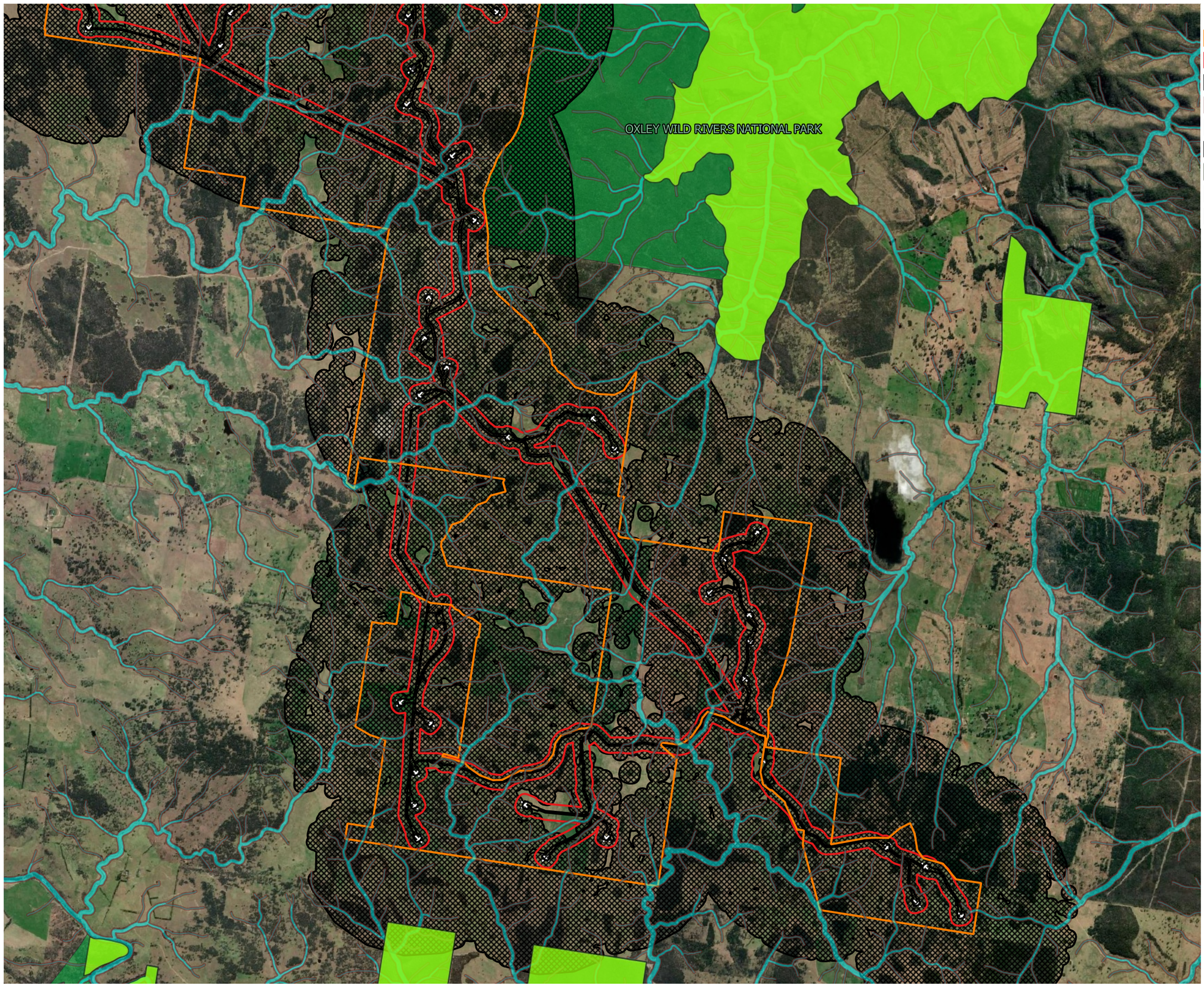

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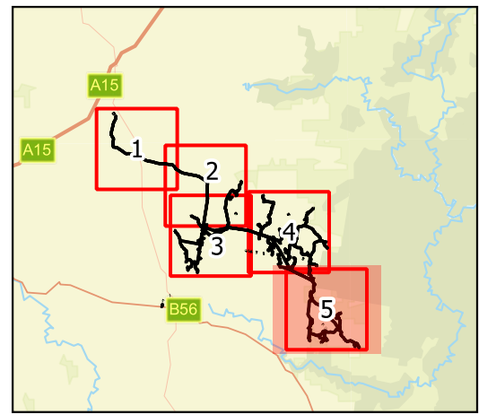

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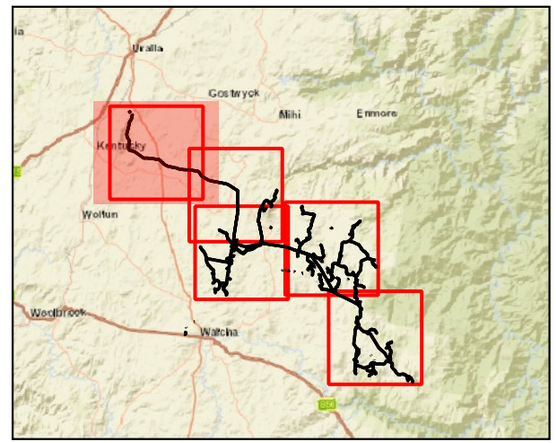
N.3 Figure 2-7 Native Vegetation within assessment area

Legend

- Development Site
- Development Footprint
- Native Vegetation Extent
- Assessment Area

Biodiversity Values Mapping

- Protected Riparian Land



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Date created: 24.03.2022
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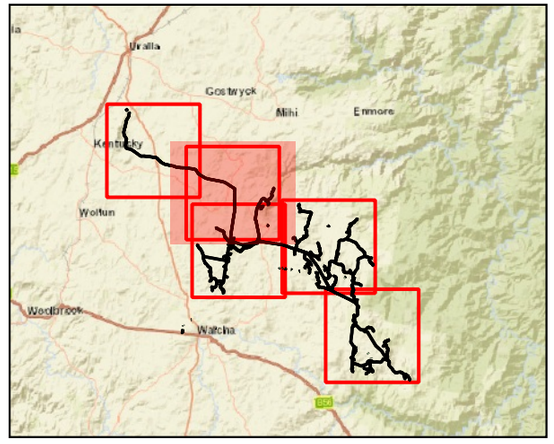
Legend

- Development Site
- Development Footprint
- Native Vegetation Extent
- Assessment Area

Biodiversity Values Mapping

- Protected Riparian Land



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Author: vitaly.K
Date created: 24.03.2022
Datum: GDA94 / MGA zone 56

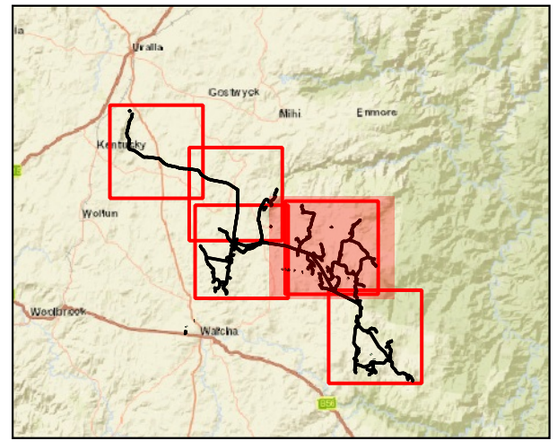
NGH

Legend

- Development Site
- Development Footprint
- Native Vegetation Extent
- Assessment Area

Biodiversity Values Mapping

- Protected Riparian Land



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Date created: 24.03.2022
Datum: GDA94 / MGA zone 56

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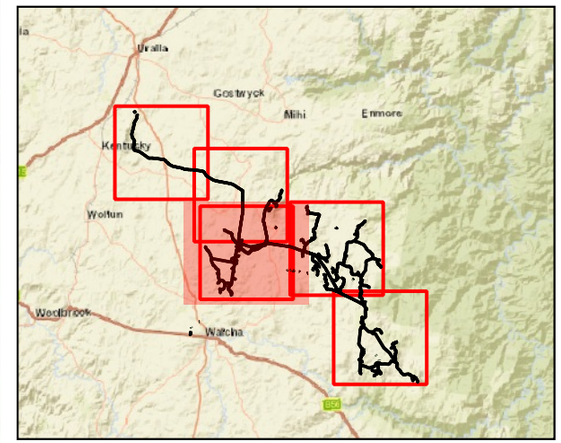
Legend

- Development Site
- Development Footprint
- Native Vegetation Extent
- Assessment Area

Biodiversity Values Mapping

- Protected Riparian Land



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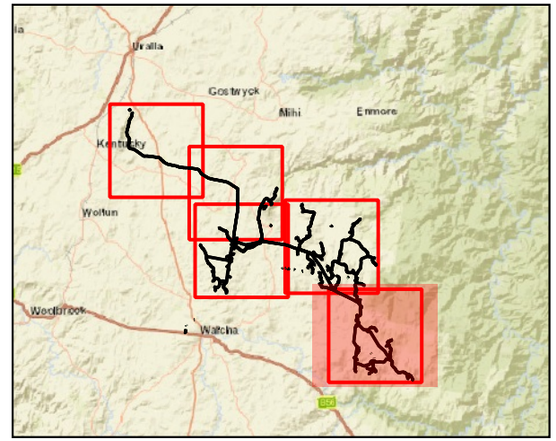
Legend

- Development Site
- Development Footprint
- Native Vegetation Extent
- Assessment Area

Biodiversity Values Mapping

- Identified Old Growth Forest
- Protected Riparian Land



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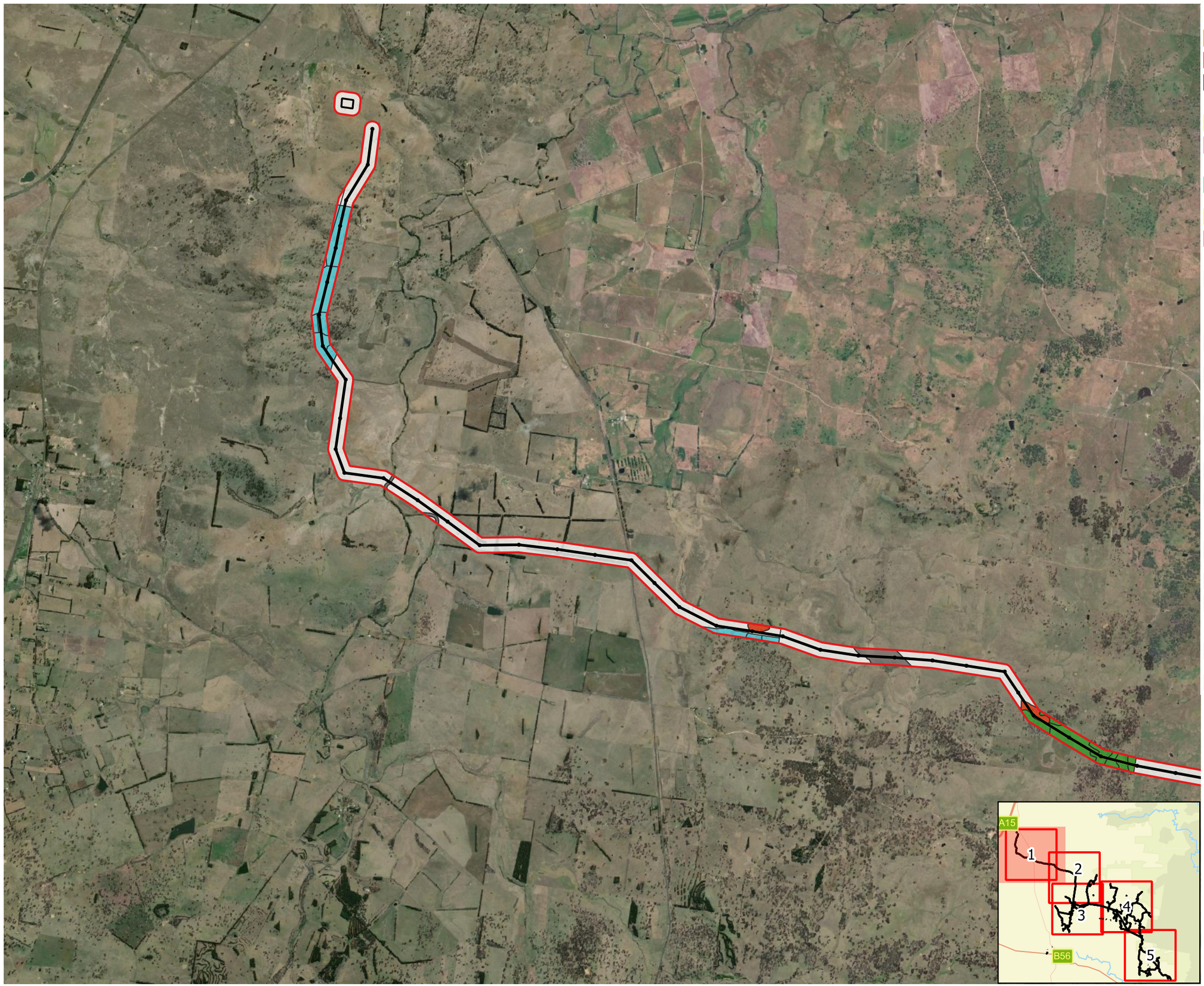
N.4 Figure 3-1 PCT and TEC mapping



Legend

Project Boundary

Development Site

Development Footprint

EPBC List TEC

Box Gum Woodland

New England Peppermint Woodland

BC Act listed TEC

Ribbon Gum Mountain Gum Snow Gum Grassy Woodland

Box Gum Woodland

New England Peppermint Woodland

Plant Community Types

1194 Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest on ranges of the NSW North Coast Bioregion and eastern New England Tableland Bioregion

510 Blakelys Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion

526 Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion

534 New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion

565 Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion

567 Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion

568 Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion

766 Carex sedgeland of the slopes and tablelands

970 Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion

997 New England stringybarks - peppermint open forest of the New England Tableland Bioregion

Cat 1 - Exempt Land

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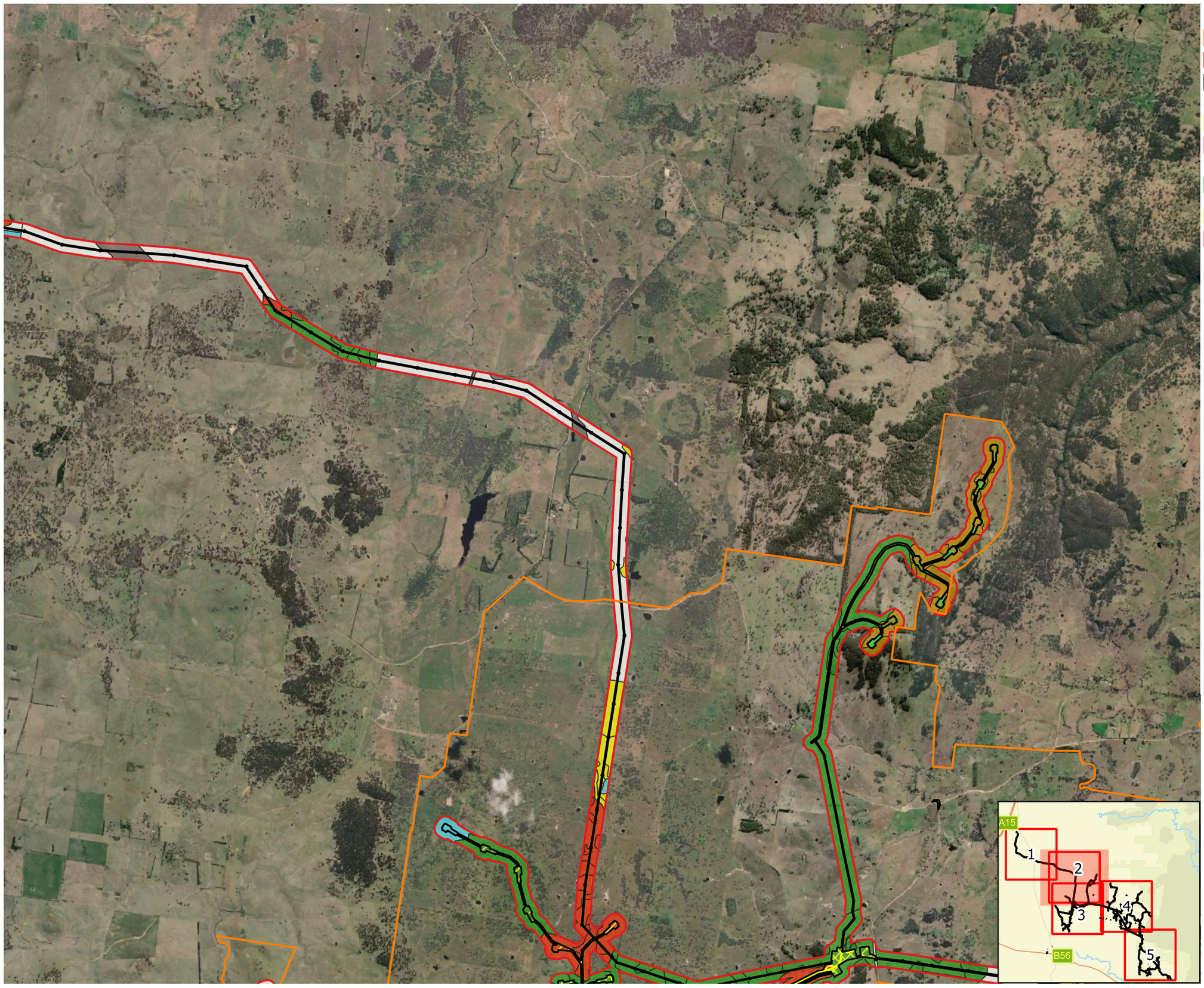

Legend

Project Boundary

Development Site

Development Footprint

EPBC List TEC

Box Gum Woodland

New England Peppermint Woodland

BC Act listed TEC

Ribbon Gum Mountain Gum Snow Gum Grassy Woodland

Box Gum Woodland

New England Peppermint Woodland

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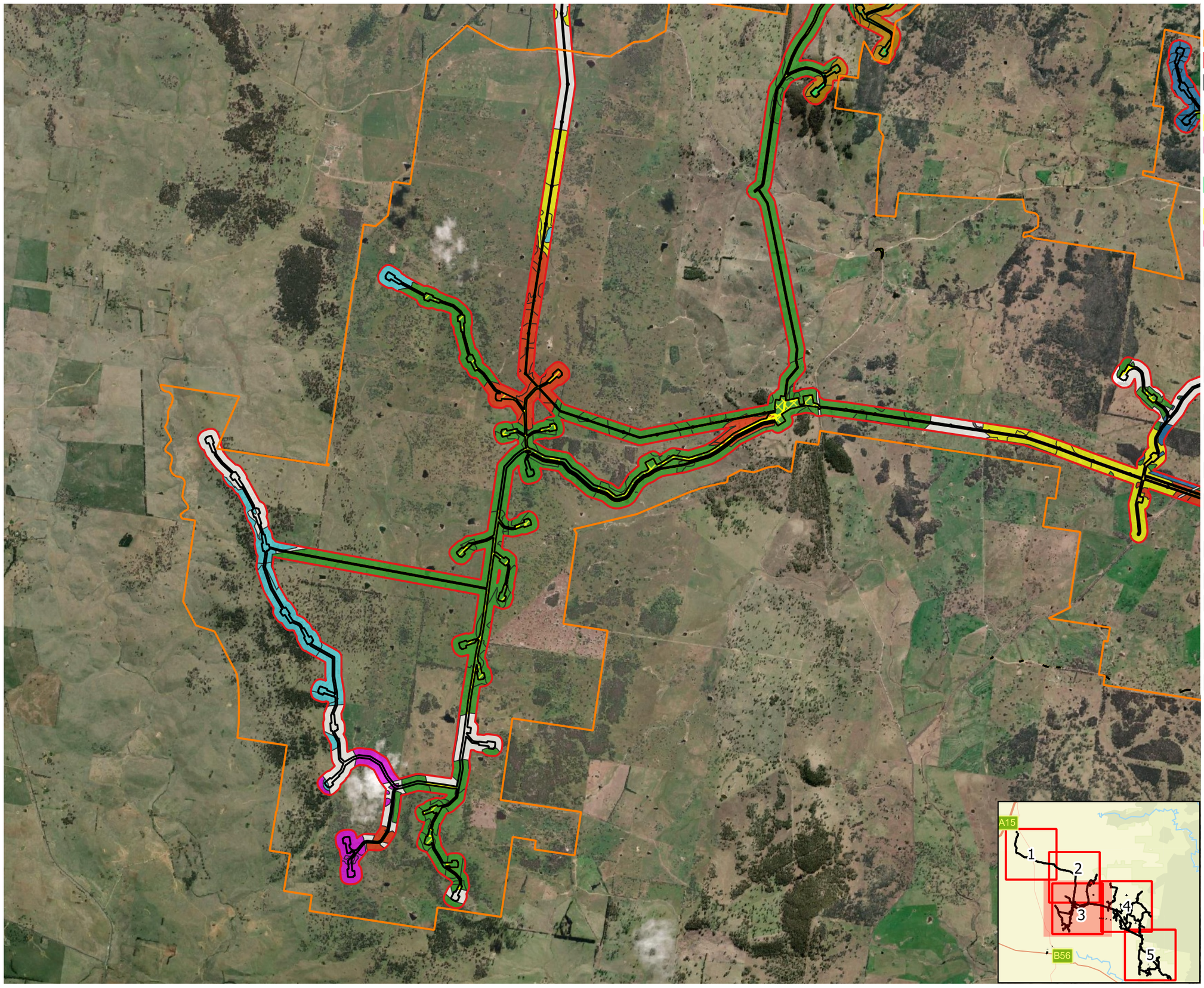

Legend

Project Boundary

Development Site

Development Footprint

EPBC List TEC

Box Gum Woodland

New England Peppermint Woodland

BC Act listed TEC

Ribbon Gum Mountain Gum Snow Gum Grassy Woodland

Box Gum Woodland

New England Peppermint Woodland

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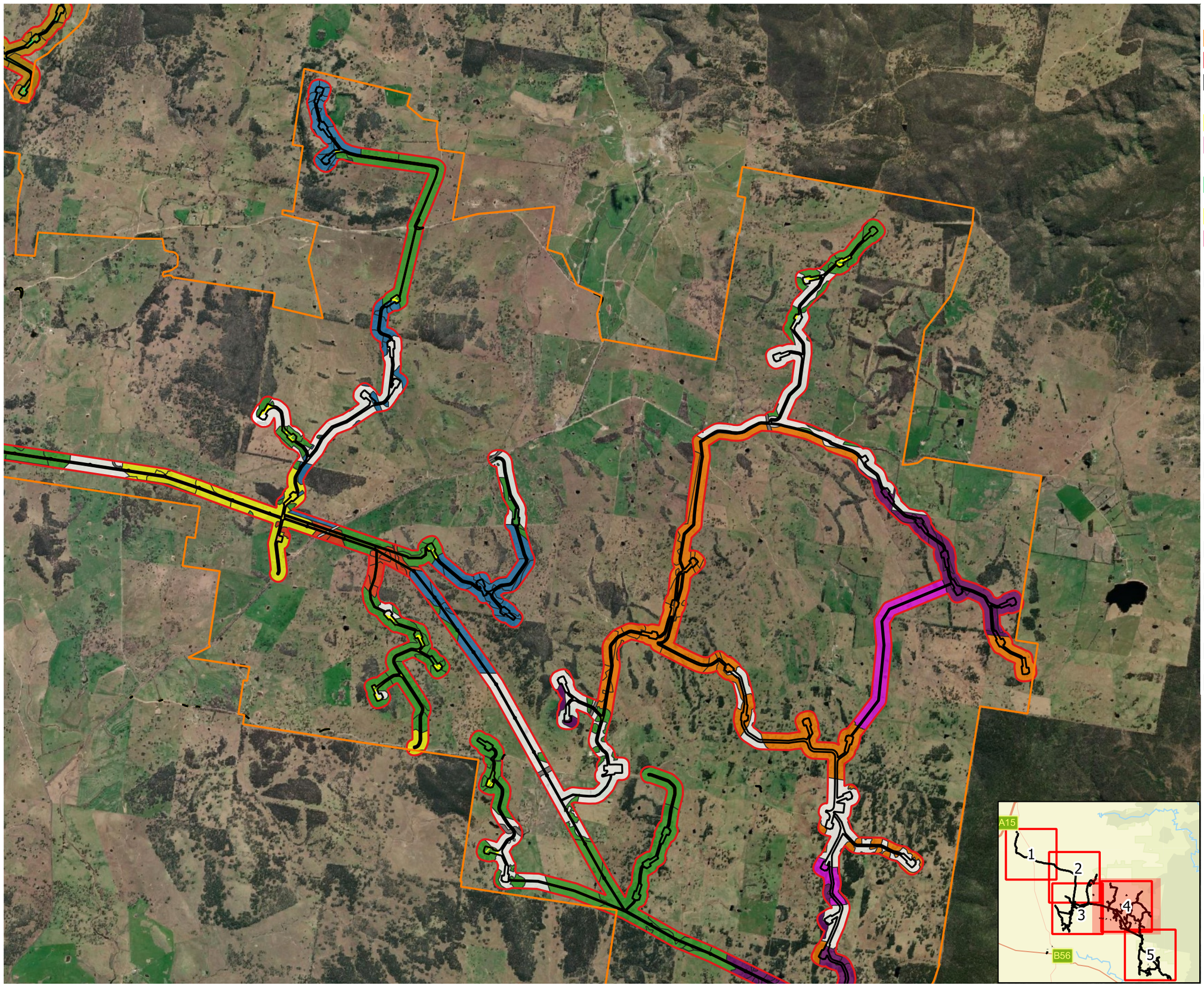

Legend

Project Boundary
Development Site
Development Footprint

EPBC List TEC
Box Gum Woodland
New England Peppermint Woodland

BC Act listed TEC
Ribbon Gum Mountain Gum Snow Gum Grassy Woodland
Box Gum Woodland
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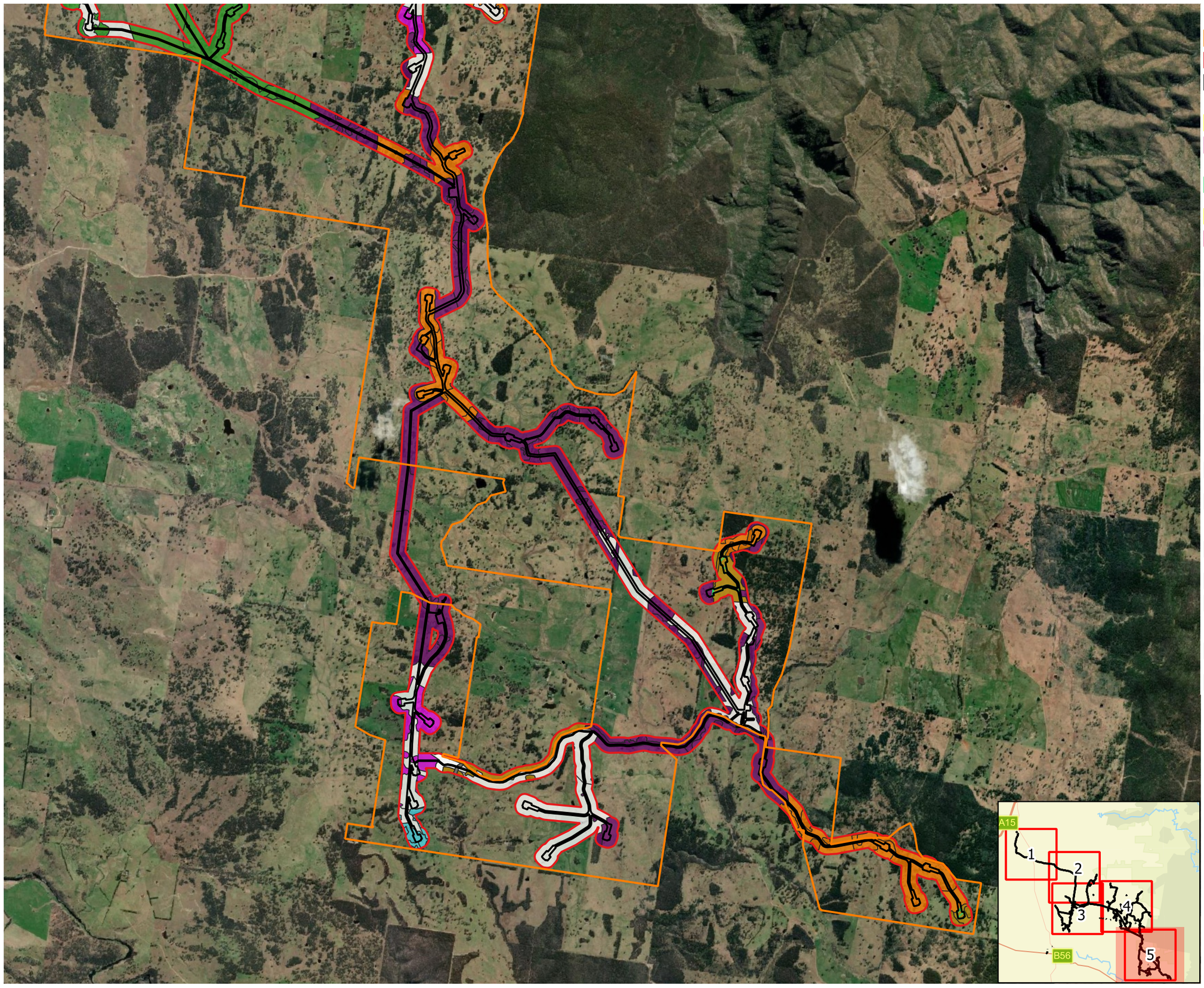

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Project Boundary

Development Site

Development Footprint

EPBC List TEC

Box Gum Woodland

New England Peppermint Woodland

BC Act listed TEC

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Legend

- Project Boundary
- Development Site
- Development Footprint
- Threatened Ecological Community

Plant Community Types

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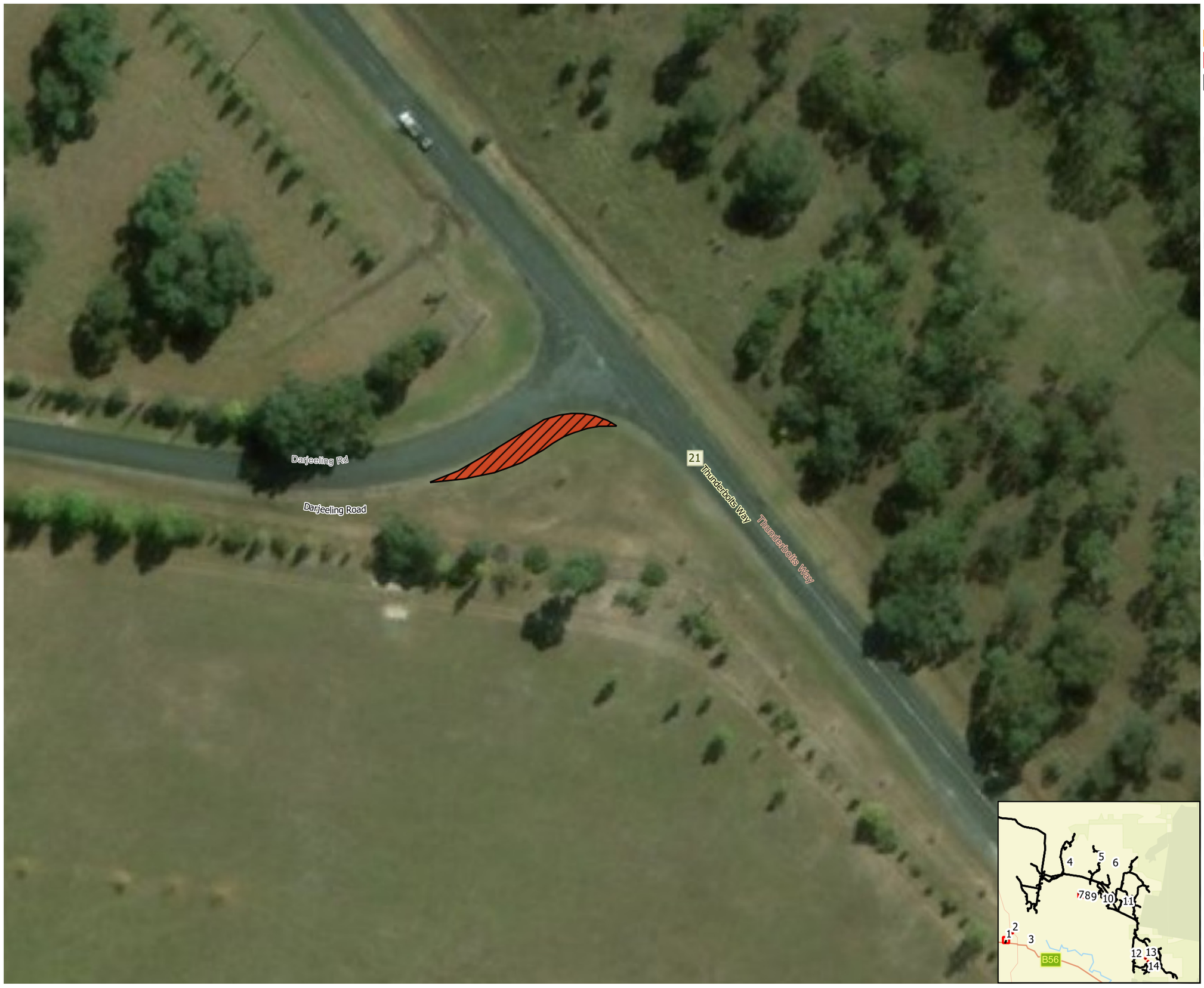

Legend

- Project Boundary
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Plant Community Types

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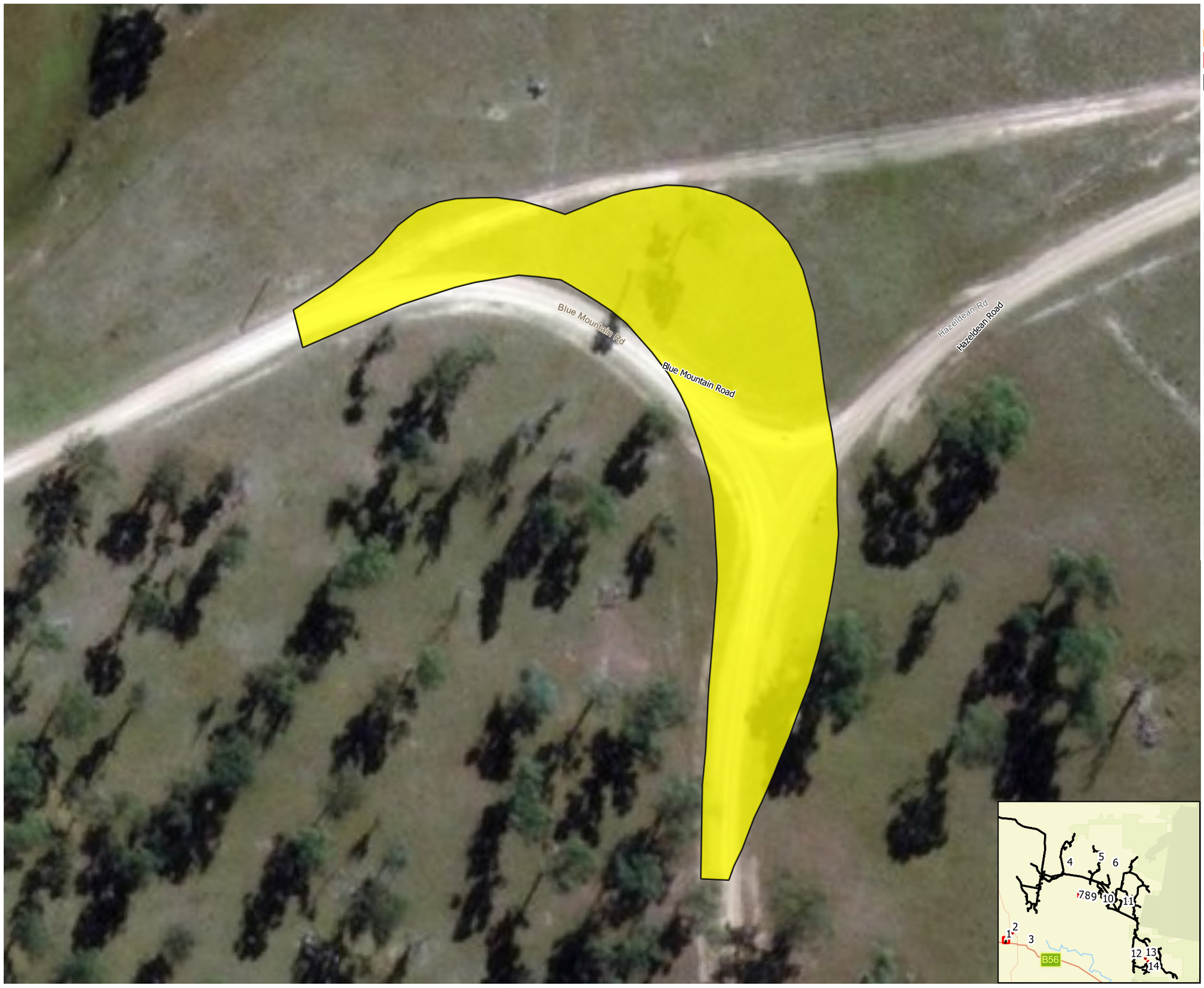

Legend

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Plant Community Types

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Plant Community Types

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- 510 Blakelys Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion
- 526 Mountain Ribbon Gum - Messmate - Broad-leaved Stringybark open forest on granitic soils of the New England Tableland Bioregion
- 534 New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion
- 565 Silvertop Stringybark - Mountain Gum grassy open forest of the New England Tableland Bioregion
- 567 Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
- 568 Broad-leaved Stringybark shrub/grass open forest of the New England Tableland Bioregion
- 766 Carex sedgeland of the slopes and tablelands
- 970 Narrow-leaved Peppermint - Wattle-leaved Peppermint shrubby open forest of the New England Tableland Bioregion
- 997 New England stringybarks - peppermint open forest of the New England Tableland Bioregion
- Cat 1 - Exempt Land

0 25 50 m

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Legend

- Project Boundary
- Development Site
- Development Footprint
- Threatened Ecological Community

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Date created: 22.03.2022
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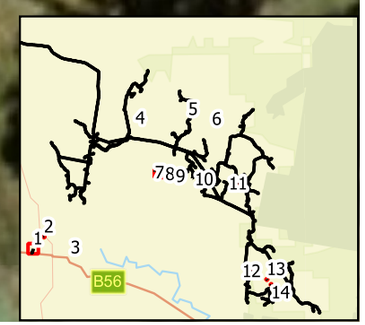
Bark Hut Road

Bark Hut Rd

Snake Creek



Legend

- Project Boundary
- Development Site
- Development Footprint
- Threatened Ecological Community

Plant Community Types

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Legend

- Project Boundary
- Development Site
- Development Footprint
- Threatened Ecological Community

Plant Community Types

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Legend

- Project Boundary
- Development Site
- Development Footprint
- Threatened Ecological Community

Plant Community Types

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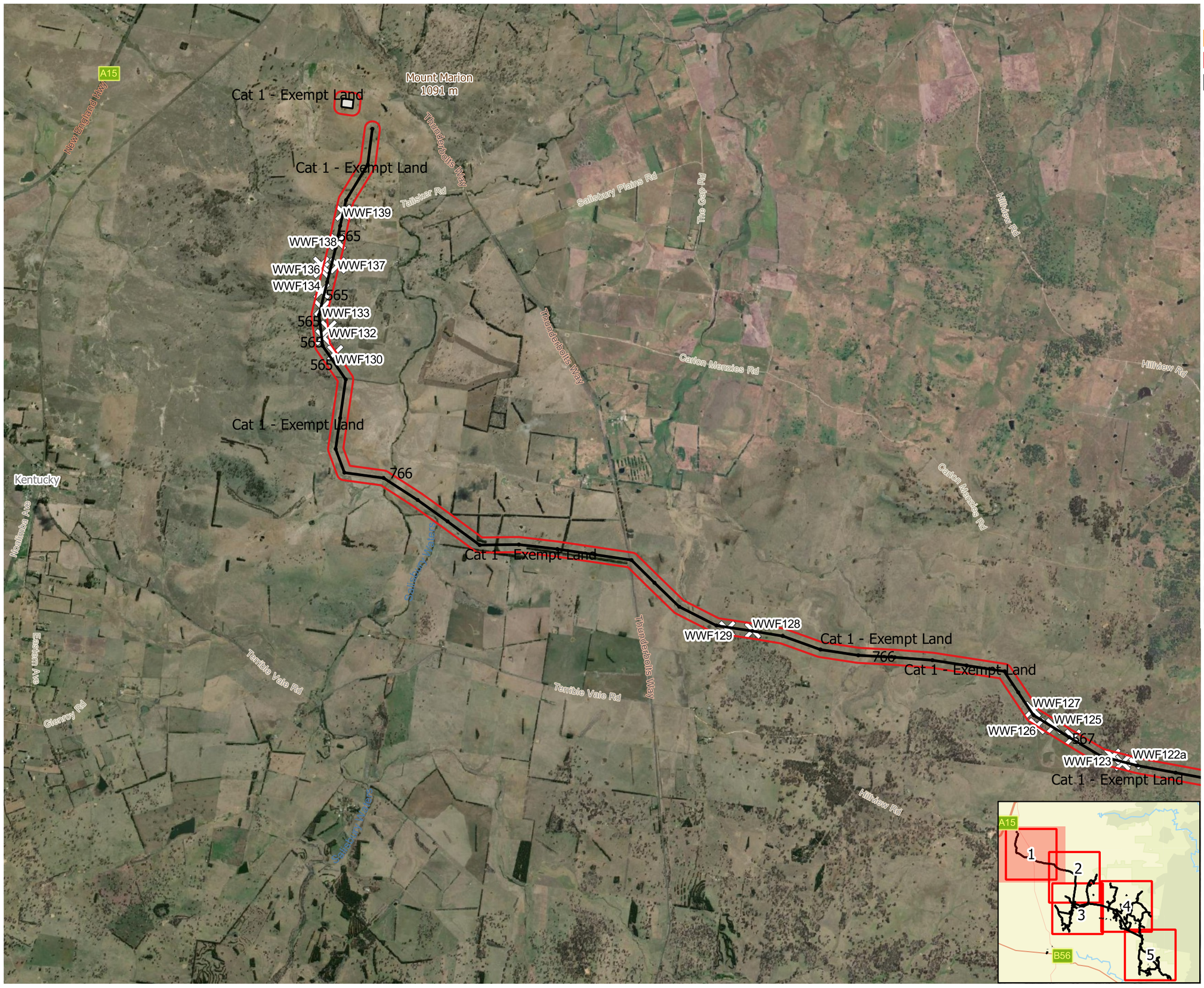
N.5 Figure 3-2 Vegetation Zones and BAM plot locations



Legend

- Project Boundary
- Development Site
- Development Footprint
- BAM Plot Locations

Vegetation

- Zone 0-PCT Cat 1 - Exempt Land
- Zone 1-PCT 510 Grassland
- Zone 2-PCT 510 Woodland
- Zone 3-PCT 526 Grassland
- Zone 4-PCT 526 Woodland
- Zone 5-PCT 534 Grassland
- Zone 6-PCT 534 Woodland
- Zone 7-PCT 565 Grassland
- Zone 8-PCT 565 Woodland
- Zone 9-PCT 568 Grassland
- Zone 10-PCT 568 Woodland
- Zone 11-PCT 766 Riparian
- Zone 12-PCT 970 Grassland
- Zone 13-PCT 970 Woodland
- Zone 14-PCT 997 Grassland
- Zone 15-PCT 997 Woodland
- Zone 16-PCT 1194 Grassland
- Zone 17-PCT 1194 Woodland
- Zone 18-PCT 567 Grassland_TEC
- Zone 19-PCT 567 Woodland_TEC
- Zone 20-PCT 567 Grassland
- Zone 21-PCT 567 Woodland

0 1 2 km

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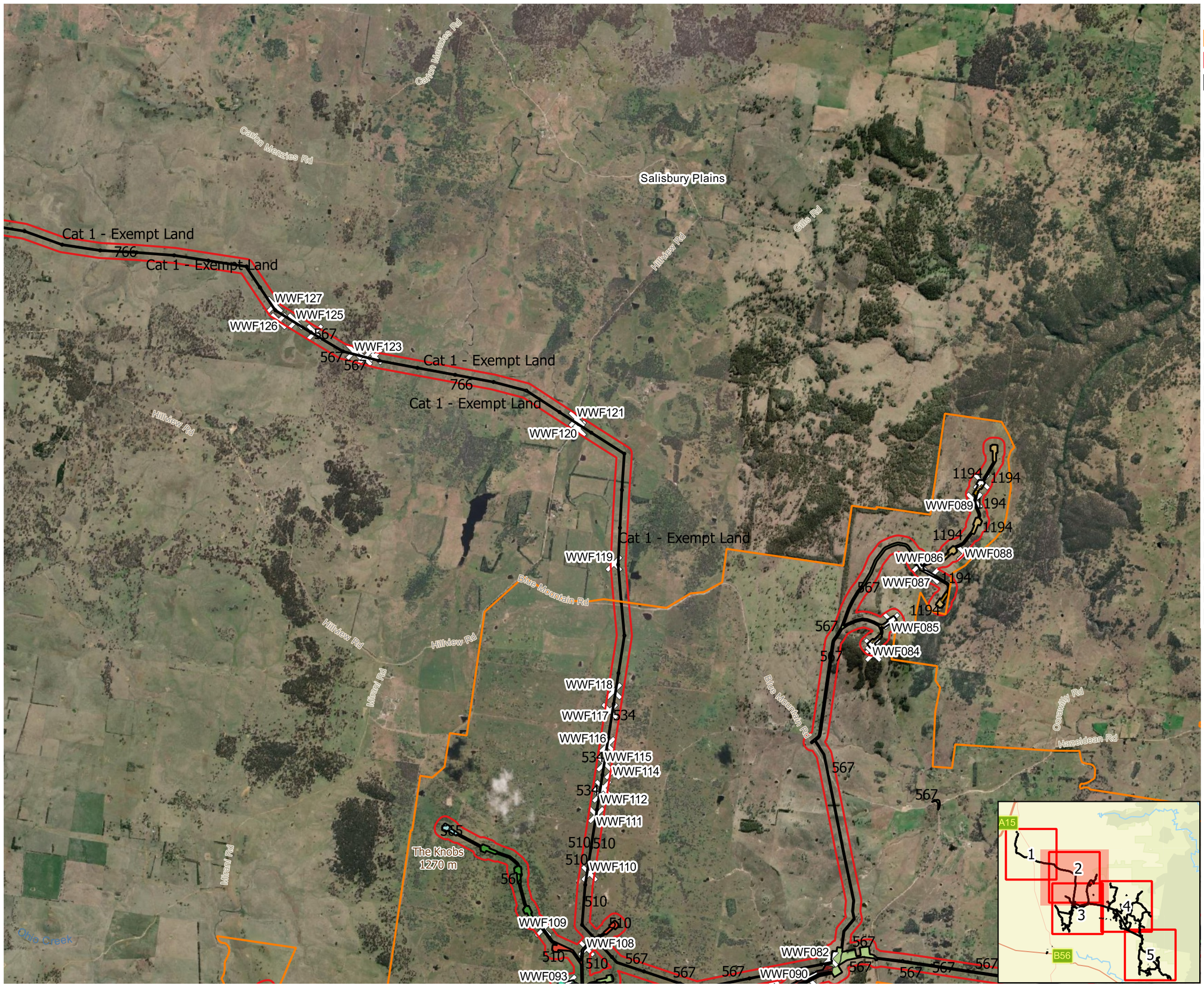

Legend

- Project Boundary
- Development Site
- Development Footprint
- BAM Plot Locations

Vegetation

- Zone 0-PCT Cat 1 - Exempt Land
- Zone 1-PCT 510 Grassland
- Zone 2-PCT 510 Woodland
- Zone 3-PCT 526 Grassland
- Zone 4-PCT 526 Woodland
- Zone 5-PCT 534 Grassland
- Zone 6-PCT 534 Woodland
- Zone 7-PCT 565 Grassland
- Zone 8-PCT 565 Woodland
- Zone 9-PCT 568 Grassland
- Zone 10-PCT 568 Woodland
- Zone 11-PCT 766 Riparian
- Zone 12-PCT 970 Grassland
- Zone 13-PCT 970 Woodland
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- Zone 19-PCT 567 Woodland_TEC
- Zone 20-PCT 567 Grassland
- Zone 21-PCT 567 Woodland

0 1 2 km

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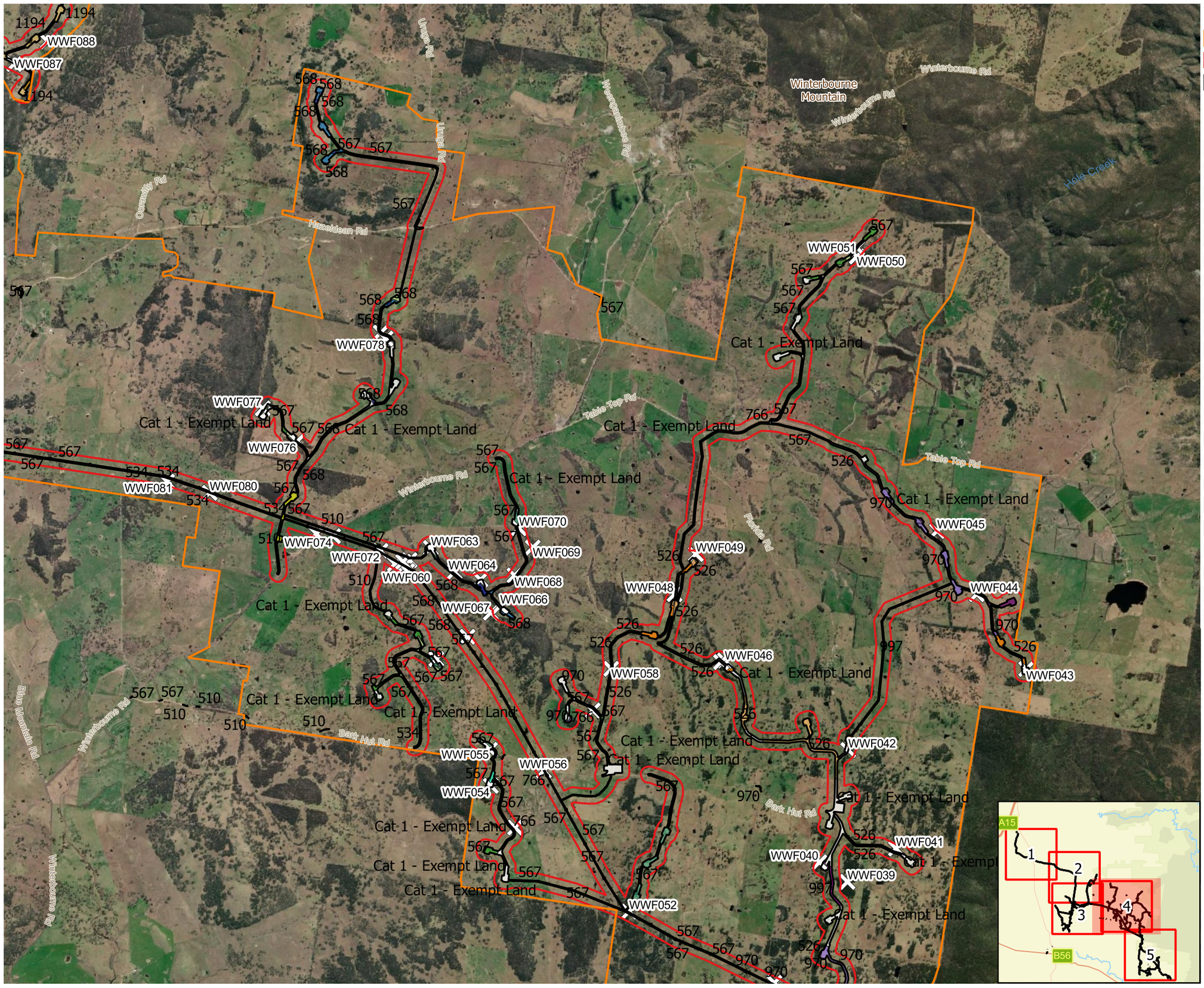

Legend

- Project Boundary
- Development Site
- Development Footprint
- BAM Plot Locations

Vegetation

- Zone 0-PCT Cat 1 - Exempt Land
- Zone 1-PCT 510 Grassland
- Zone 2-PCT 510 Woodland
- Zone 3-PCT 526 Grassland
- Zone 4-PCT 526 Woodland
- Zone 5-PCT 534 Grassland
- Zone 6-PCT 534 Woodland
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- Zone 19-PCT 567 Woodland_TEC
- Zone 20-PCT 567 Grassland
- Zone 21-PCT 567 Woodland

0 1 2 km

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Datum: GDA94 / MGA zone 56

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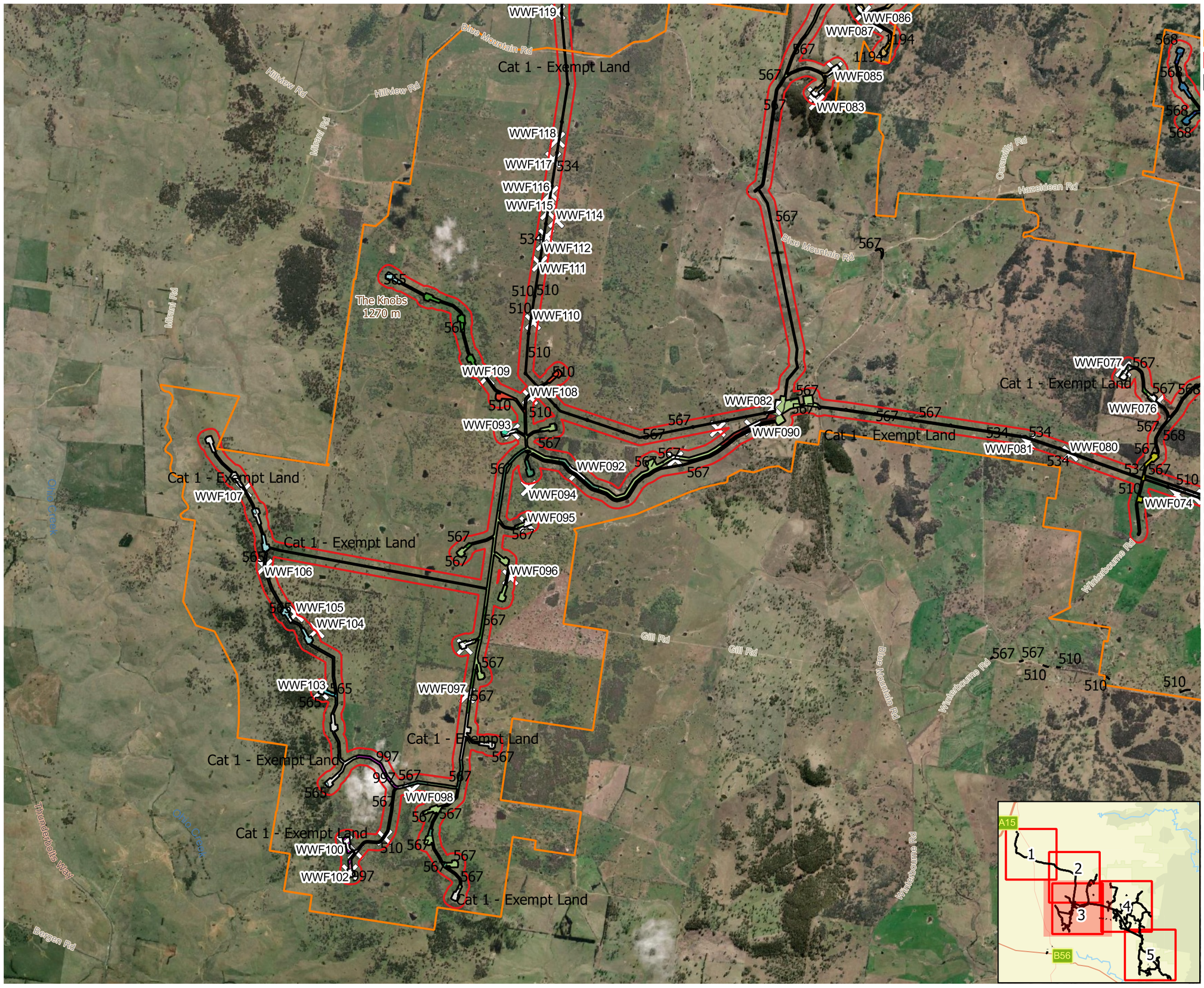

Legend

- Project Boundary
- Development Site
- Development Footprint
- BAM Plot Locations

Vegetation

- Zone 0-PCT Cat 1 - Exempt Land
- Zone 1-PCT 510 Grassland
- Zone 2-PCT 510 Woodland
- Zone 3-PCT 526 Grassland
- Zone 4-PCT 526 Woodland
- Zone 5-PCT 534 Grassland
- Zone 6-PCT 534 Woodland
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- Zone 21-PCT 567 Woodland

0 1 2 km

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Date created: 06.10.2022
Datum: GDA94 / MGA zone 56

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Legend

Project Boundary
Development Site
Development Footprint
BAM Plot Locations

Vegetation

Zone 0-PCT Cat 1 - Exempt Land
Zone 1-PCT 510 Grassland
Zone 2-PCT 510 Woodland
Zone 3-PCT 526 Grassland
Zone 4-PCT 526 Woodland
Zone 5-PCT 534 Grassland
Zone 6-PCT 534 Woodland
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Zone 8-PCT 565 Woodland
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Zone 20-PCT 567 Grassland
Zone 21-PCT 567 Woodland

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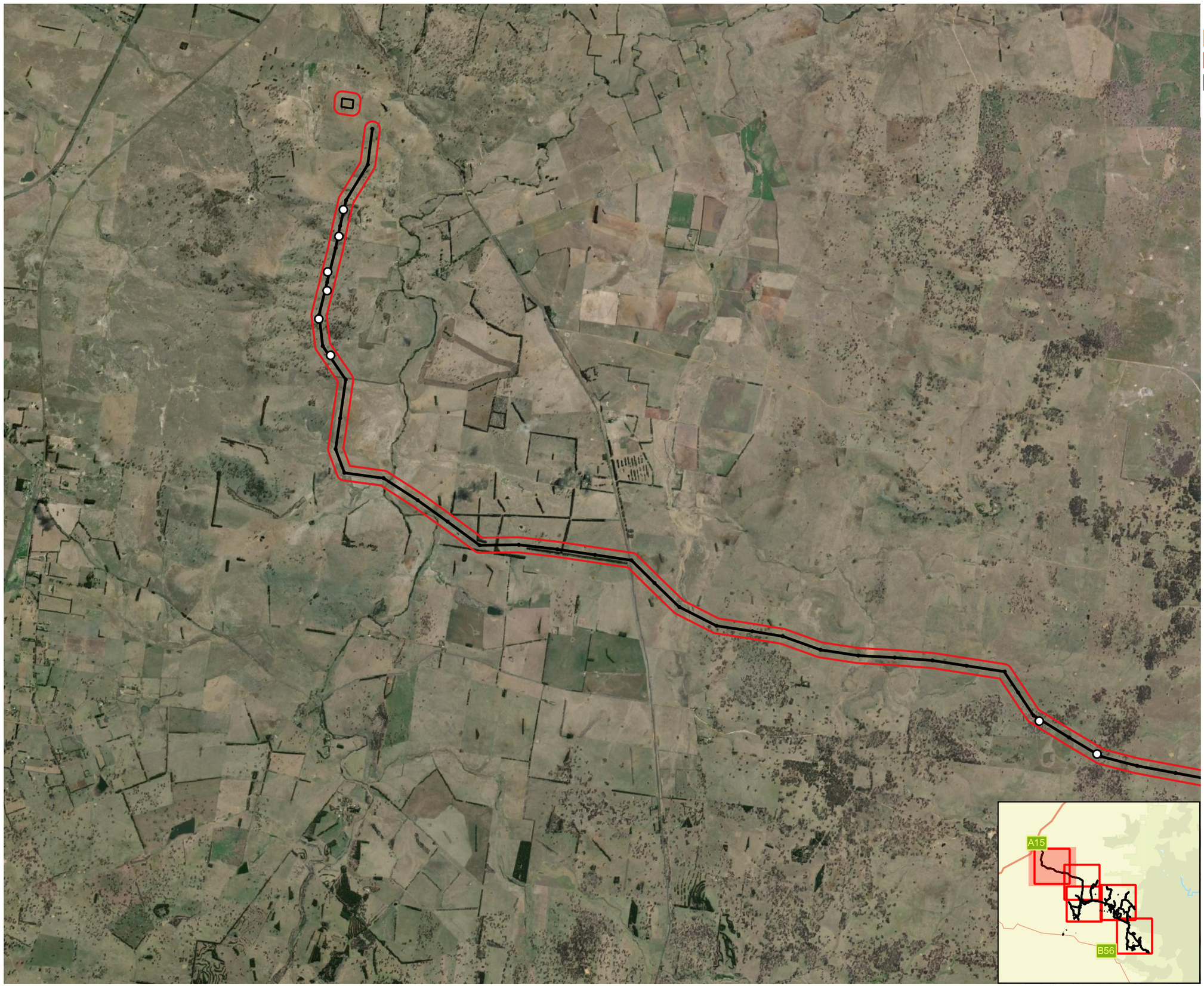
N.6 Figure 4-2 Threatened flora survey locations



Legend

- Project Boundary
- Development Site
- Development Footprint
- Flora survey locations

0 1 2 km

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Targeted Flora Surveys
Author: vitaly.K
Date created: 27.05.2022
Datum: GDA94 / MGA zone 56

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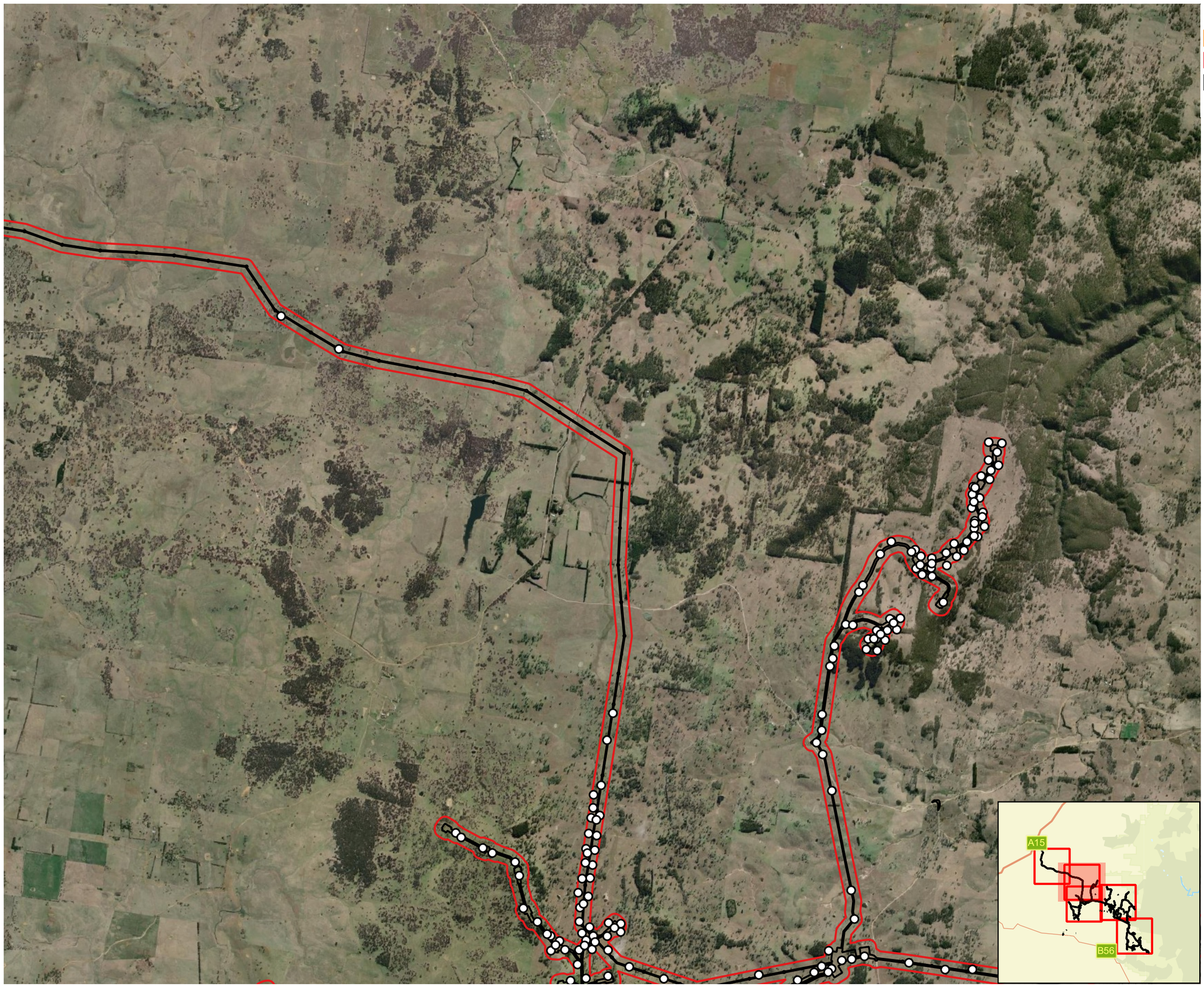

Legend

- Project Boundary
- Development Site
- Development Footprint
- Flora survey locations

0 1 2 km

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Date created: 27.05.2022
Datum: GDA94 / MGA zone 56

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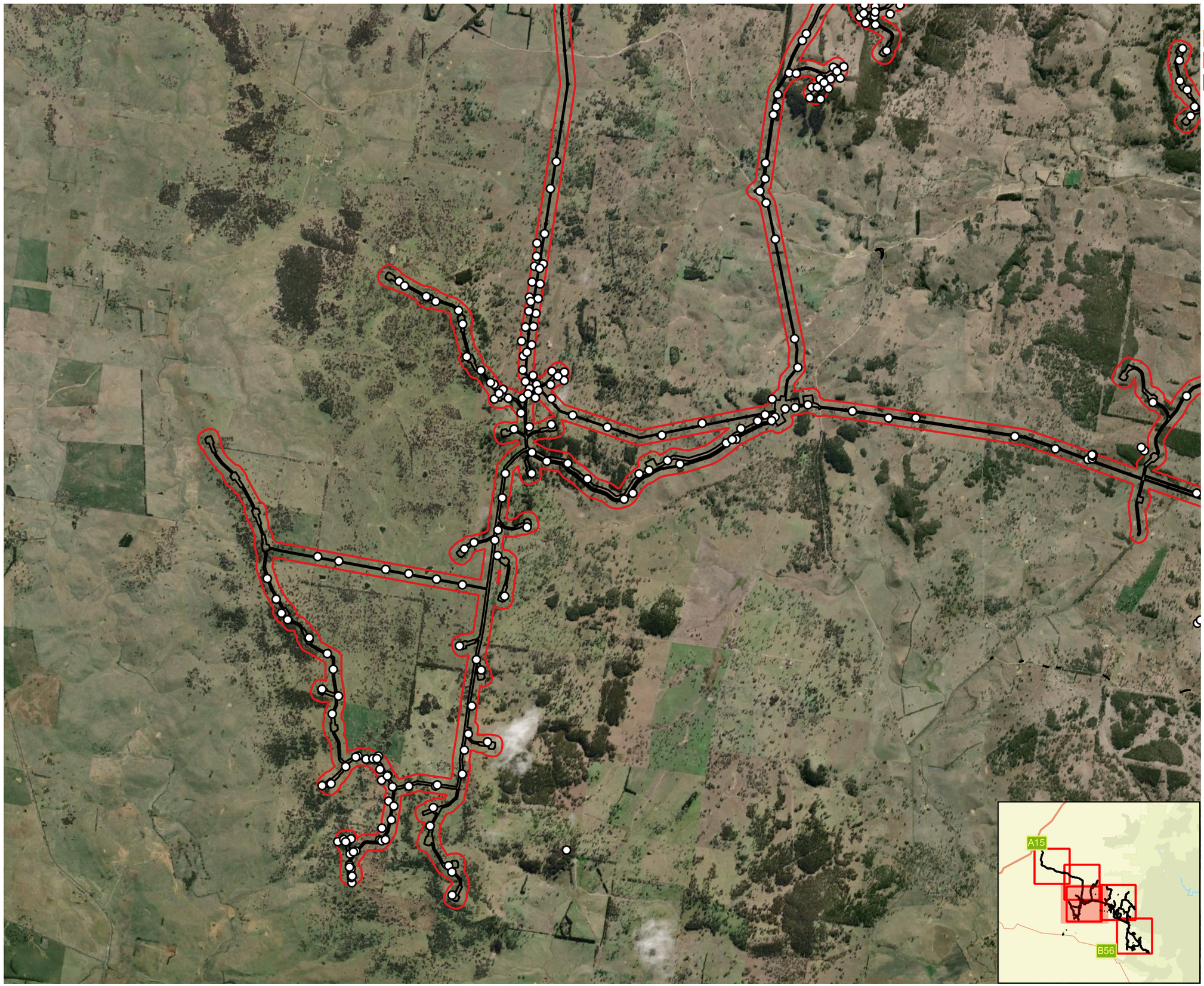

Legend

- Project Boundary
- Development Site
- Development Footprint
- Flora survey locations

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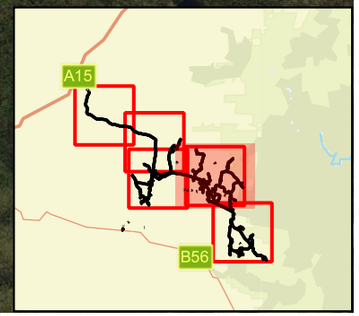
Legend

- Project Boundary
- Development Site
- Development Footprint
- Flora survey locations



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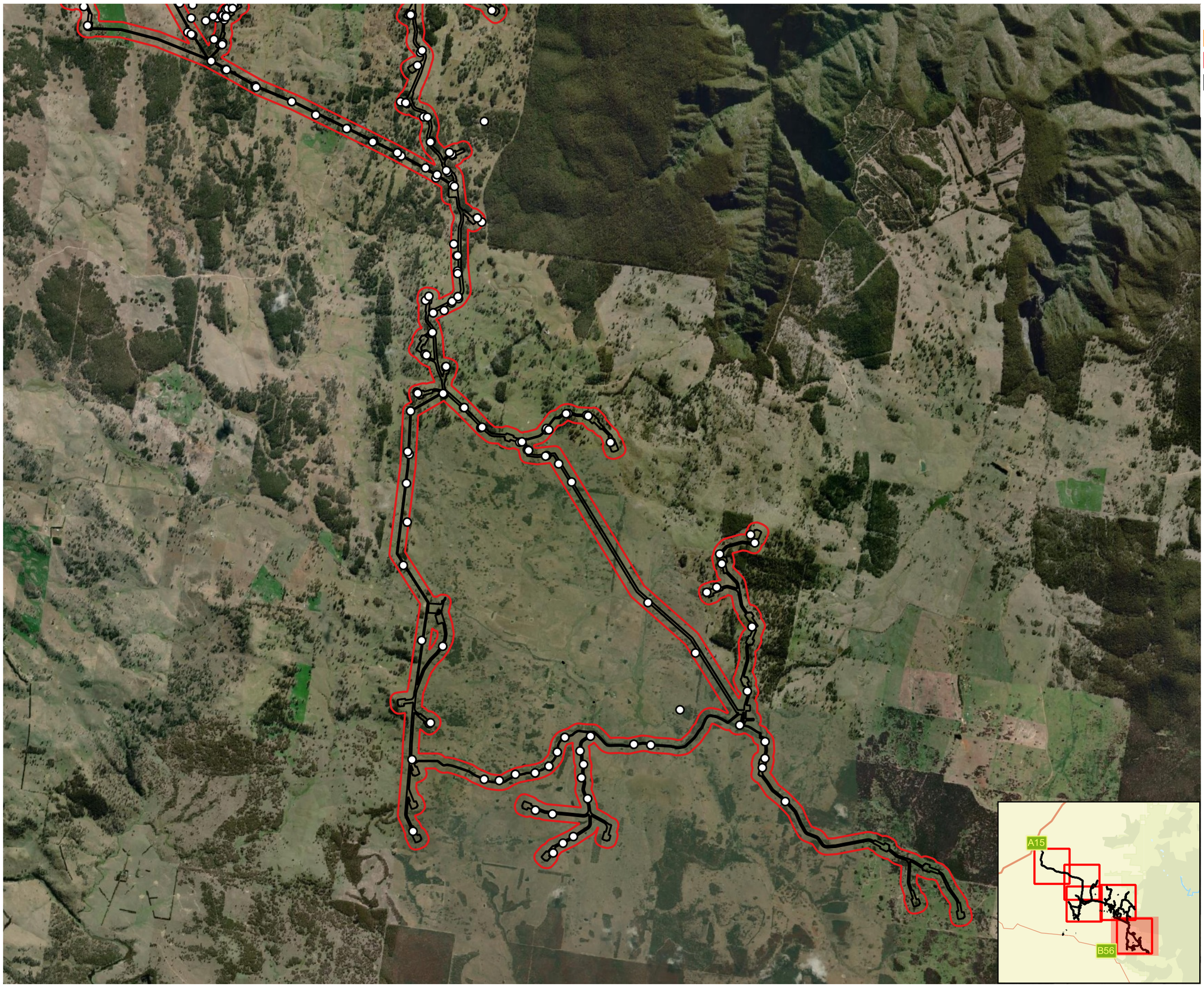

Legend

- Project Boundary
- Development Site
- Development Footprint
- Flora survey locations

0 1 2 km

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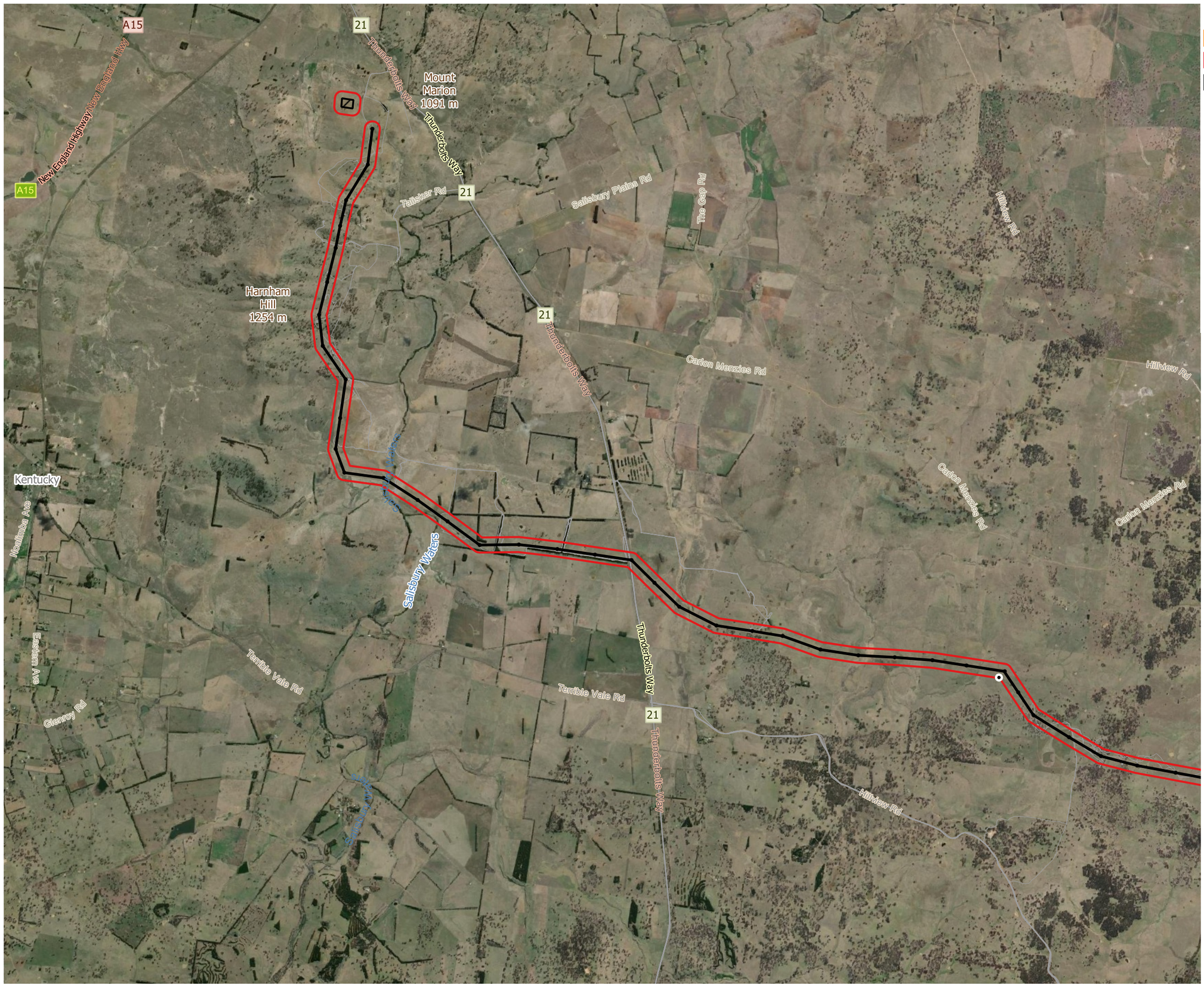
N.7 Figure 4-3 Threatened fauna survey locations

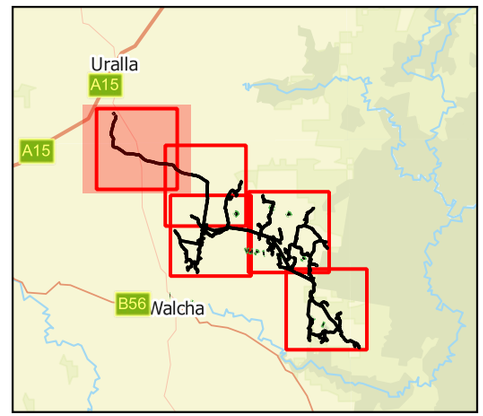


Legend

- Project Boundary
- Development Site
- Development Footprint
- Survey Tracks

Fauna Survey Locations

- Amphibian Survey Locations
- Anabat Locations
- Bird Utilisation Survey Locations
- Pale Headed Snake Survey Locations
- Pygmy Possum Trap Locations
- Rufous Bettong Camera Trap Locations
- Rufous Bettong Survey Locations
- Targetted Owl Survey Locations
- Hairtube Trap Locations



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Targetted fauna survey locations ATLAS
Author: vitaly.K
Date created: 22.03.2022
Datum: GDA94 / MGA zone 56

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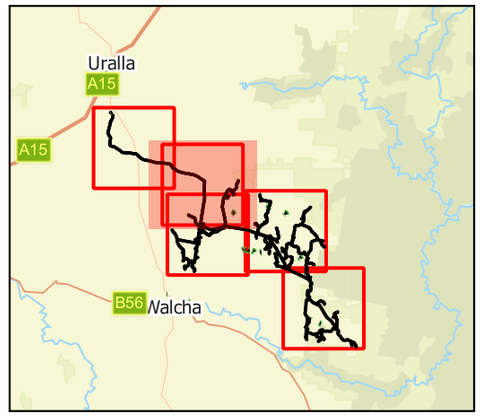
Legend

- Project Boundary
- Development Site
- Development Footprint
- Survey Tracks

Fauna Survey Locations

- Amphibian Survey Locations
- Anabat Locations
- Bird Utilisation Survey Locations
- Pale Headed Snake Survey Locations
- Pygmy Possum Trap Locations
- Rufous Bettong Camera Trap Locations
- Rufous Bettong Survey Locations
- Targetted Owl Survey Locations
- Hairtube Trap Locations



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Datum: GDA94 / MGA zone 56

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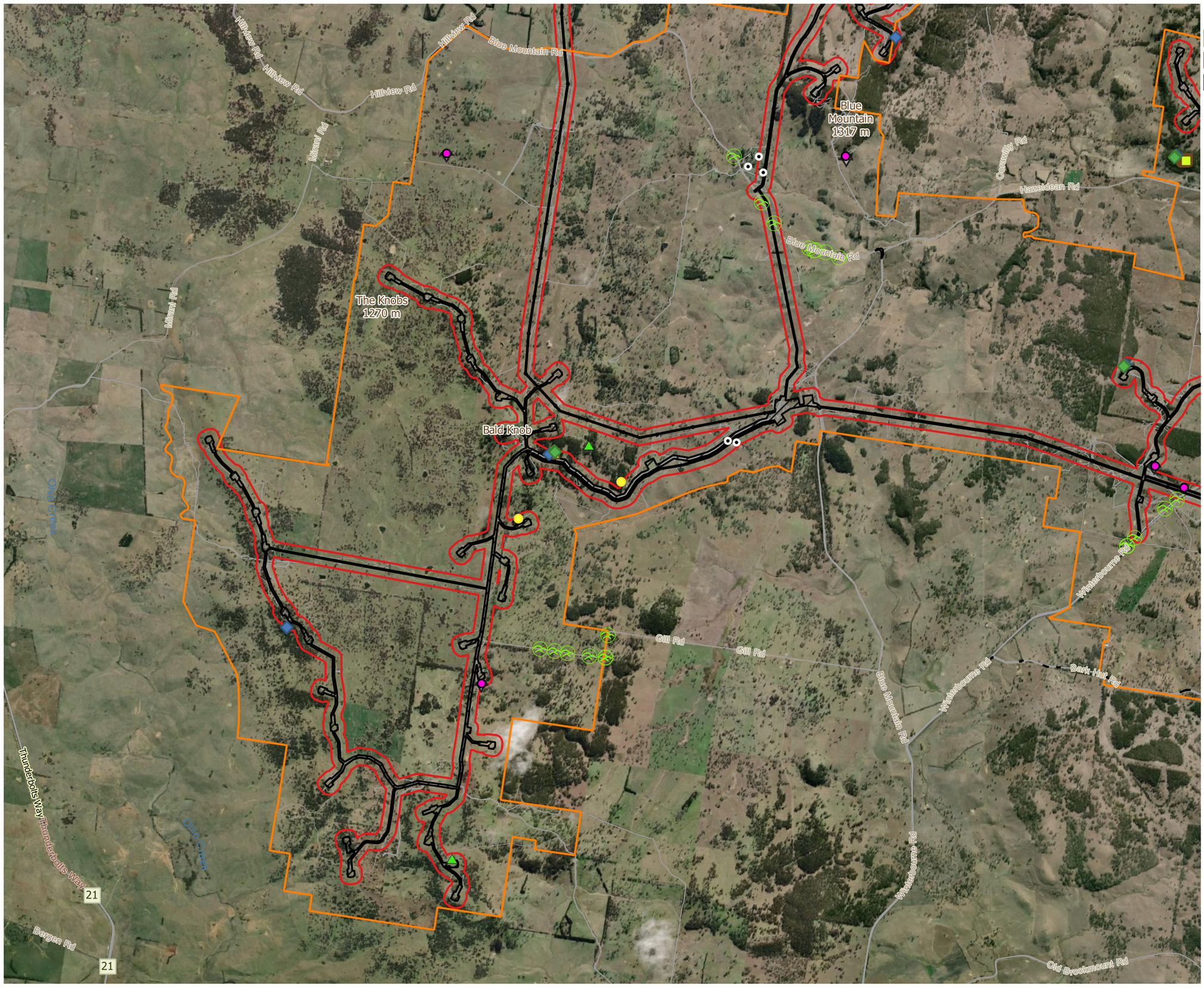

Legend

- Project Boundary
- Development Site
- Development Footprint
- Survey Tracks

Fauna Survey Locations

- Amphibian Survey Locations
- Anabat Locations
- Bird Utilisation Survey Locations
- Pale Headed Snake Survey Locations
- Pygmy Possum Trap Locations
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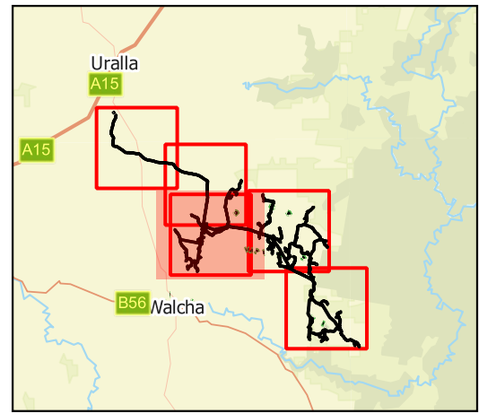
- Rufous Bettong Survey Locations
- Targetted Owl Survey Locations
- Hairtube Trap Locations



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Ref: 21-570 Winterbourne BDAR VK \ BDAR Figure 13
Targetted fauna survey locations ATLAS
Author: vitaly.K
Date created: 22.03.2022
Datum: GDA94 / MGA zone 56

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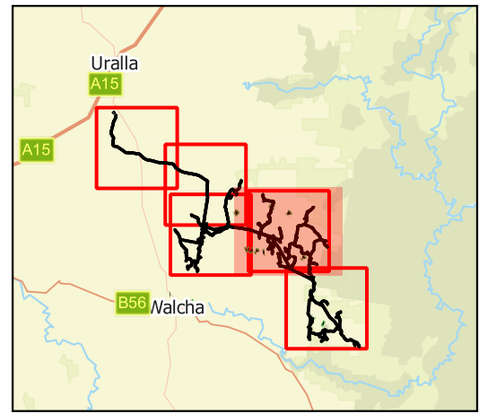
Legend

- Project Boundary
- Development Site
- Development Footprint
- Survey Tracks

Fauna Survey Locations

- Amphibian Survey Locations
- Anabat Locations
- Bird Utilisation Survey Locations
- Pale Headed Snake Survey Locations
- Pygmy Possum Trap Locations
- Rufous Bettong Camera Trap Locations
- Rufous Bettong Survey Locations
- Targetted Owl Survey Locations
- Hairtube Trap Locations



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Targetted fauna survey locations ATLAS
Author: vitaly.K
Date created: 22.03.2022
Datum: GDA94 / MGA zone 56

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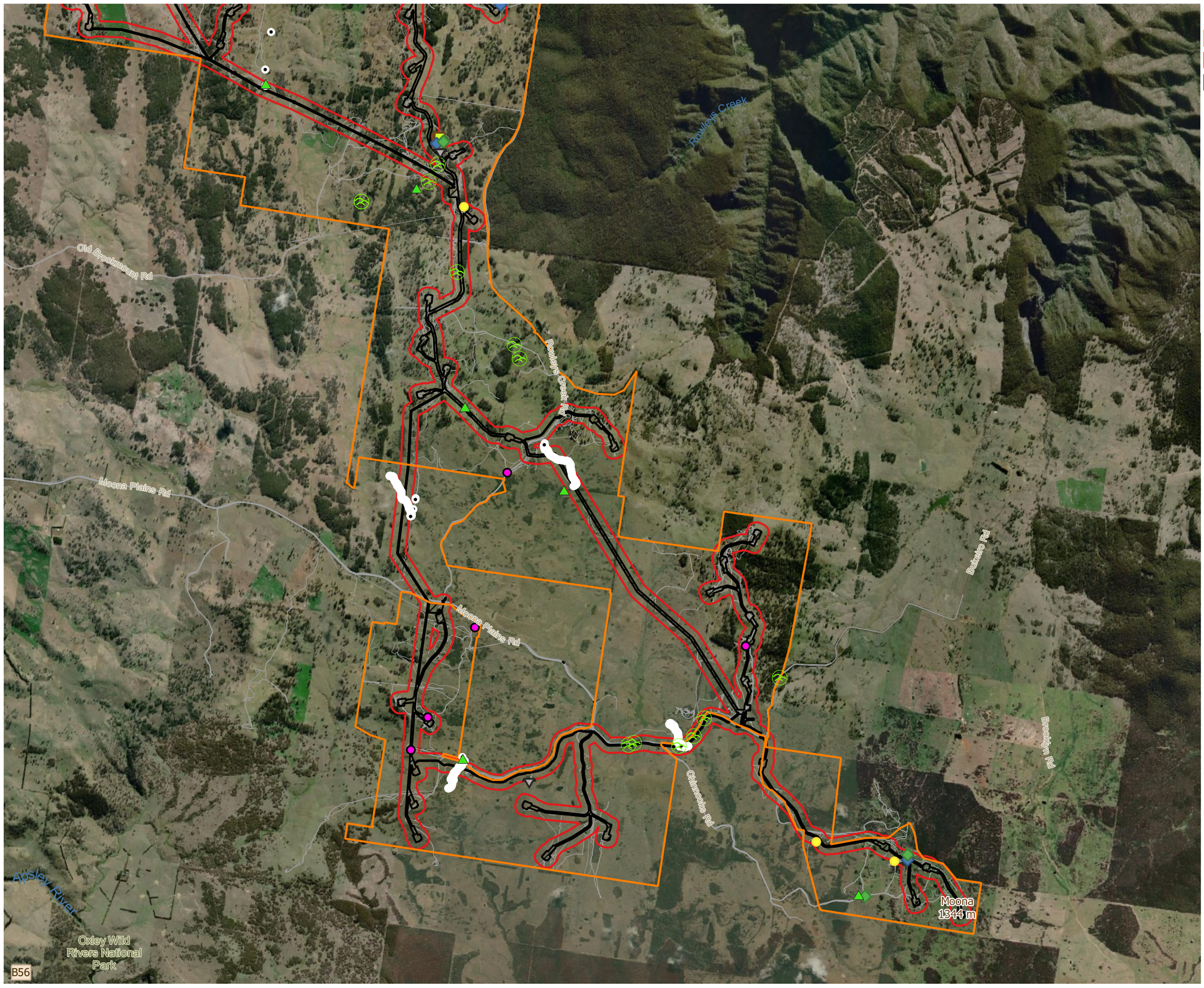

Legend

- Project Boundary
- Development Site
- Development Footprint
- Survey Tracks

Fauna Survey Locations

- Amphibian Survey Locations
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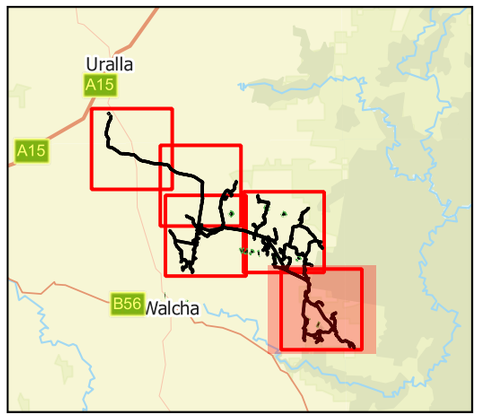
- Hairtube Trap Locations



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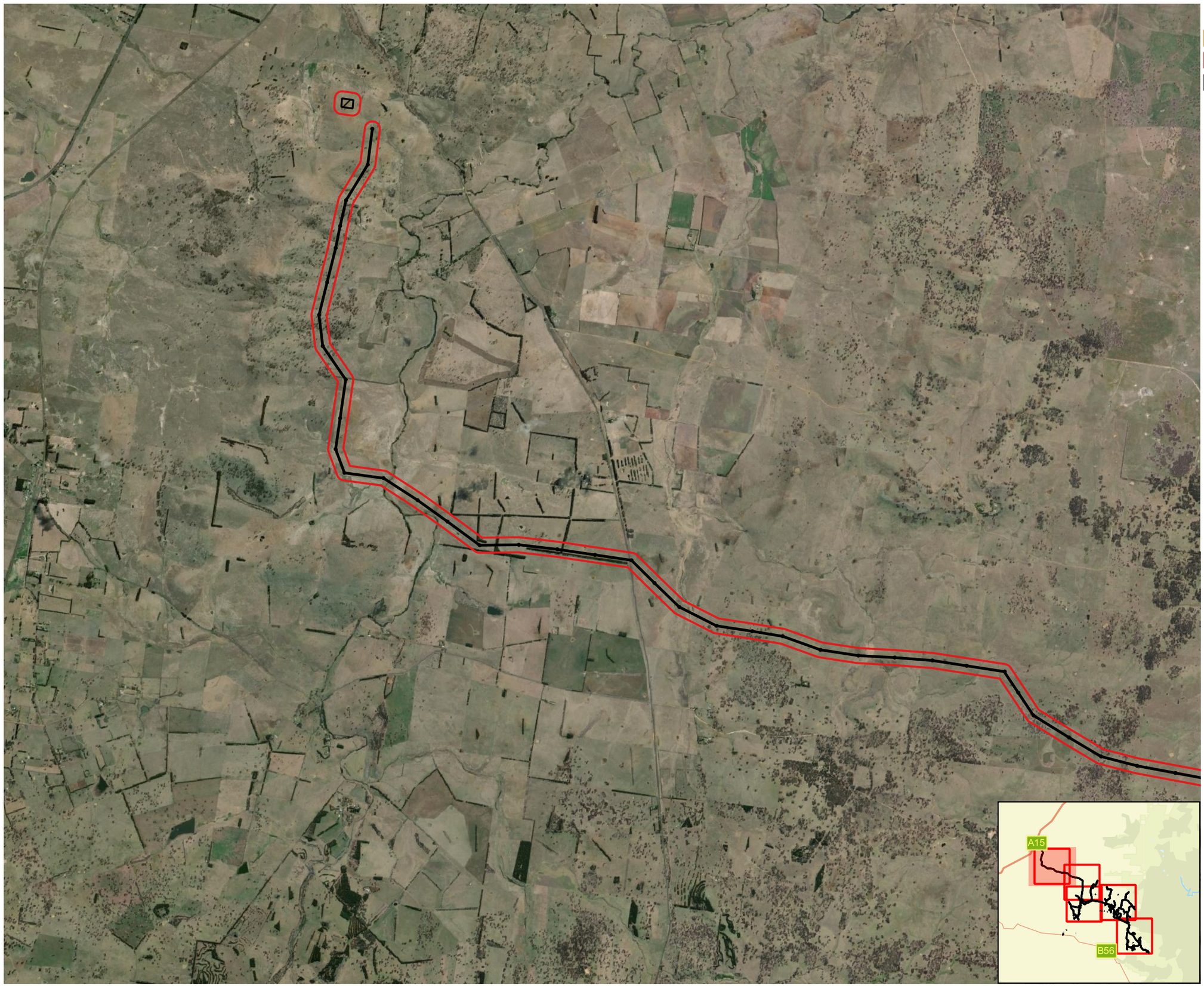
N.8 Figure 4-4 Threatened flora and fauna survey results



Legend

- Project Boundary
- Development Site
- Development Footprint

Threatened Species Results

- Barking owl
- Greater Glider
- Little eagle
- Squirrel Glider
- Spotted-Tailed Quoll
- Koala Scat
- Glossy black-cockatoo Sightings
- Diamond Firetail
- Dusky Woodswallow
- Little Lorikeet
- Speckled Warbler
- Varied Sitella
- Eucalyptus nicholii Sightings
- Bluegrass Sightings

Habitat Features

- Rocky Outcrops
- Stick Nest
- Logs
- Potential Glossy black-cockatoo Habitat
- White-bellied Sea-Eagle nesting site

0 1 2 km

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Threatened Species Results ATLAS
Author: vitaly.K
Date created: 27.05.2022
Datum: GDA94 / MGA zone 56

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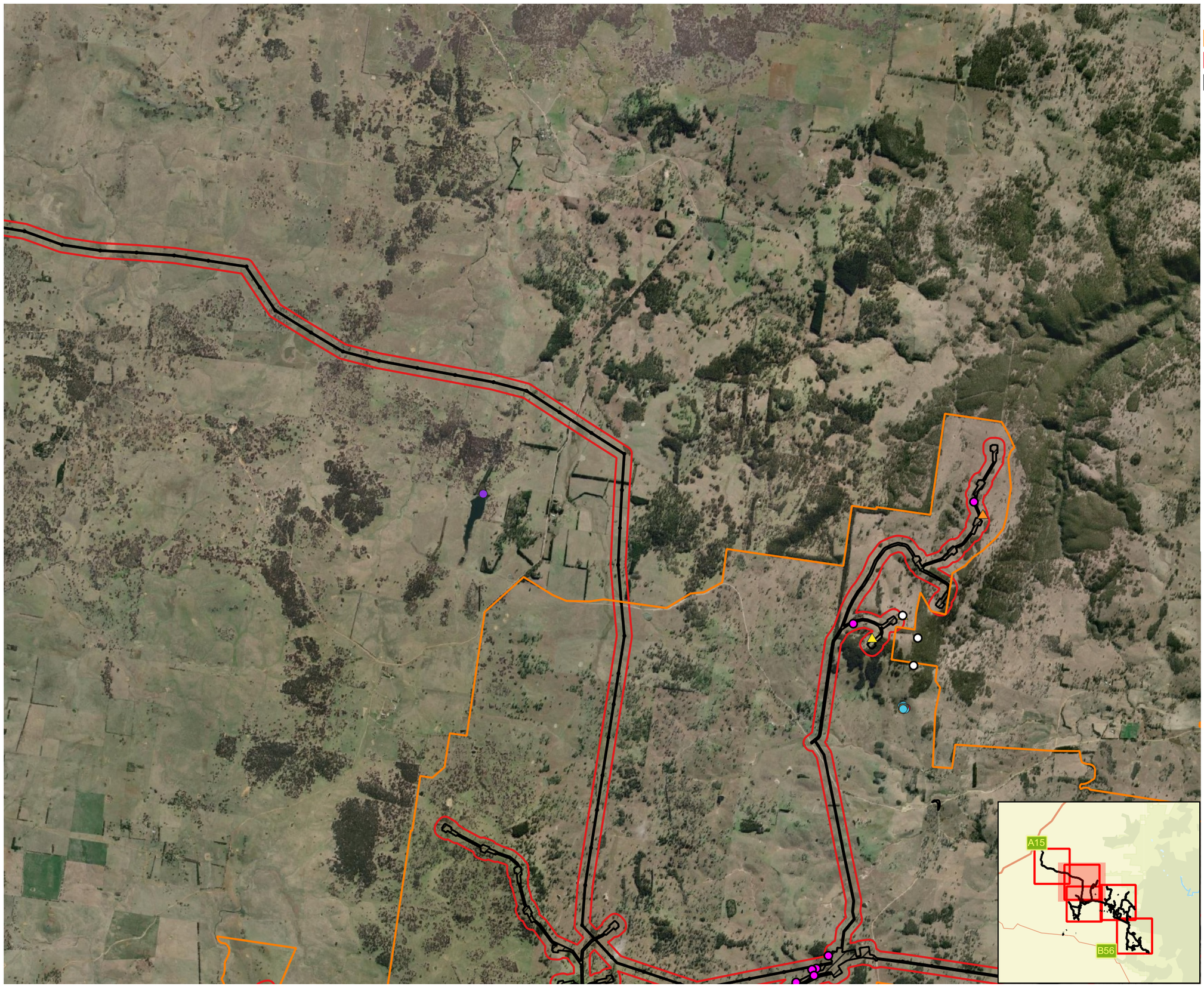

Legend

- Project Boundary
- Development Site
- Development Footprint

Threatened Species Results

- Barking owl
- Greater Glider
- Little eagle
- Squirrel Glider
- Spotted-Tailed Quoll
- Koala Scat
- Glossy black-cockatoo Sightings
- Diamond Firetail
- Dusky Woodswallow
- Little Lorikeet
- Speckled Warbler
- Varied Sitella
- Eucalyptus nicholii Sightings
- Bluegrass Sightings

Habitat Features

- Rocky Outcrops
- Stick Nest
- Logs
- Potential Glossy black-cockatoo Habitat
- White-bellied Sea-Eagle nesting site

0 1 2 km

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Author: vitaly.K
Date created: 27.05.2022
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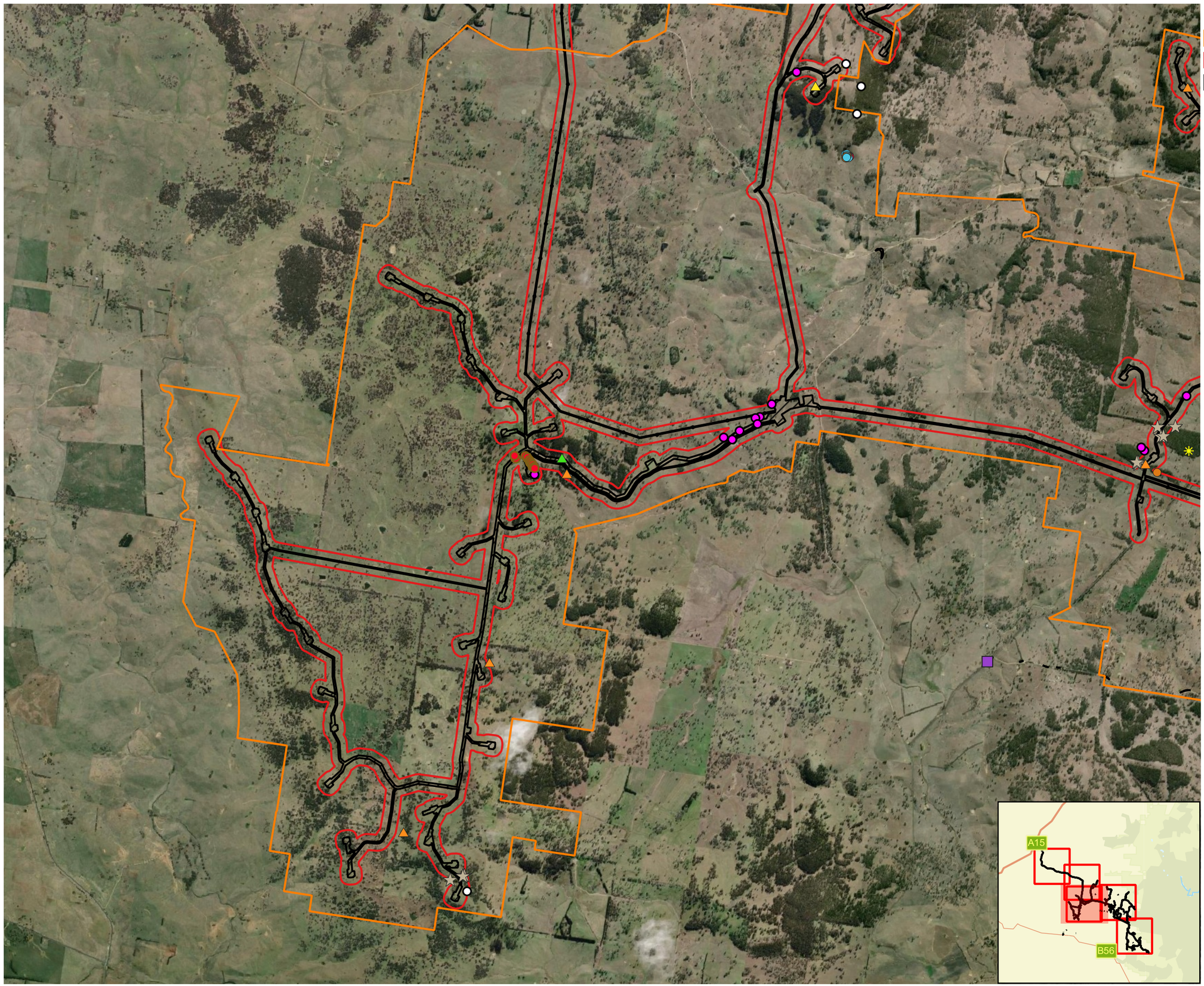

Legend

- Project Boundary
- Development Site
- Development Footprint

Threatened Species Results

- Barking owl
- Greater Glider
- Little eagle
- Squirrel Glider
- Spotted-Tailed Quoll
- Koala Scat
- Glossy black-cockatoo Sightings
- Diamond Firetail
- Dusky Woodswallow
- Little Lorikeet
- Speckled Warbler
- Varied Sitella
- Eucalyptus nicholii Sightings
- Bluegrass Sightings

Habitat Features

- Rocky Outcrops
- Stick Nest
- Logs
- Potential Glossy black-cockatoo Habitat
- White-bellied Sea-Eagle nesting site

0 1 2 km

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Date created: 27.05.2022
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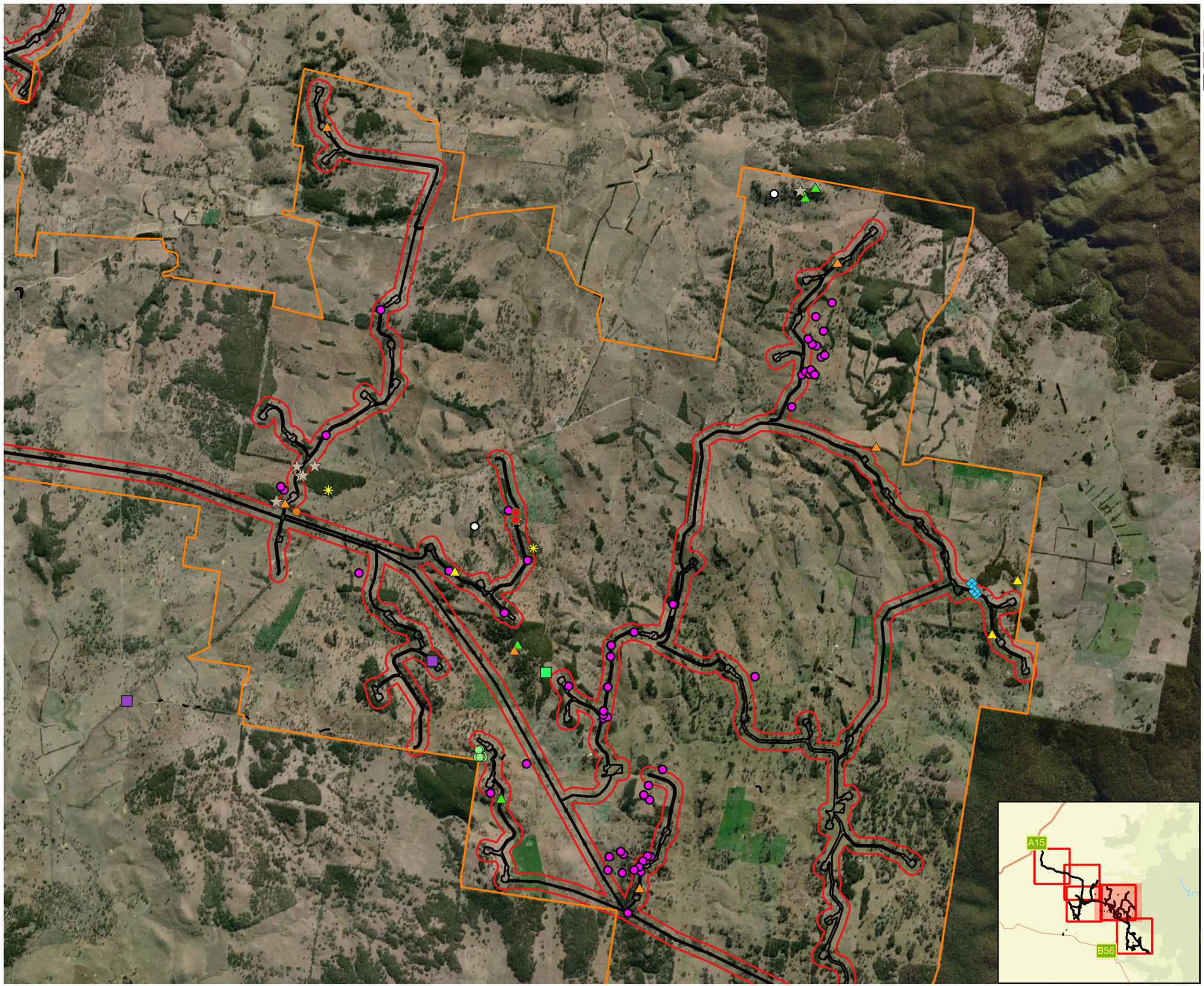

Legend

Project Boundary
Development Site
Development Footprint

Threatened Species Results

Barking owl
Greater Glider
Little eagle
Squirrel Glider
Spotted-Tailed Quoll
Koala Scat
Glossy black-cockatoo Sightings
Diamond Firetail
Dusky Woodswallow
Little Lorikeet
Speckled Warbler
Varied Sitella
Eucalyptus nicholii Sightings
Bluegrass Sightings

Habitat Features

Rocky Outcrops
Stick Nest
Logs
Potential Glossy black-cockatoo Habitat
White-bellied Sea-Eagle nesting site

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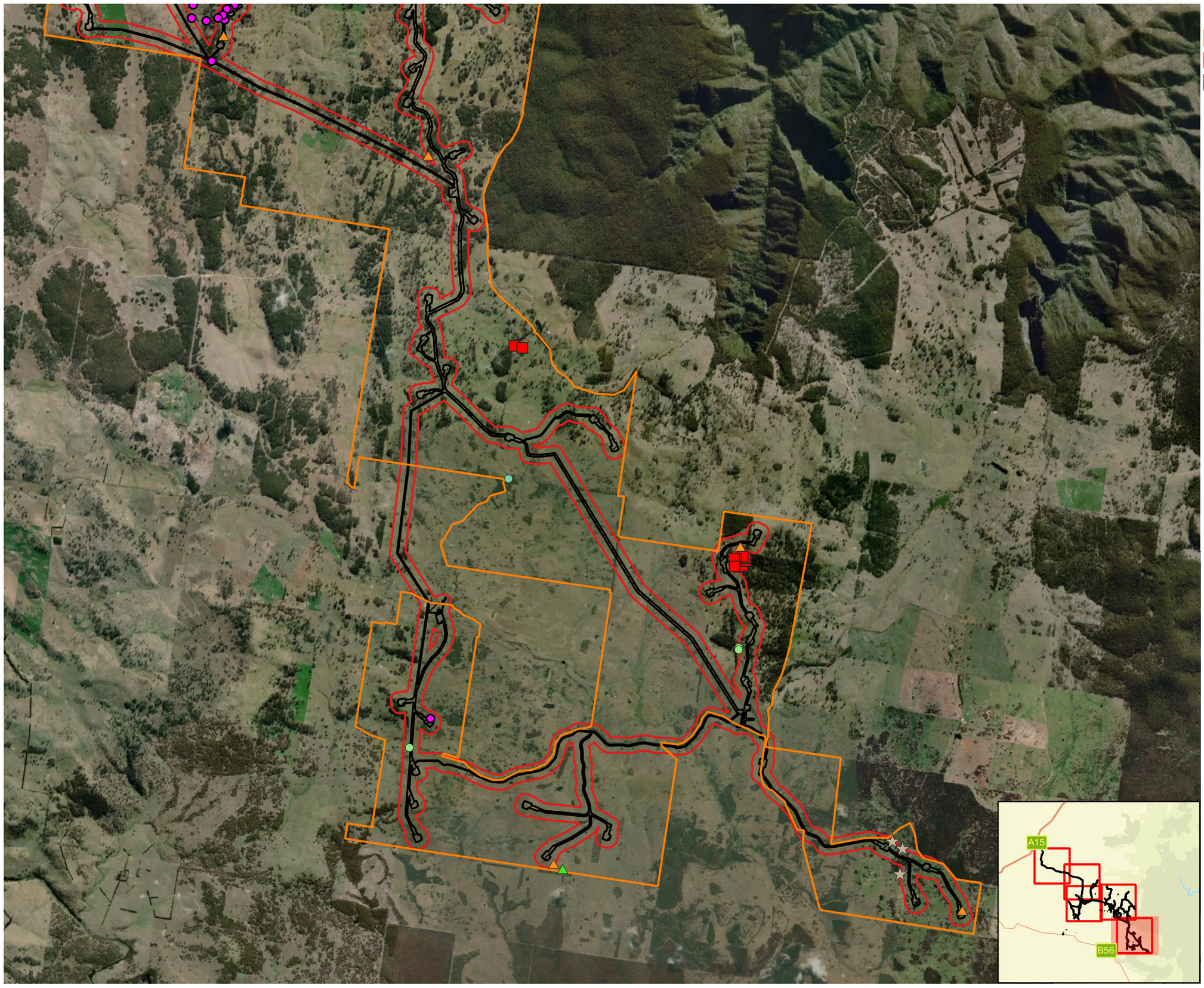

Legend

Project Boundary
Development Site
Development Footprint

Threatened Species Results

- Barking owl
- Greater Glider
- Little eagle
- Squirrel Glider
- Spotted-Tailed Quoll
- Koala Scat
- Glossy black-cockatoo Sightings
- Diamond Firetail
- Dusky Woodswallow
- Little Lorikeet
- Speckled Warbler
- Varied Sitella
- Eucalyptus nicholii Sightings
- Bluegrass Sightings

Habitat Features

- Rocky Outcrops
- Stick Nest
- Logs
- Potential Glossy black-cockatoo Habitat
- White-bellied Sea-Eagle nesting site

0 1 2 km

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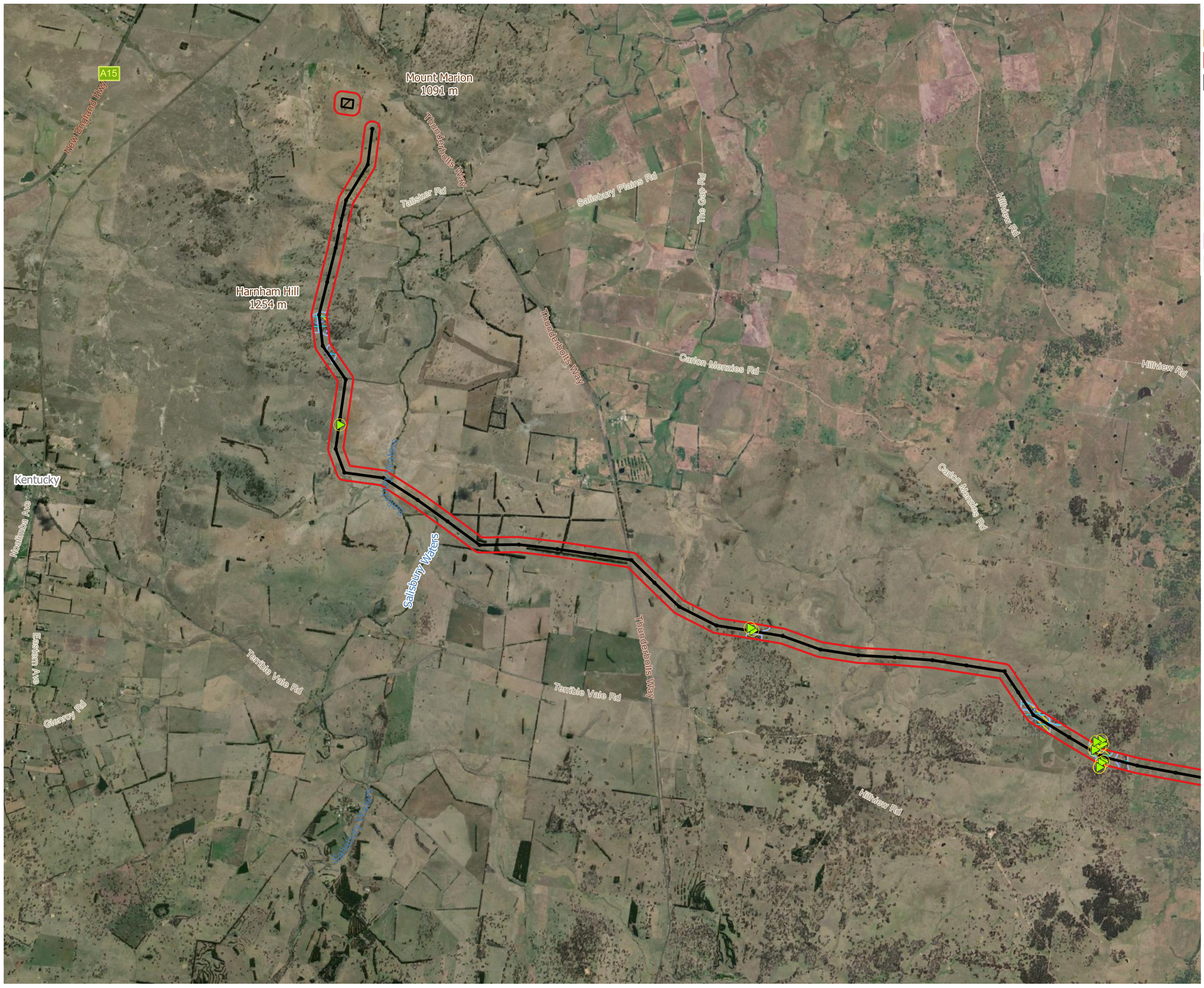
N.9 Figure 4-5 Threatened species polygons

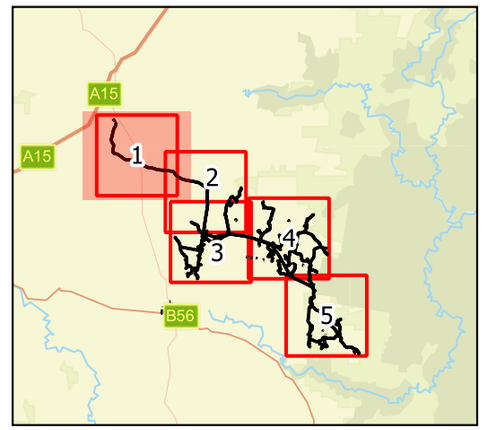


Legend

- Project Boundary
- Development Site
- Development Footprint
- Narrow-leaved Black Peppermint
- Hollow bearing trees

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
- Greater Glider/Squirrel Glider Petauroides volans/Petaurus norfolcensis
- Koala - Phascolarctos cinereus
- Glossy Black-cockatoo Calyptorhynchus lathami



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Date created: 12.10.2022
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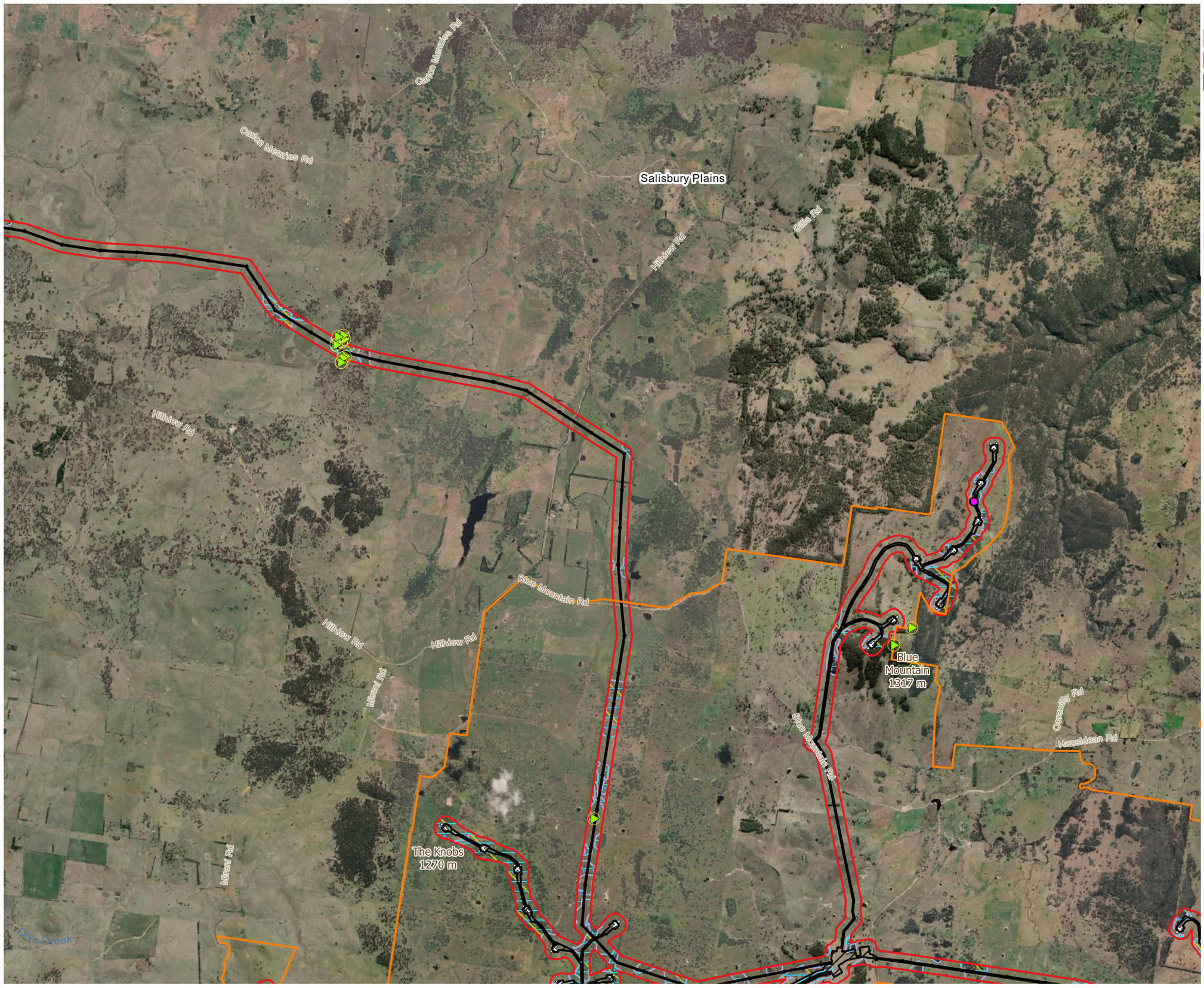
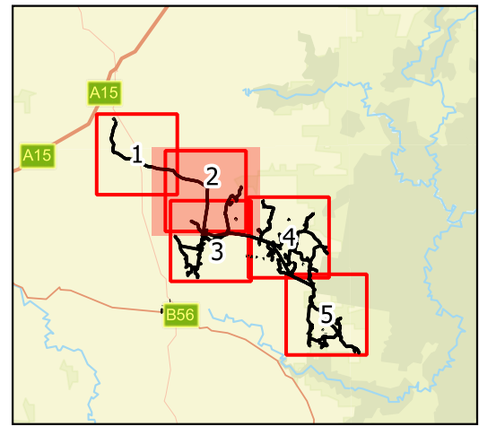


Legend

- Project Boundary
- Development Site
- Development Footprint
- Narrow-leaved Black Peppermint
- Hollow bearing trees

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
- Greater Glider/Squirrel Glider Petauroides volans/Petaurus norfolcensis
- Koala - Phascolarctos cinereus
- Glossy Black-cockatoo Calyptorhynchus lathami



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Author: vitaly.K
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Legend

- Project Boundary
- Development Site
- Development Footprint
- Narrow-leaved Black Peppermint
- Hollow bearing trees

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
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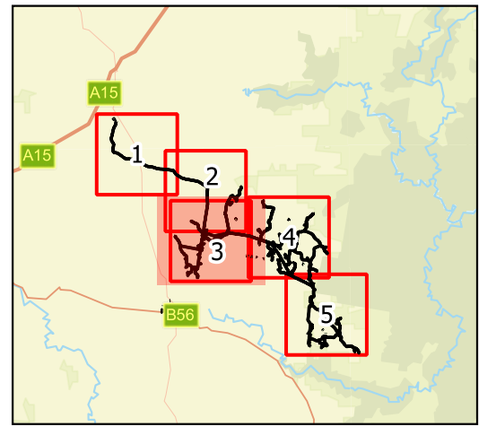
- Koala - Phascolarctos cinereus
- Glossy Black-cockatoo Calyptorhynchus lathami



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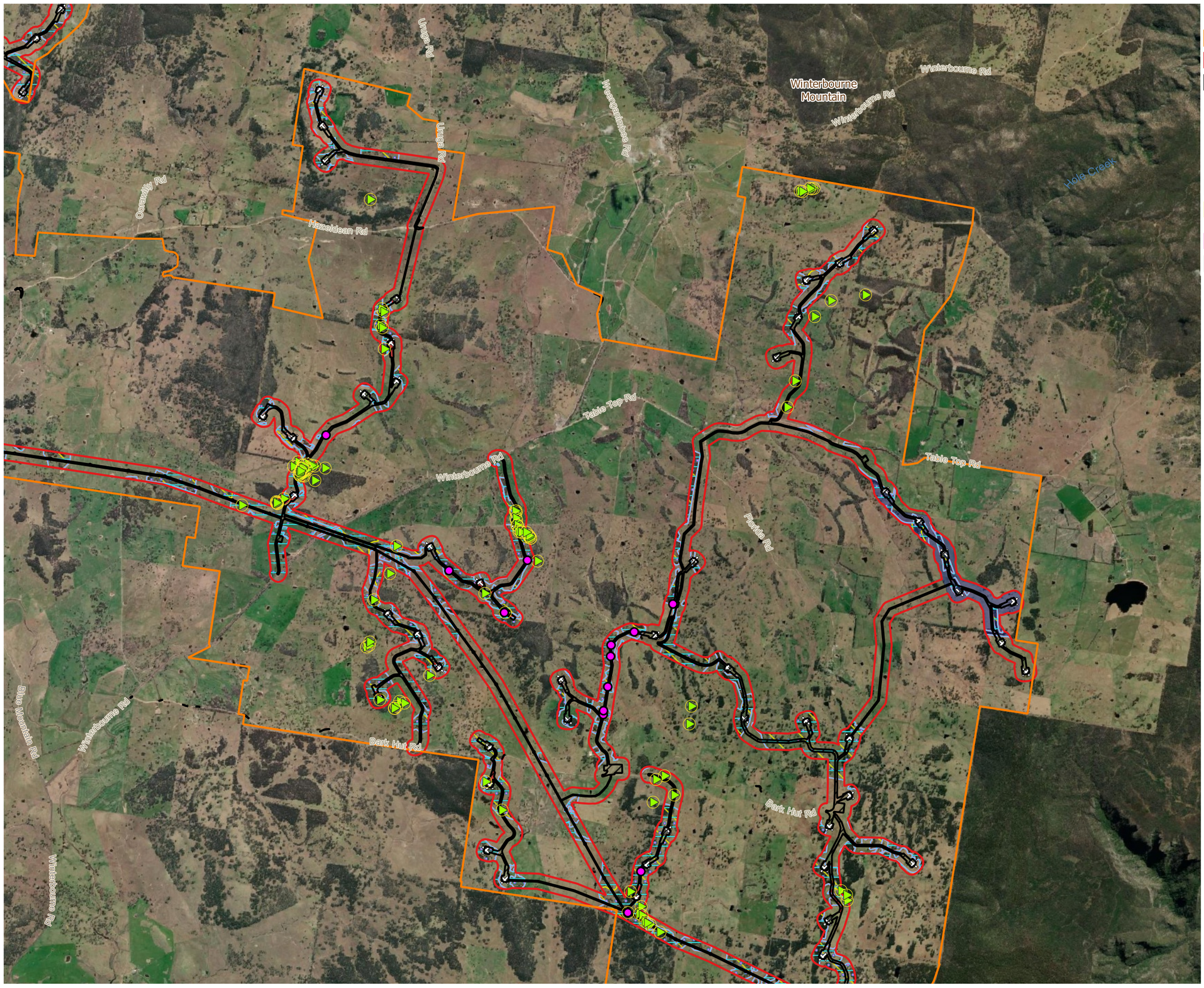

Legend

- Project Boundary
- Development Site
- Development Footprint
- Narrow-leaved Black Peppermint
- Hollow bearing trees

Species Polygons within Development Site

- Barking Owl - Ninox connivens
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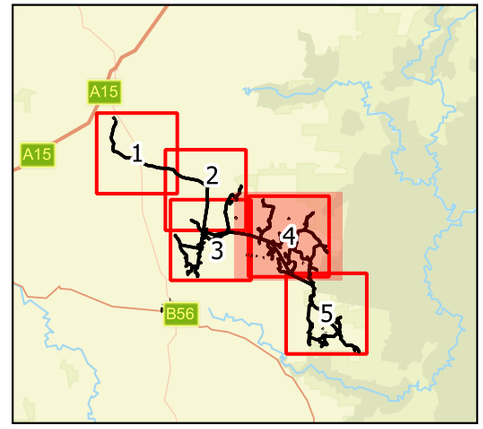
- Koala - Phascolarctos cinereus
- Glossy Black-cockatoo Calyptorhynchus lathami



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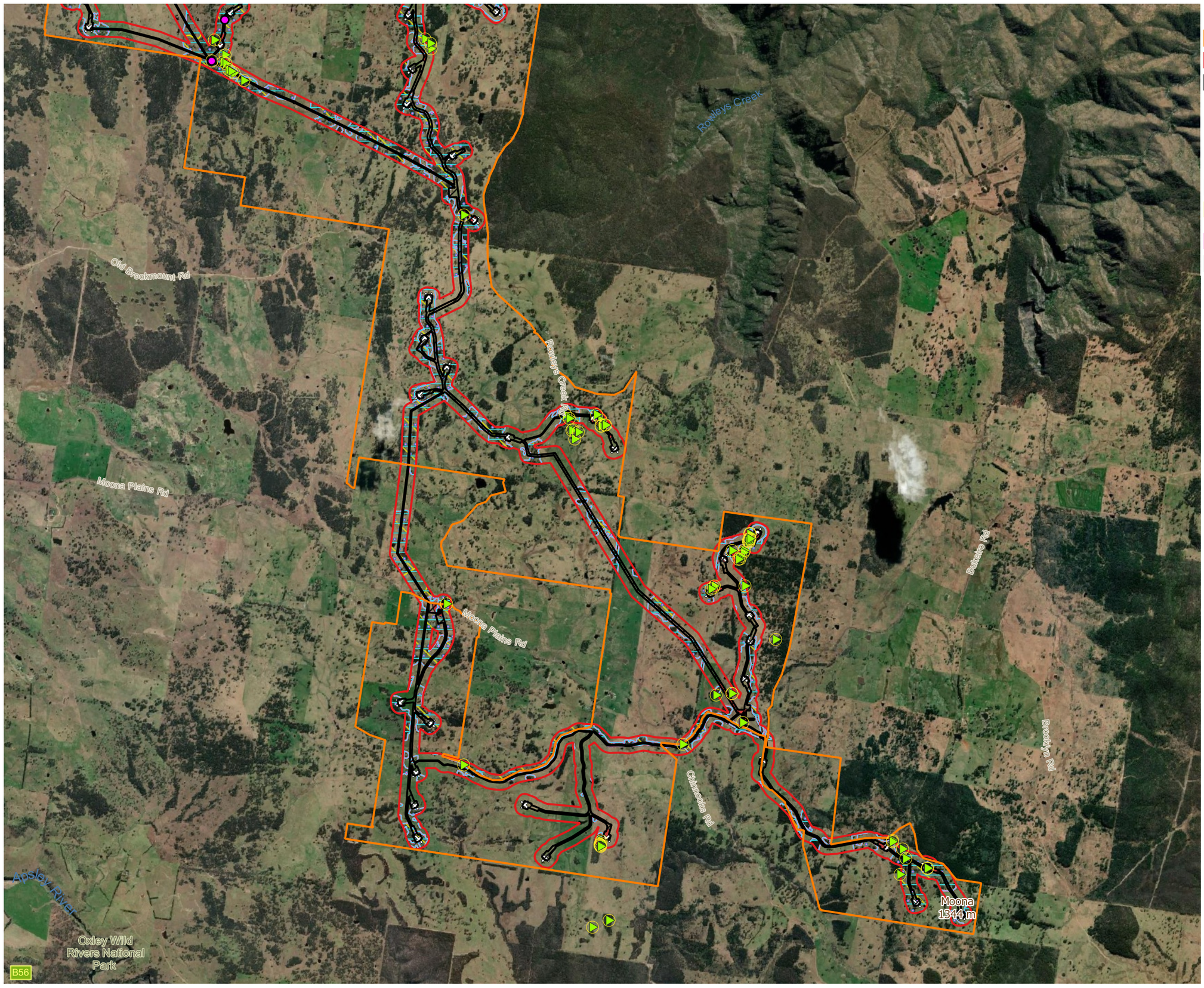

Legend

- Project Boundary
- Development Site
- Development Footprint
- Narrow-leaved Black Peppermint
- Hollow bearing trees

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
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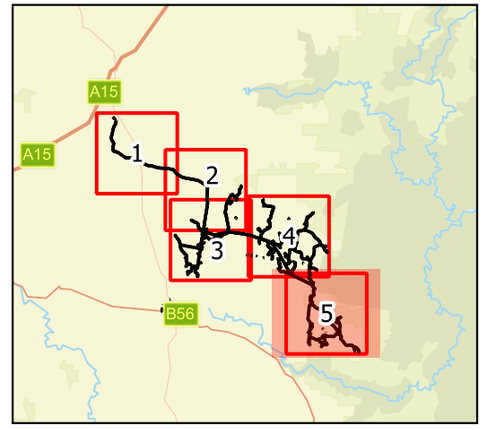
- Glossy Black-cockatoo Calyptorhynchus lathami



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Date created: 12.10.2022
Datum: GDA94 / MGA zone 56

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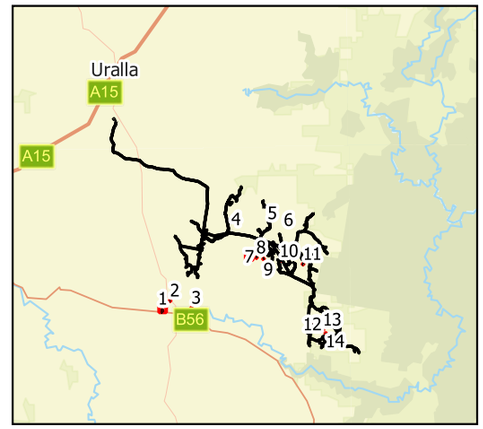
Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
- Elegant Greenhood - Pterostylis elegans
- Glossy Black Cockatoo - Calyptorhynchus lathami
- Greater Glider/Squirrel Glider Petauroides volans/Petaurus norfolcensis
- Koala - Phascolarctos cinereus
- Southern Myotis - Myotis macropus
- Narrow-leaved black peppermint-Eucalyptus nicholii



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Species Polygons ATLAS IU
Author: vitaly.K
Date created: 22.03.2022
Datum: GDA94 / MGA zone 56

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Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

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- Bluegrass - Dicanthium setosum
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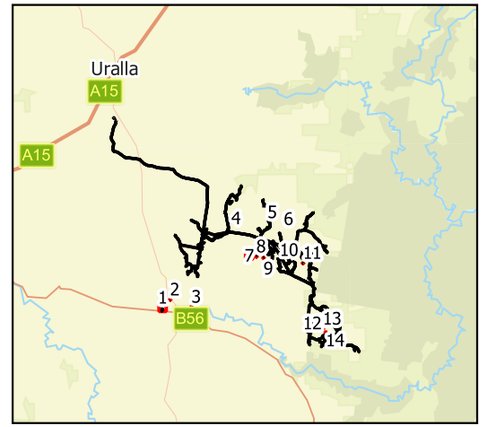
- Glossy Black Cockatoo - Calyptorhynchus lathami
- Greater Glider/Squirrel Glider Petauroides volans/Petaurus norfolcensis
- Koala - Phascolarctos cinereus
- Southern Myotis - Myotis macropus
- Narrow-leaved black peppermint-Eucalyptus nicholii



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Species Polygons ATLAS IU
Author: vitaly.K
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NGH



Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
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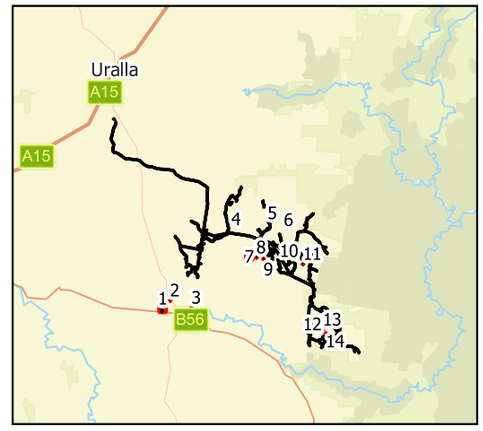

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Species Polygons ATLAS IU
Author: vitaly.K
Date created: 22.03.2022
Datum: GDA94 / MGA zone 56

NGH



Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
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- Koala - Phascolarctos cinereus
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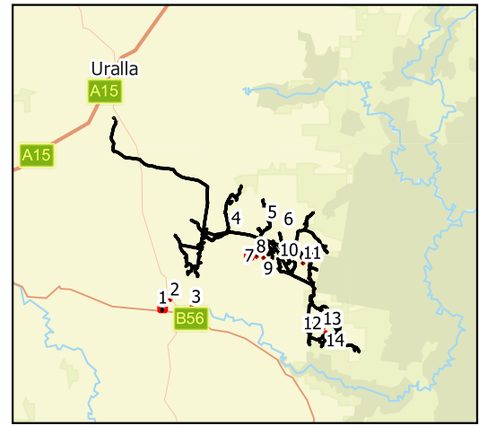
- Narrow-leaved black peppermint-Eucalyptus nicholii



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Species Polygons ATLAS IU
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Legend

- Project Boundary
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Species Polygons within Development Site

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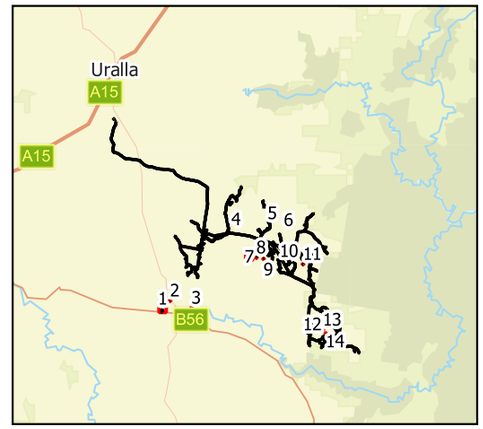

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Author: vitaly.K
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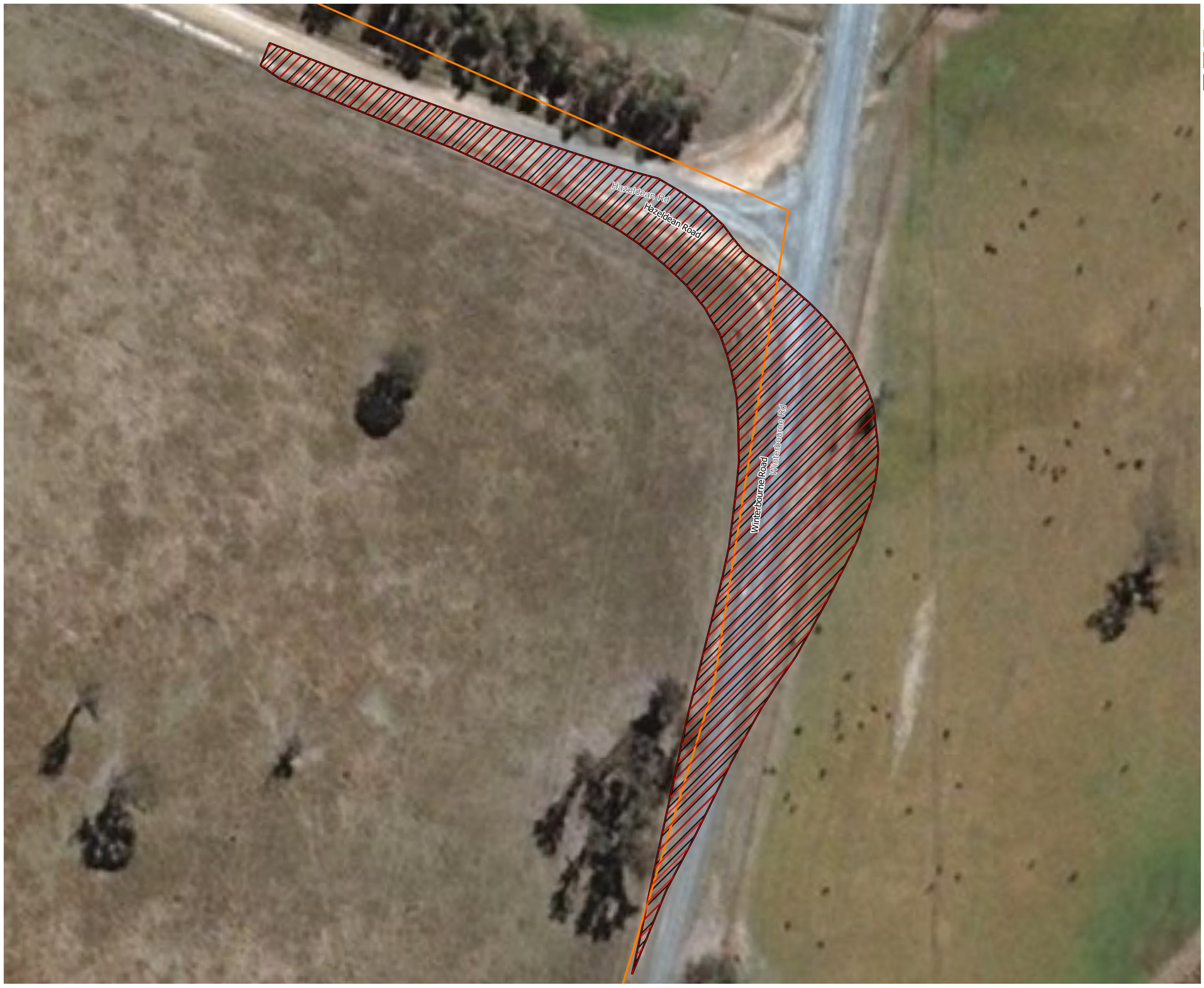
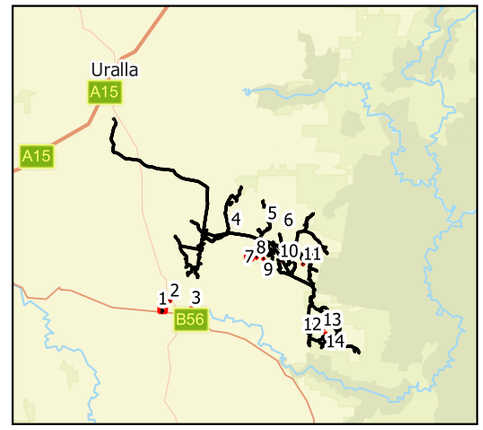


Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

- Barking Owl - Ninox connivens
- Bluegrass - Dicanthium setosum
- Elegant Greenhood - Pterostylis elegans
- Glossy Black Cockatoo - Calyptorhynchus lathami
- Greater Glider/Squirrel Glider Petauroides volans/Petaurus norfolcensis
- Koala - Phascolarctos cinereus
- Southern Myotis - Myotis macropus
- Narrow-leaved black peppermint-Eucalyptus nicholii



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NGH

Winterbourne Rd Winterbourne Road

Winterbourne Road Winterbourne Rd

Bark Hut Road

Bark Hut Rd

Legend

- Project Boundary
- Development Site
- Development Footprint

Species Polygons within Development Site

- Barking Owl - Ninox connivens
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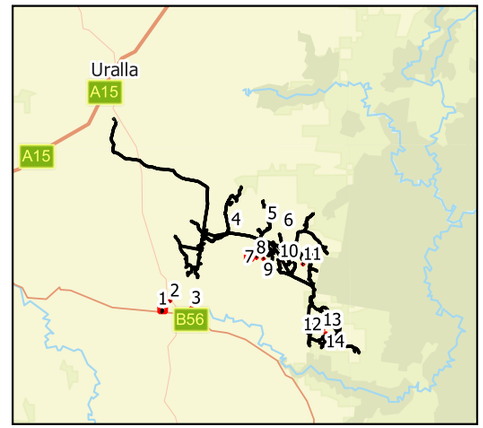

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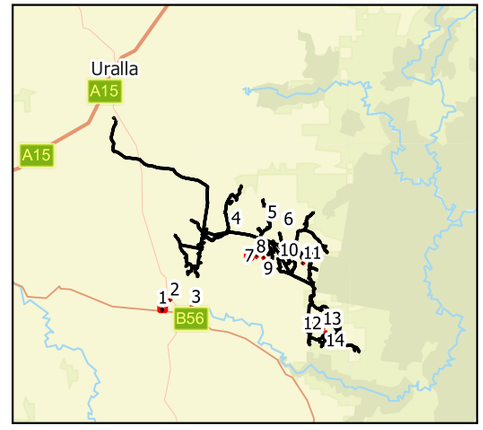

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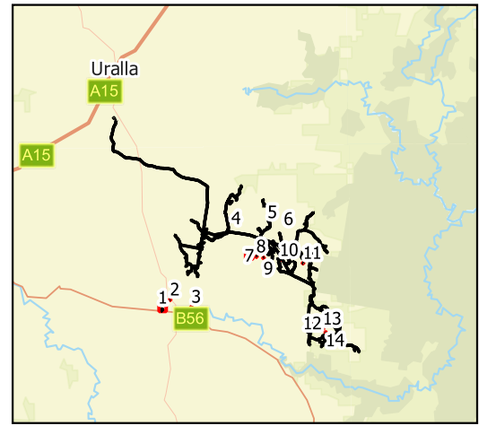

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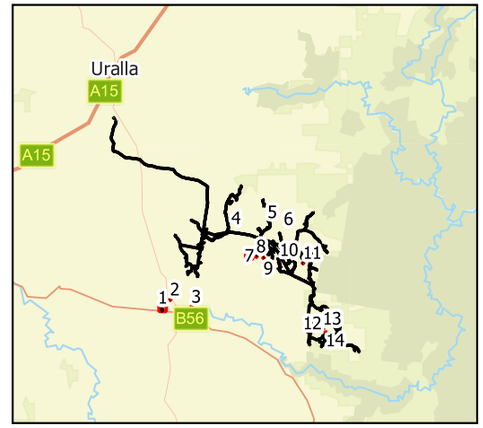

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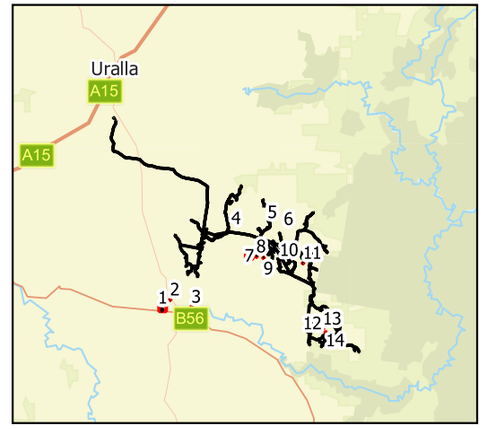

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Legend

Project Boundary

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Development Footprint

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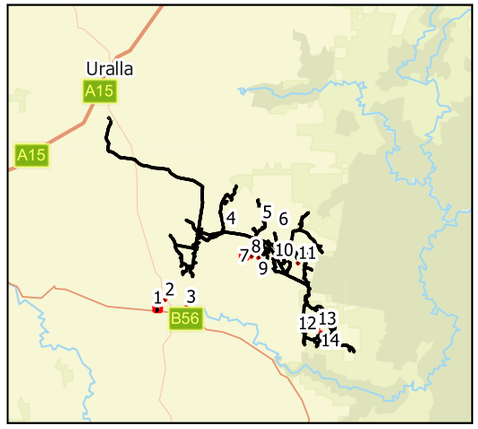
Greater Glider/Squirrel Glider
Petauroides volans/Petaurus norfolcensis

Koala - Phascolarctos cinereus

Southern Myotis - Myotis macropus

Narrow-leaved black peppermint-
Eucalyptus nicholii



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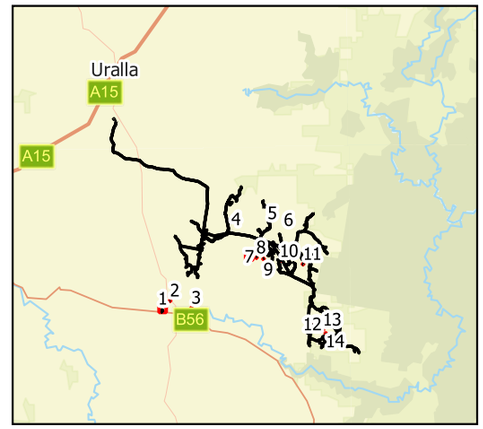

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- Project Boundary
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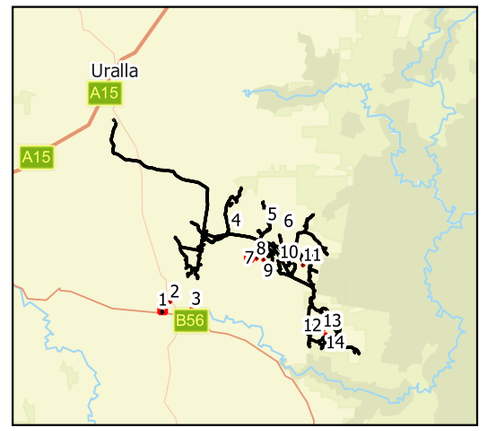

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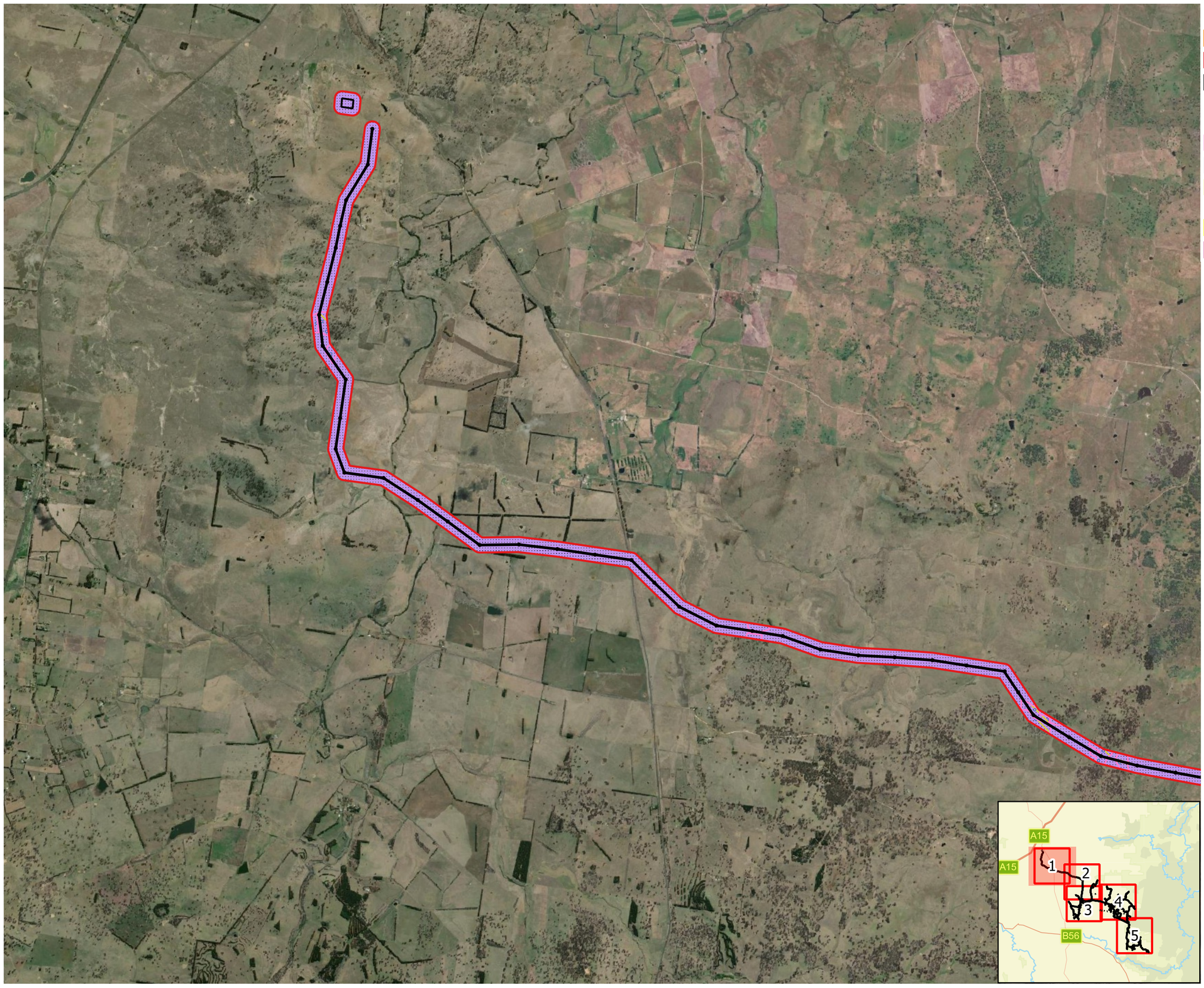
N.10 Figure 7-2 MNES species polygons



Legend

- Project Boundary
- Development Site
- Development Footprint

Species

- Narrow-leaved Black Peppermint
- Koala
- Tiger Quoll & Threatened Migratory Species
- Greater Glider

TEC

- Box Gum Woodland
- New England Peppermint Woodland

0 1 2 km

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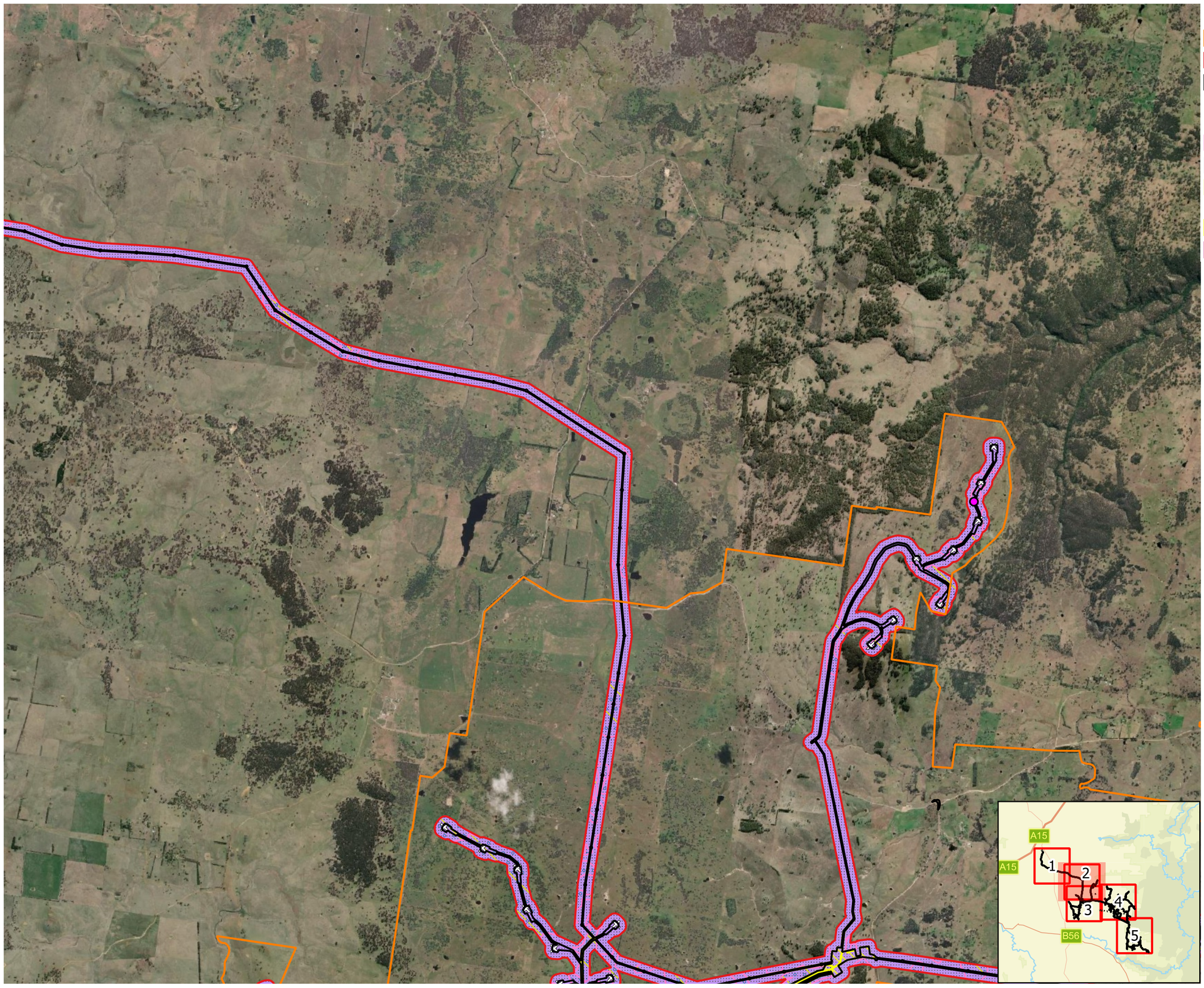

Legend

- Project Boundary
- Development Site
- Development Footprint

Species

- Narrow-leaved Black Peppermint
- Koala
- Tiger Quoll & Threatened Migratory Species
- Greater Glider

TEC

- Box Gum Woodland
- New England Peppermint Woodland

0 1 2 km

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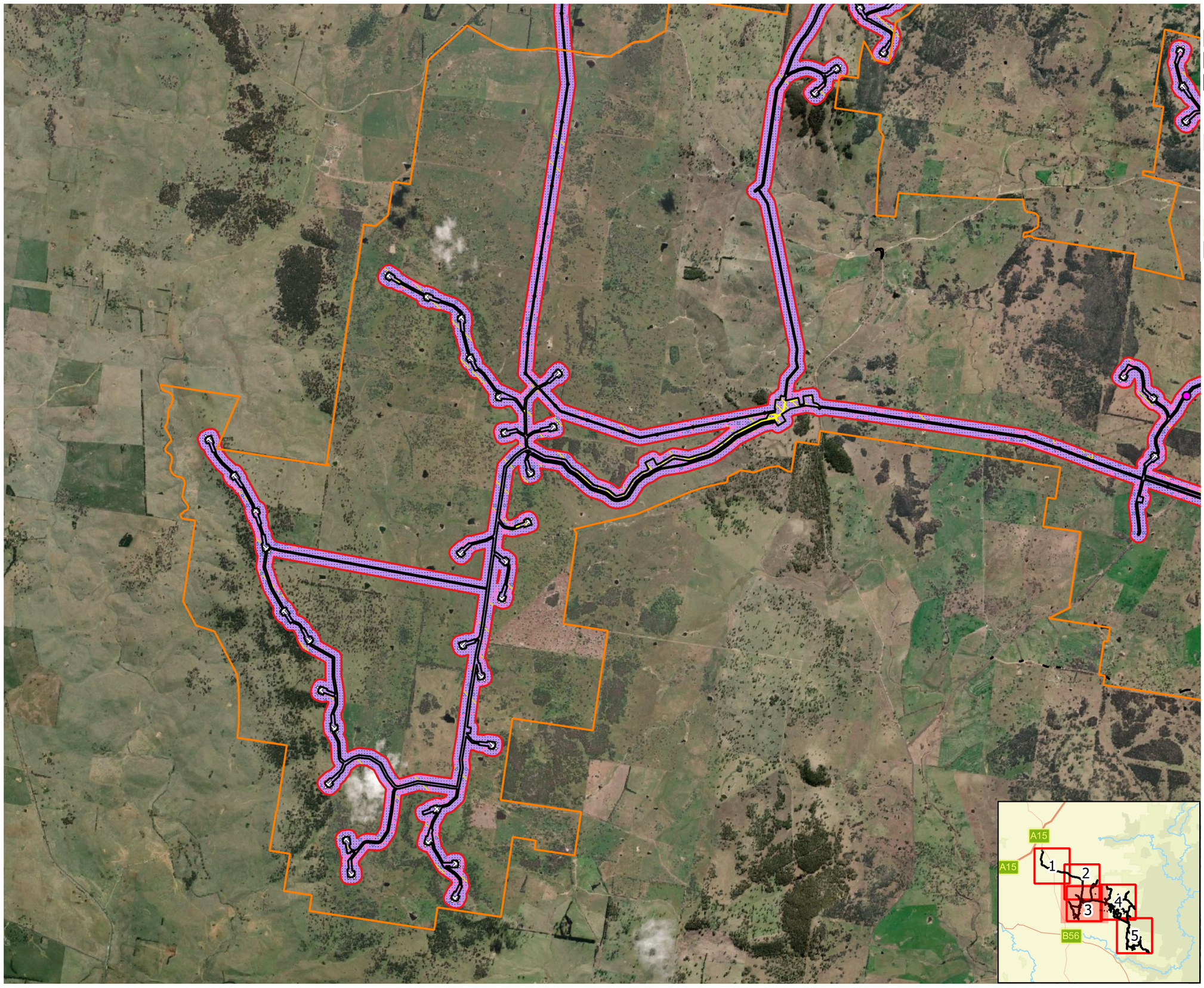

Legend

- Project Boundary
- Development Site
- Development Footprint

Species

- Narrow-leaved Black Peppermint
- Koala
- Tiger Quoll & Threatened Migratory Species
- Greater Glider

TEC

- Box Gum Woodland
- New England Peppermint Woodland

0 1 2 km

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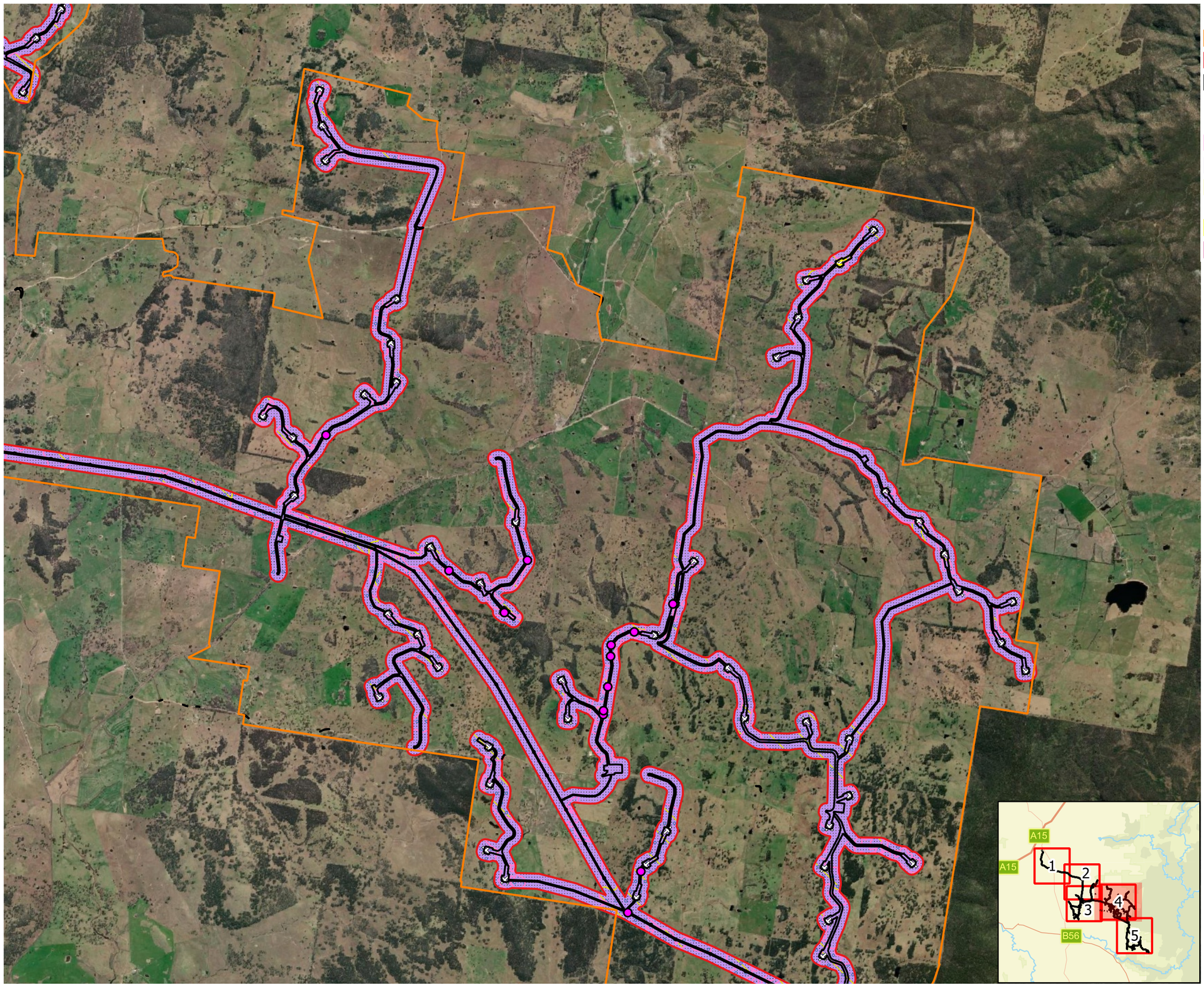

Legend

- Project Boundary
- Development Site
- Development Footprint

Species

- Narrow-leaved Black Peppermint
- Koala
- Tiger Quoll & Threatened Migratory Species
- Greater Glider

TEC

- Box Gum Woodland
- New England Peppermint Woodland

0 1 2 km

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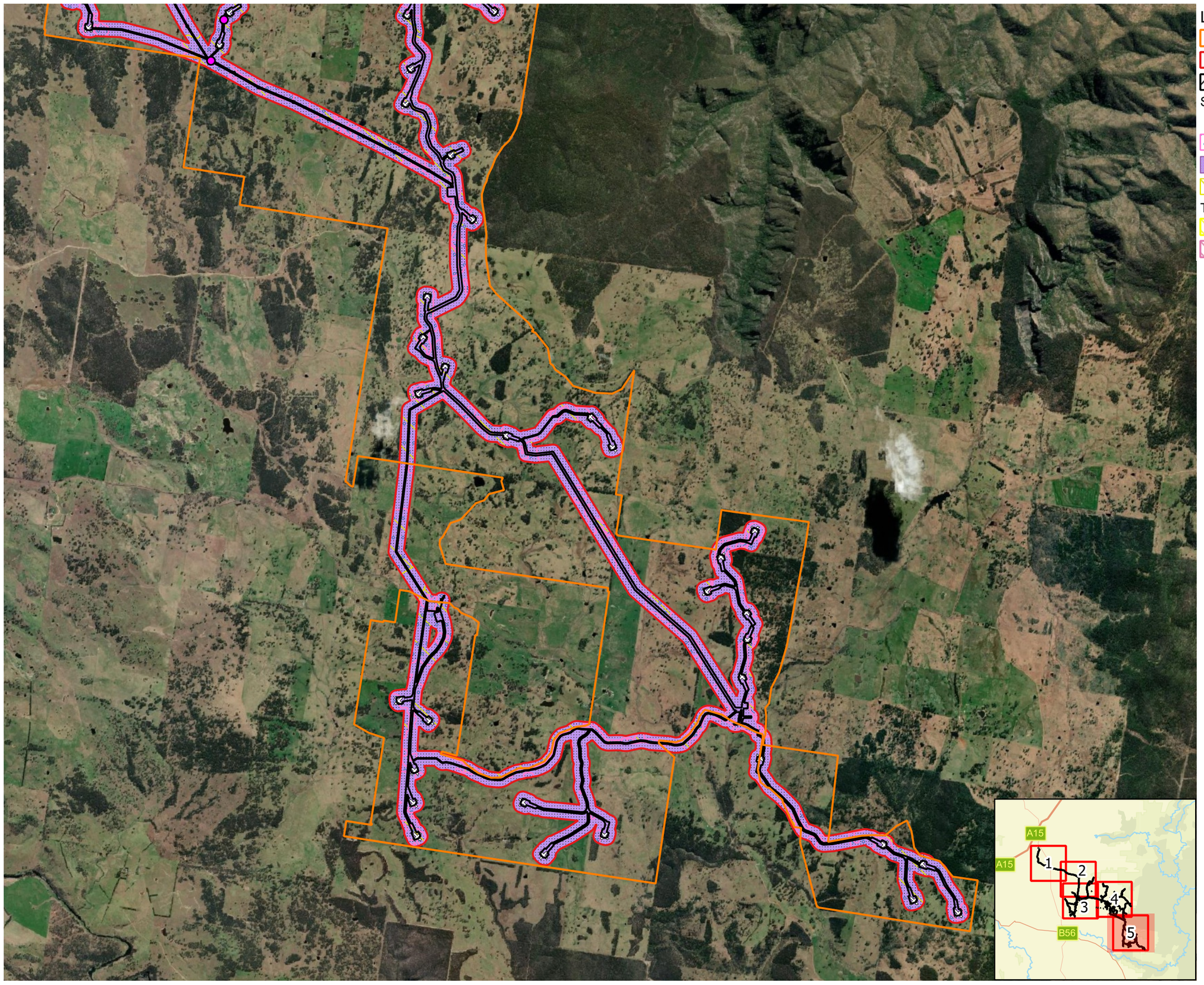

Legend

- Project Boundary
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Species

- Narrow-leaved Black Peppermint
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TEC

- Box Gum Woodland
- New England Peppermint Woodland

0 1 2 km

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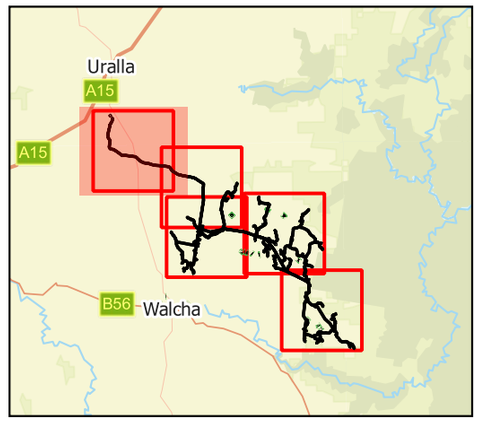
N.11 Figure 9-1 SAII impacts



Legend

- Project Boundary
- Development Site
- Development Footprint
- Box Gum Woodland
- New England Peppermint
- Serious and Irreversible Impacts



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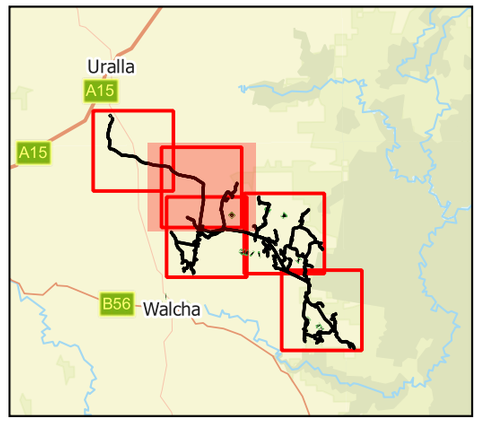
Legend

- Project Boundary
- Development Site
- Development Footprint
- Box Gum Woodland
- New England Peppermint
- Serious and Irreversible Impacts

Carlon Menzies Rd
Carlon Menzies Rd
Salisbury Plains
Grills Rd
Hillview Rd
Hillview Rd
Blue Mountain Rd
Hillview Rd
Hillview Rd
Mirani Rd
Blue Mountain 1317 m
Blue Mountain Rd
Ooreawilly Rd
Hazeldean Rd
The Knobs 1270 m
Mirani Rd
Ohio Creek



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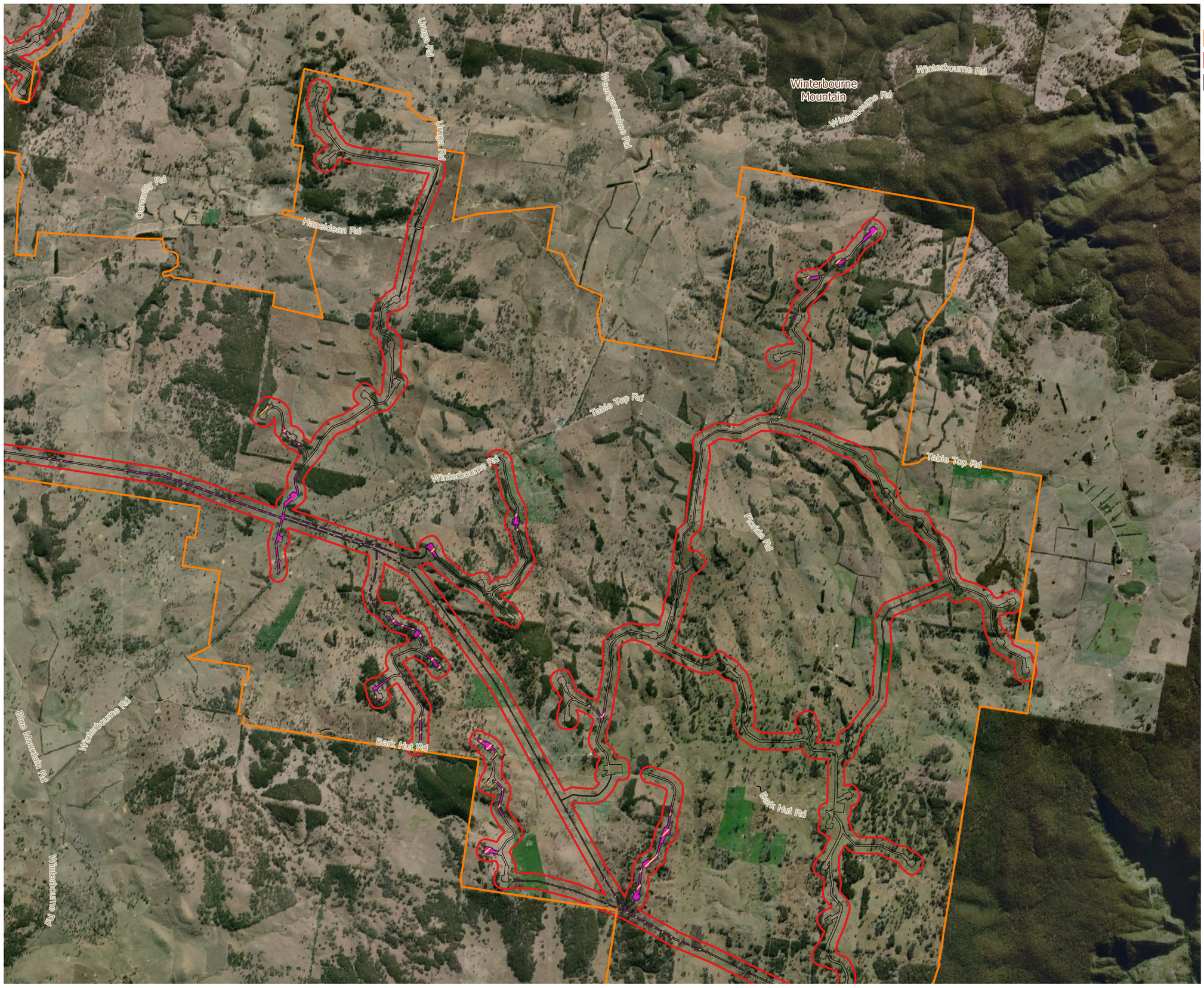

Legend

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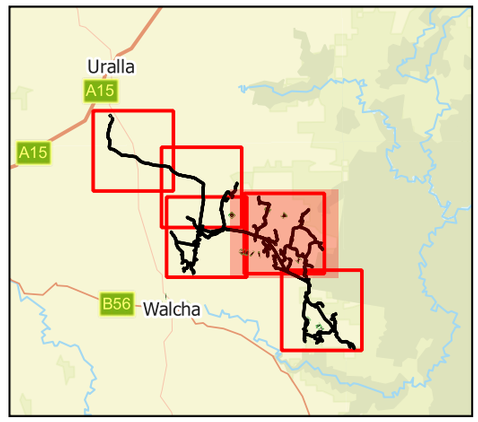
- Development Site
- Development Footprint
- Box Gum Woodland
- New England Peppermint
- Serious and Irreversible Impacts



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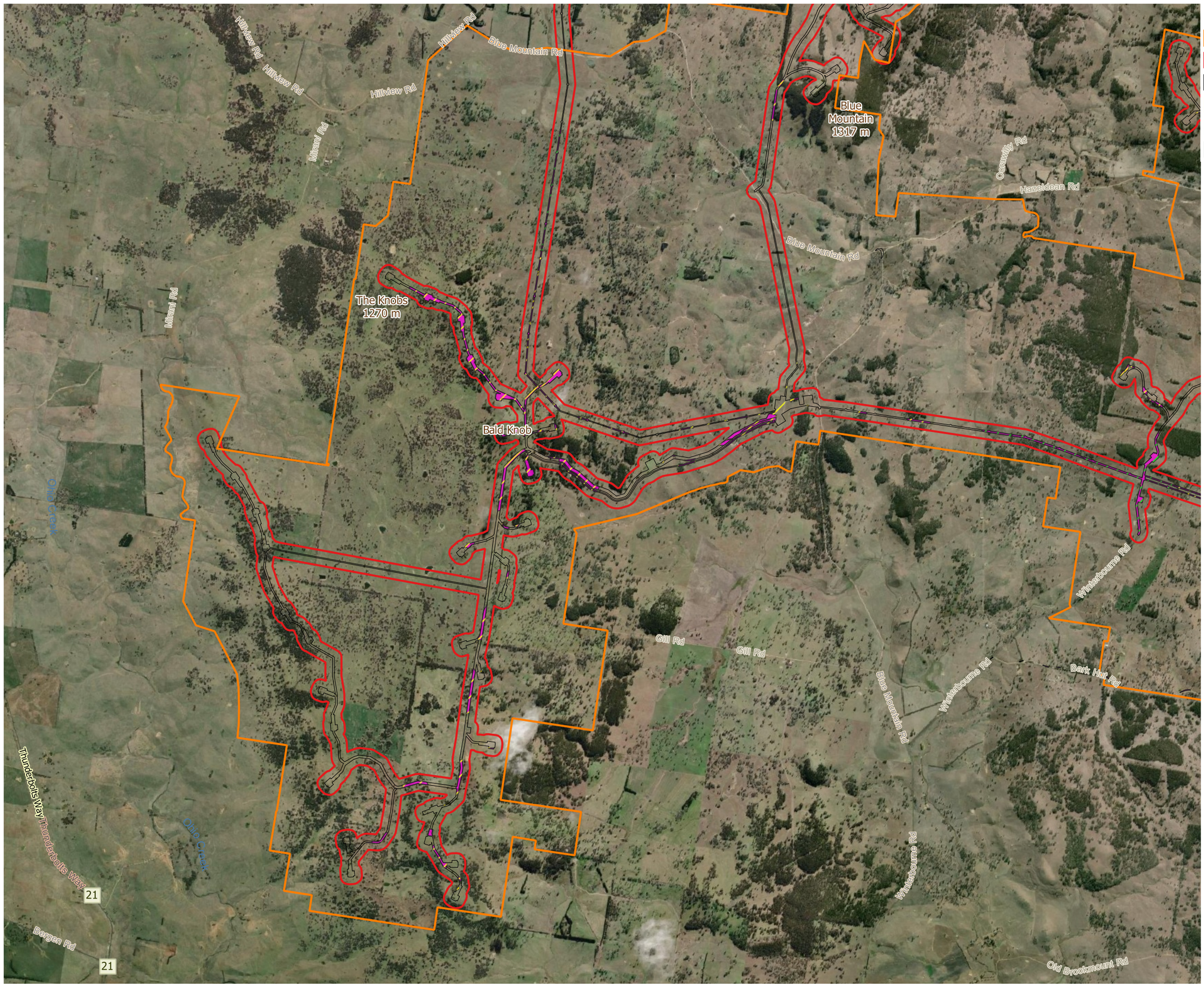

Legend

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- New England Peppermint
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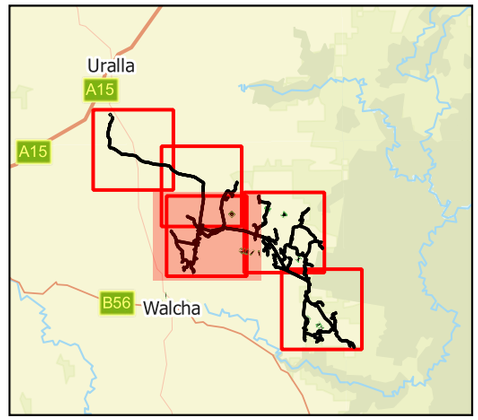

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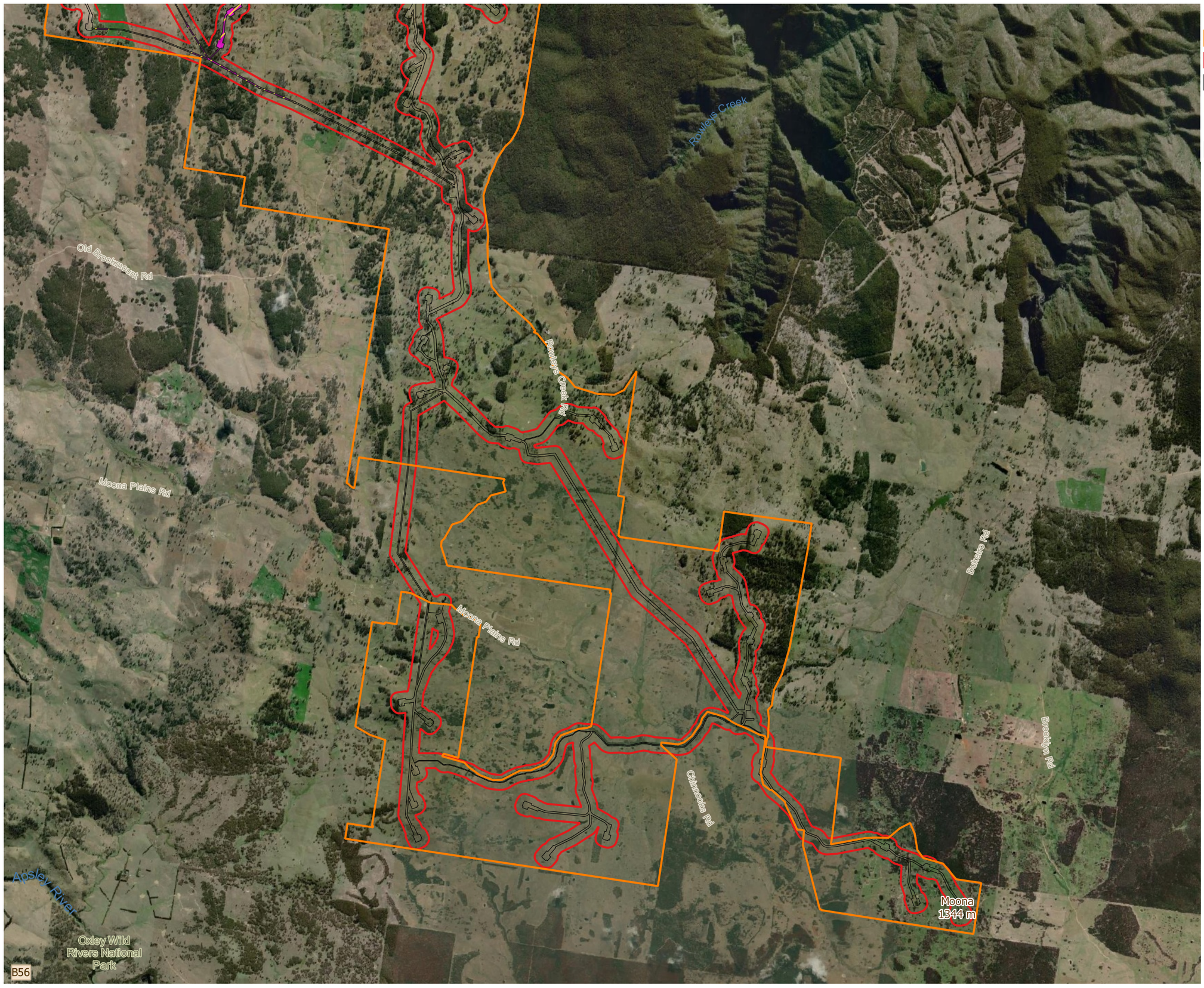

Legend

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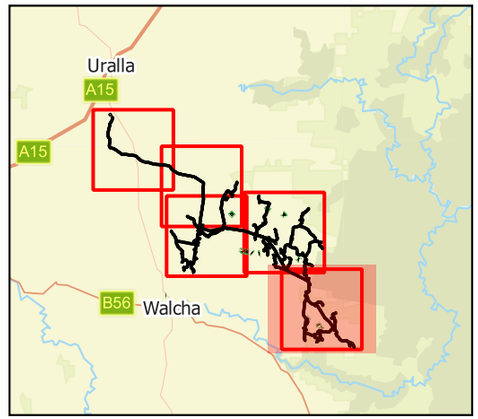

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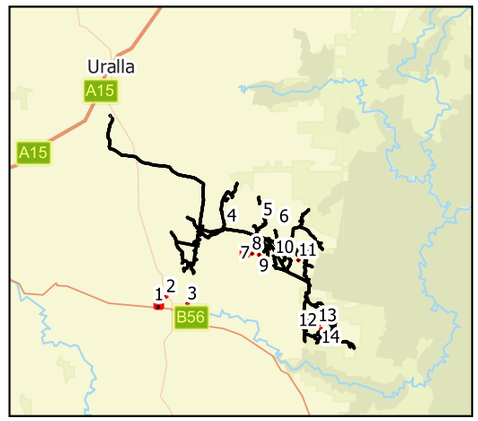

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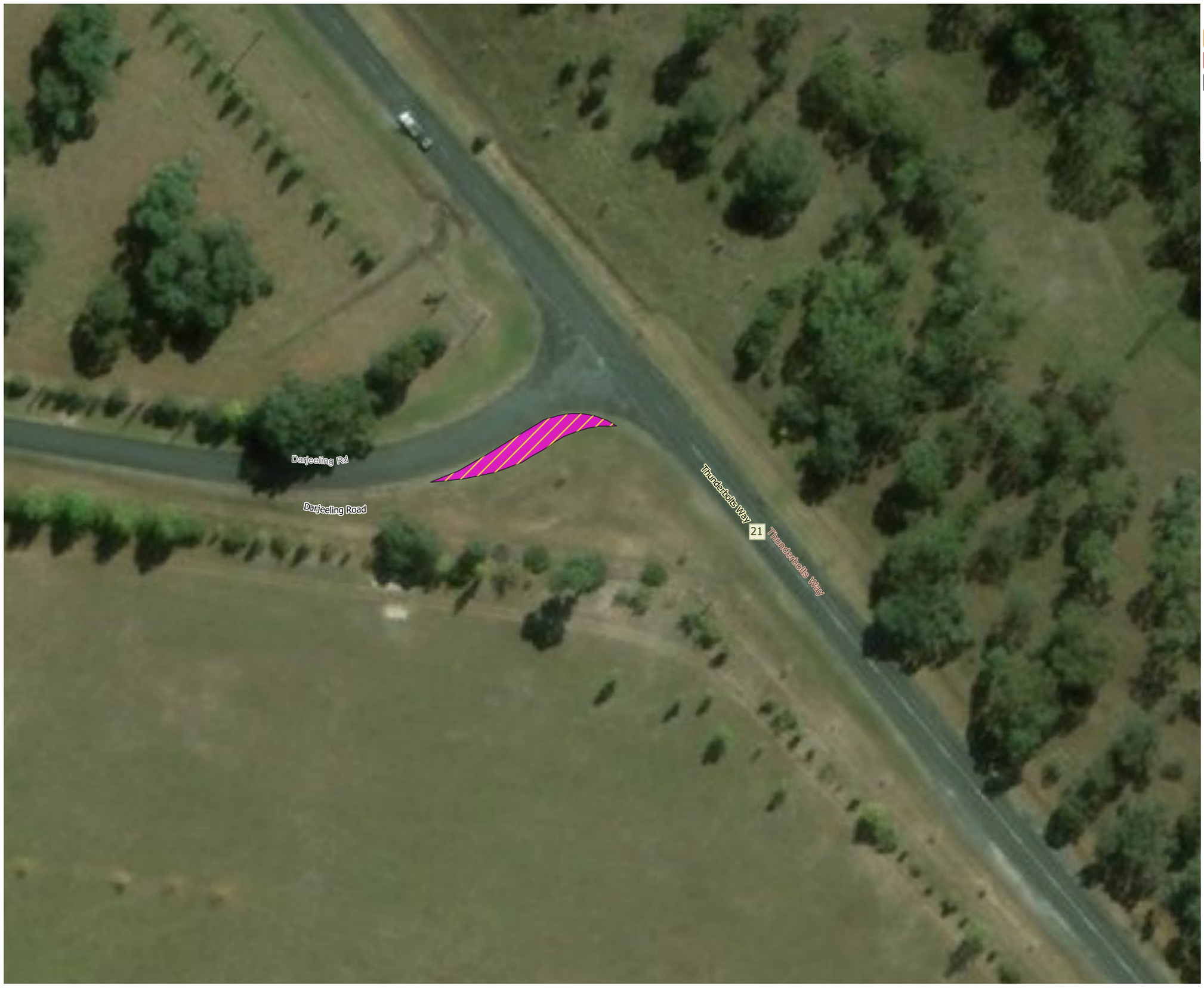

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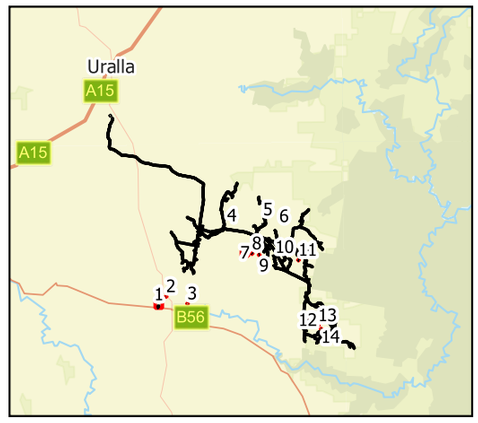

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Date created: 22.03.2022
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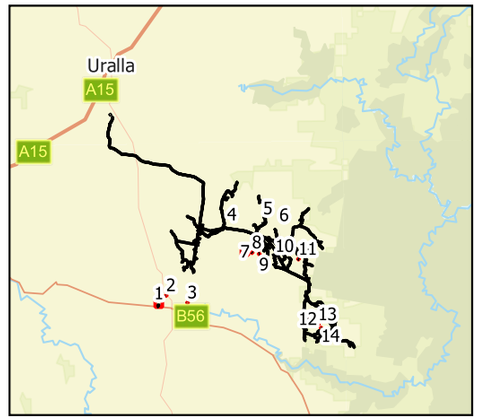
Legend

- Project Boundary
- Development Site
- Development Footprint
- Box Gum Woodland
- New England Peppermint
- Serious and Irreversible Impacts



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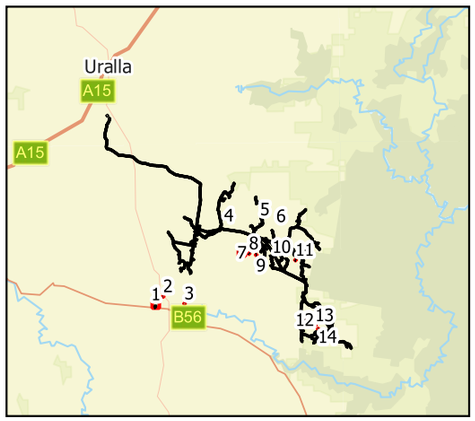

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NGH

Uruga Road
Uruga Rd
Uruga Road
Uruga Rd
Hazeldean Road
Hazeldean Rd

Legend

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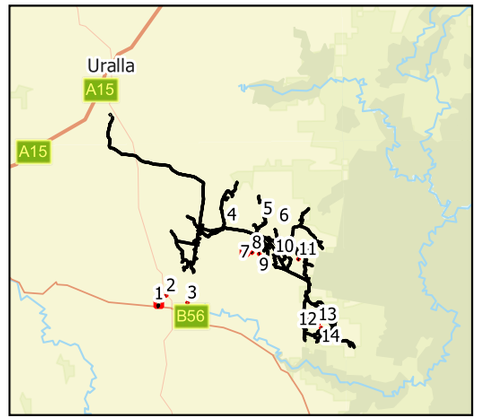
- New England Peppermint
- Serious and Irreversible Impacts



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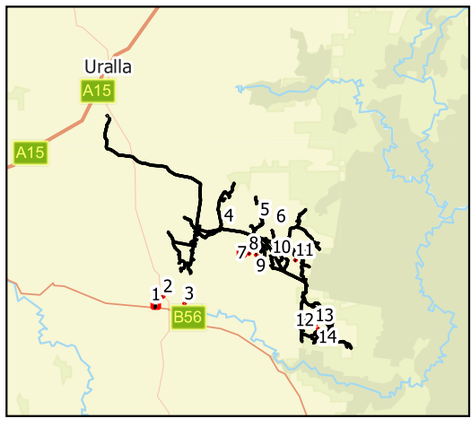

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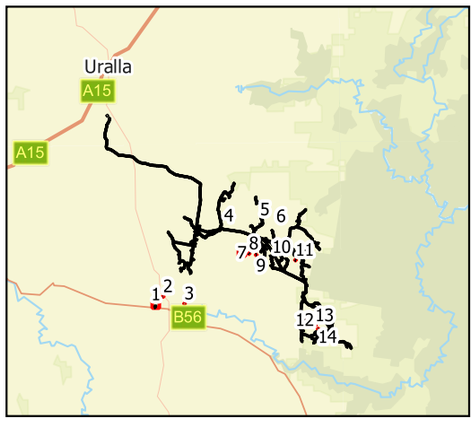

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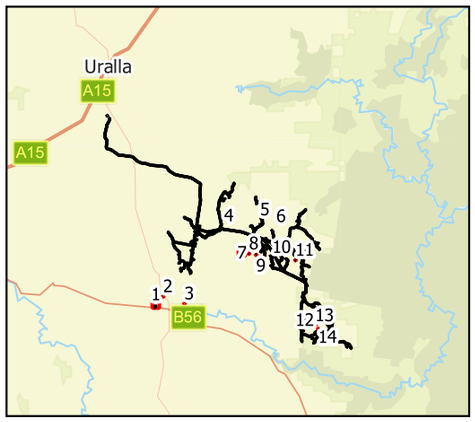

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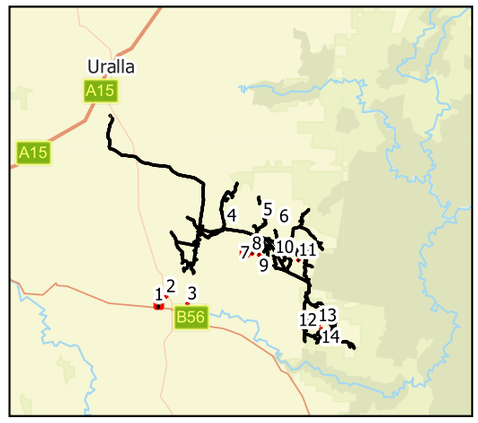

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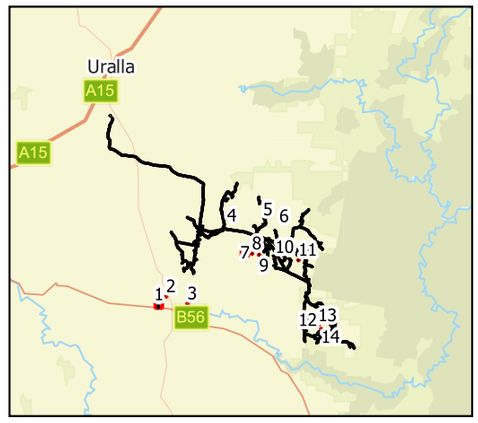

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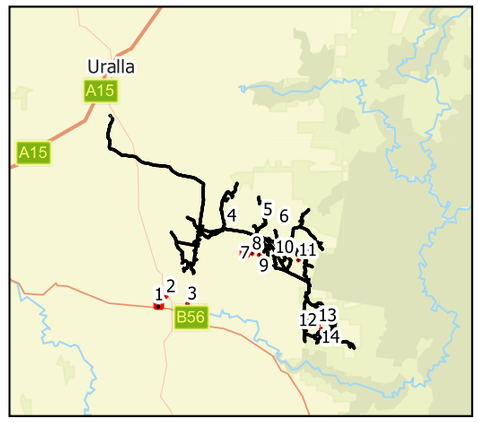
Bark Hut Road

Bark Hut Rd

Snake Creek



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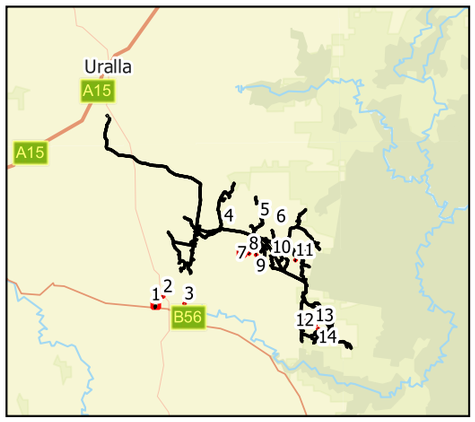

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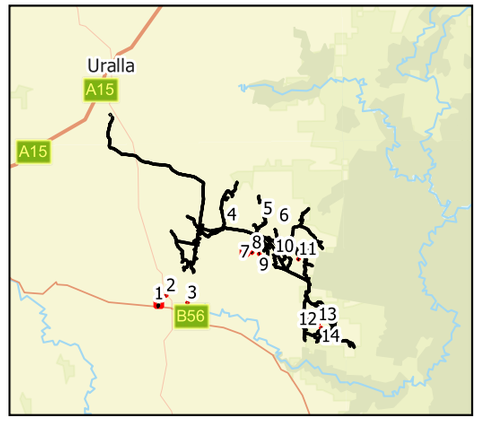

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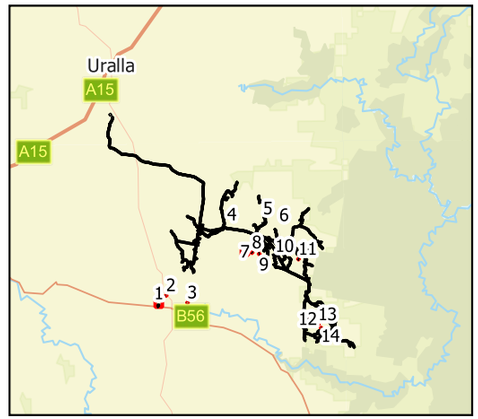

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N.12 Figure 10-1 Areas requiring offsets

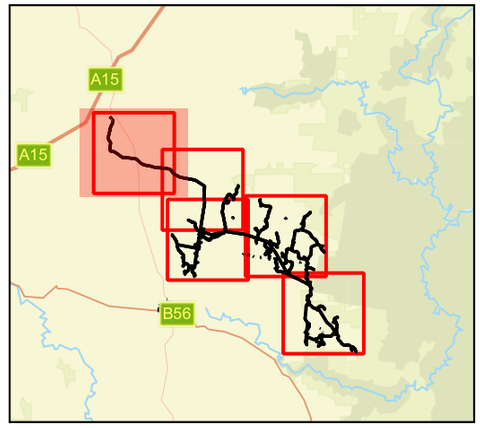


Legend

- Project Boundary
- Development Site
- Development Footprint

Vegetation Impacts Requiring Offsets

- Impacts Requiring Offset
- Impacts Not Requiring Offset
- Not Requiring Assessment
- Species Polygons Requiring Offset
- Narrow-leaved Black Peppermint



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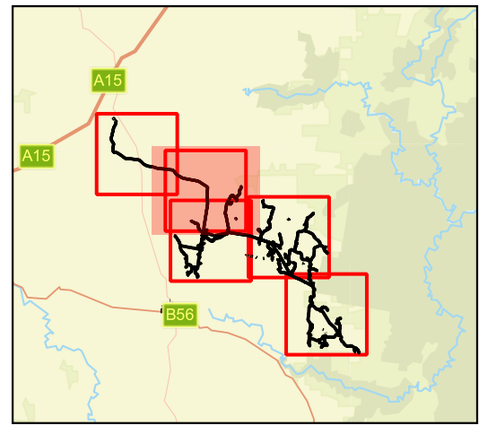
Legend

- Project Boundary
- Development Site
- Development Footprint

Vegetation Impacts Requiring Offsets

- Impacts Requiring Offset
- Impacts Not Requiring Offset
- Not Requiring Assessment
- Species Polygons Requiring Offset
- Narrow-leaved Black Peppermint



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Datum: GDA94 / MGA zone 56

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Legend

- Project Boundary
- Development Site
- Development Footprint

Vegetation Impacts Requiring Offsets

- Impacts Requiring Offset
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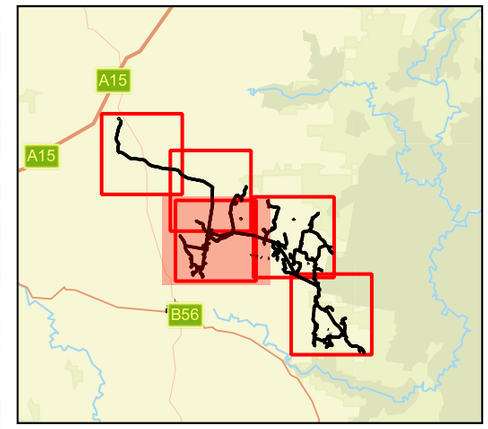
- Not Requiring Assessment
- Species Polygons Requiring Offset
- Narrow-leaved Black Peppermint



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- Not Requiring Assessment
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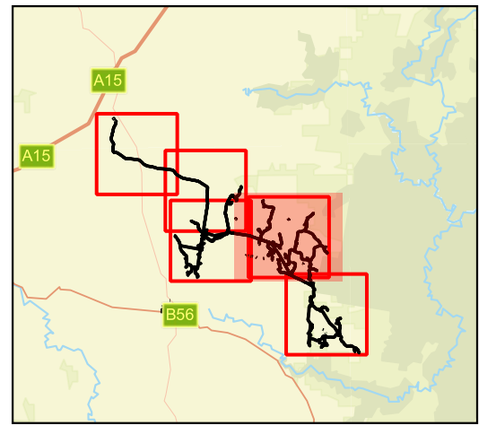

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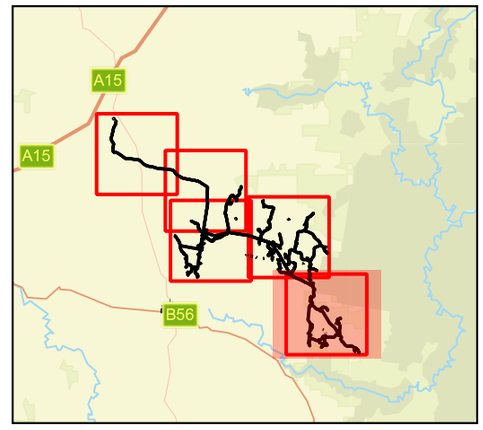

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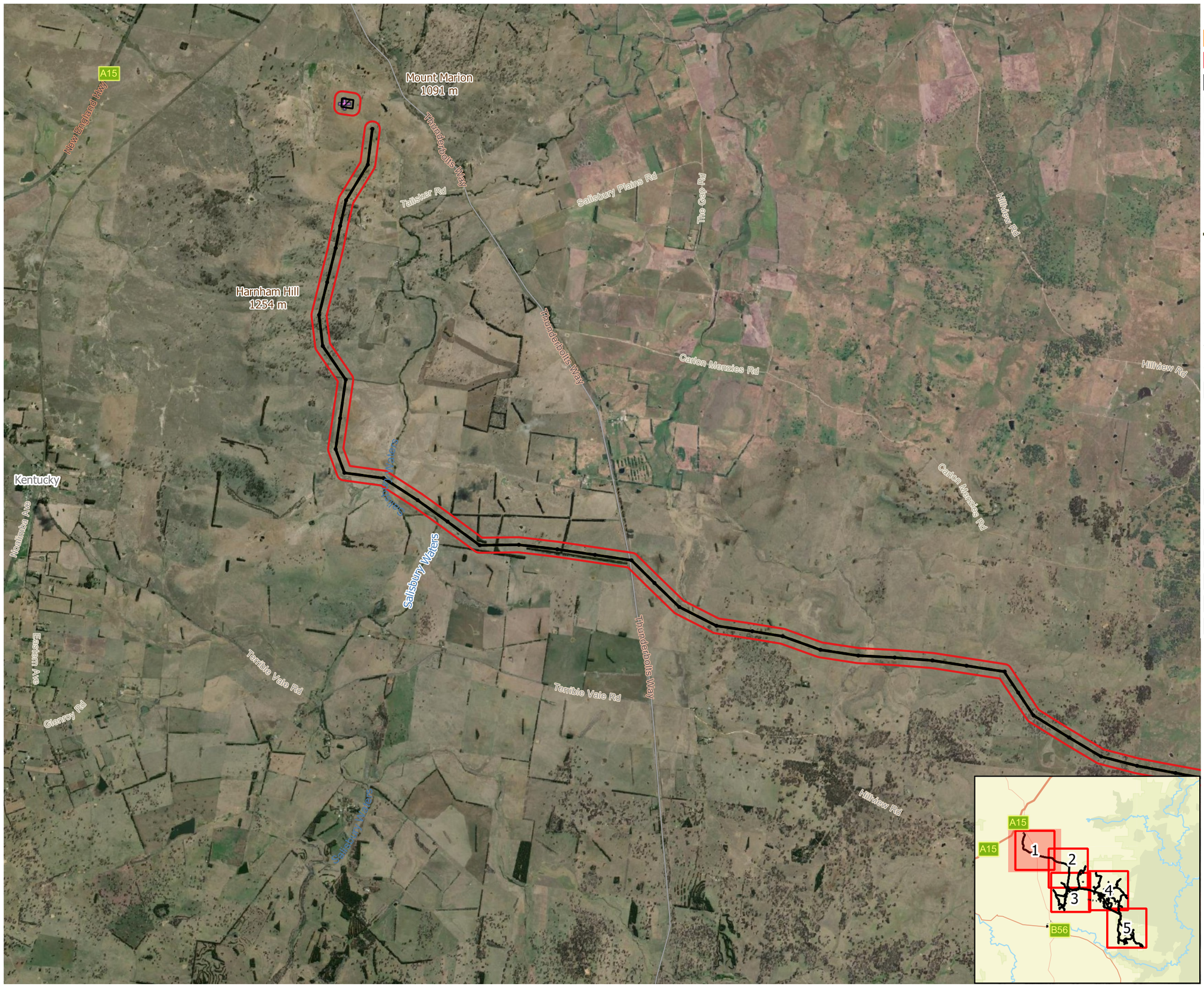
N.13 Figure 10-2 Project layout



Legend

- Project Boundary
- Development Site
- Development Footprint
- NPWS Reserve
- State Forest
- Turbine Hosts
- Easement Hosts

Proposed Infrastructure Layout

- Turbines
- Transmission Line
- Temporary Masts
- Installed Masts
- Mast
- Access Roads
- Additional Reticulation
- Collector System
- Hardstands & Crane Pads

Substation Locations

- North Substation
- South Substation
- Uralla Switchyard
- Uralla Hub Lot

Ancillary Infrastructure

- Batch Plant
- BESS
- Laydown
- O&M Building
- Temporary Sites

0 1 2 km

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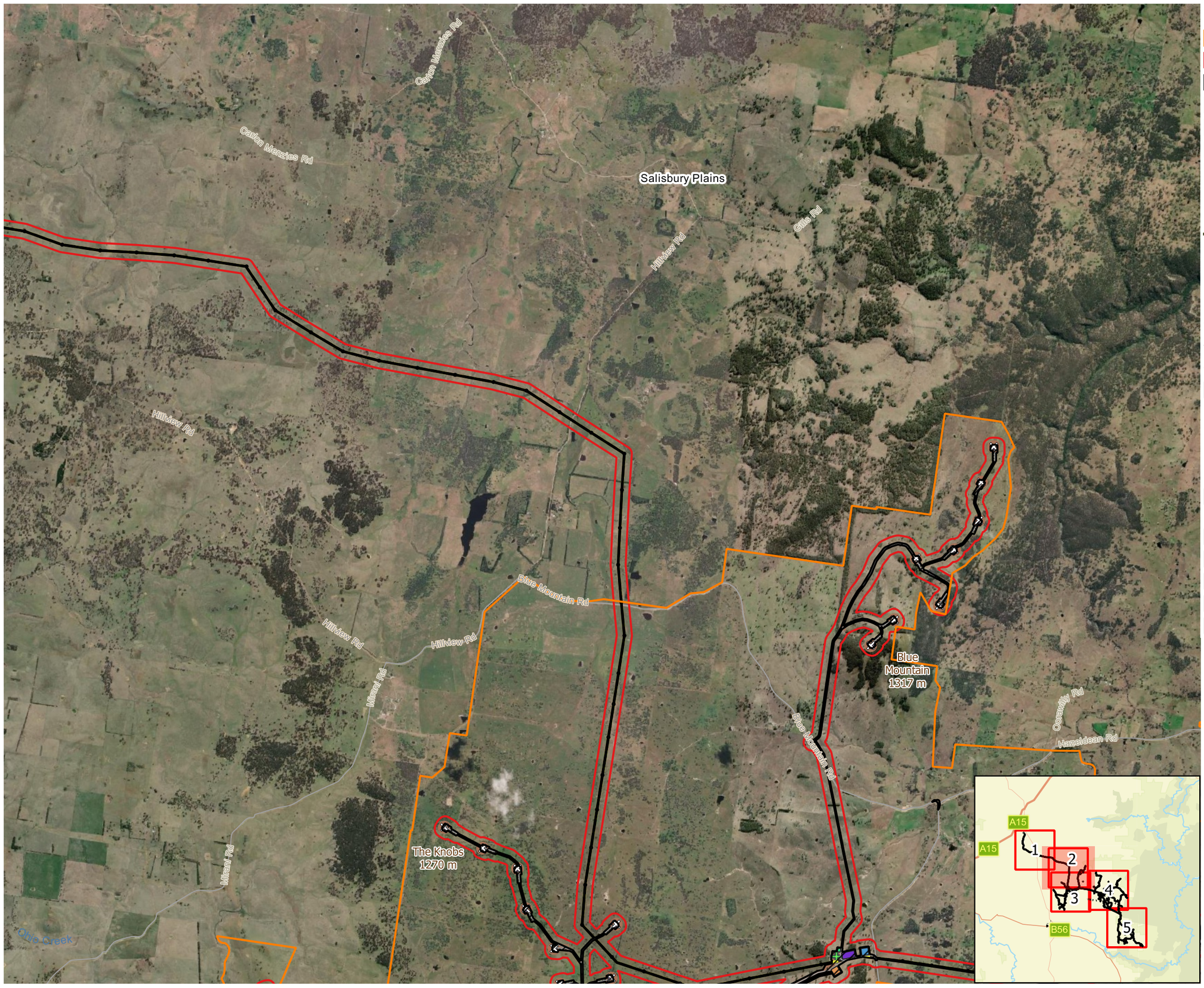

Legend

- Project Boundary
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- Development Footprint
- NPWS Reserve
- State Forest
- Turbine Hosts
- Easement Hosts

Proposed Infrastructure Layout

- Turbines
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- Mast
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- Additional Reticulation
- Collector System
- Hardstands & Crane Pads

Substation Locations

- North Substation
- South Substation
- Uralla Switchyard
- Uralla Hub Lot

Ancillary Infrastructure

- Batch Plant
- BESS
- Laydown
- O&M Building
- Temporary Sites

0 1 2 km

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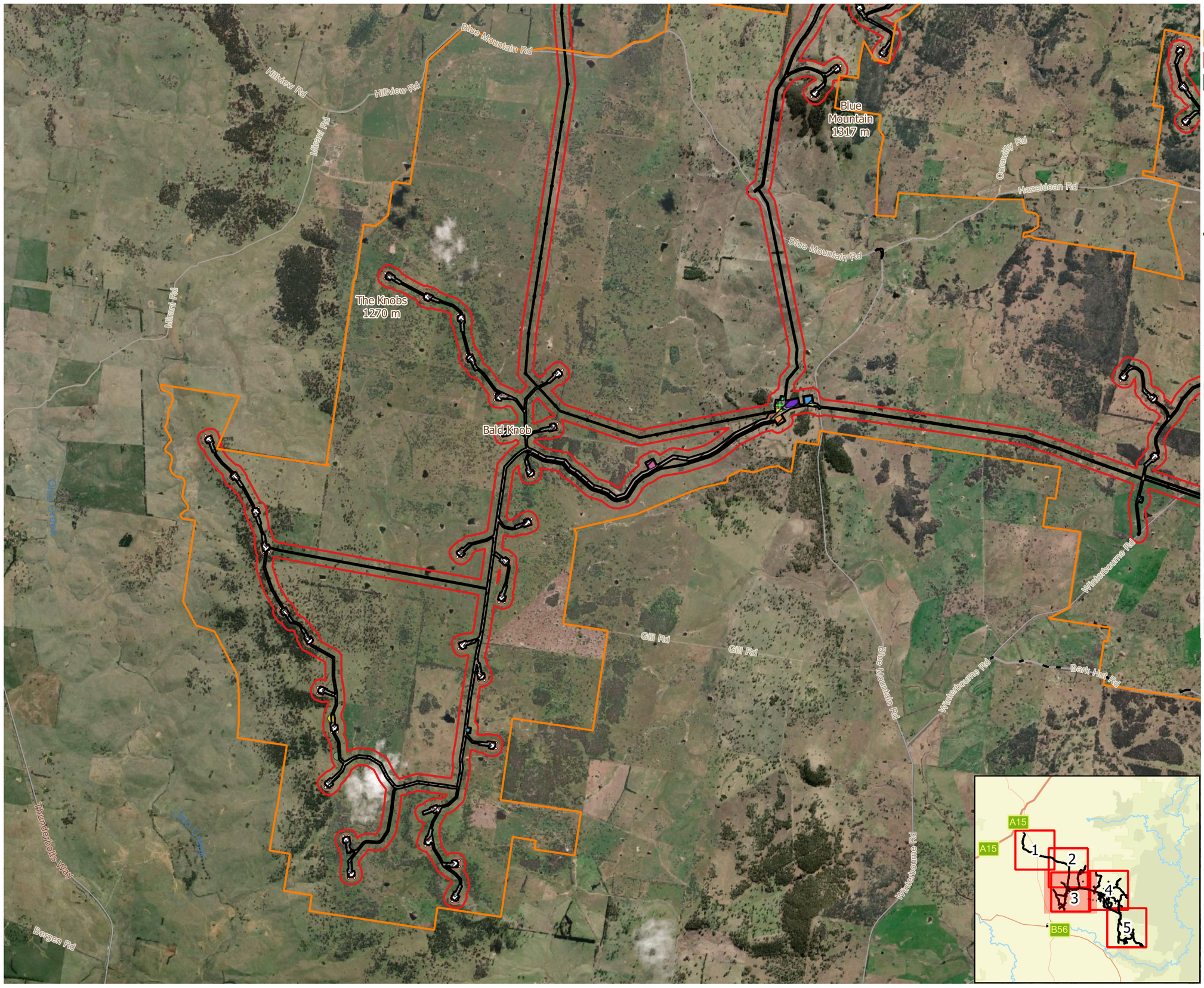

Legend

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Proposed Infrastructure Layout

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Ancillary Infrastructure

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- Temporary Sites

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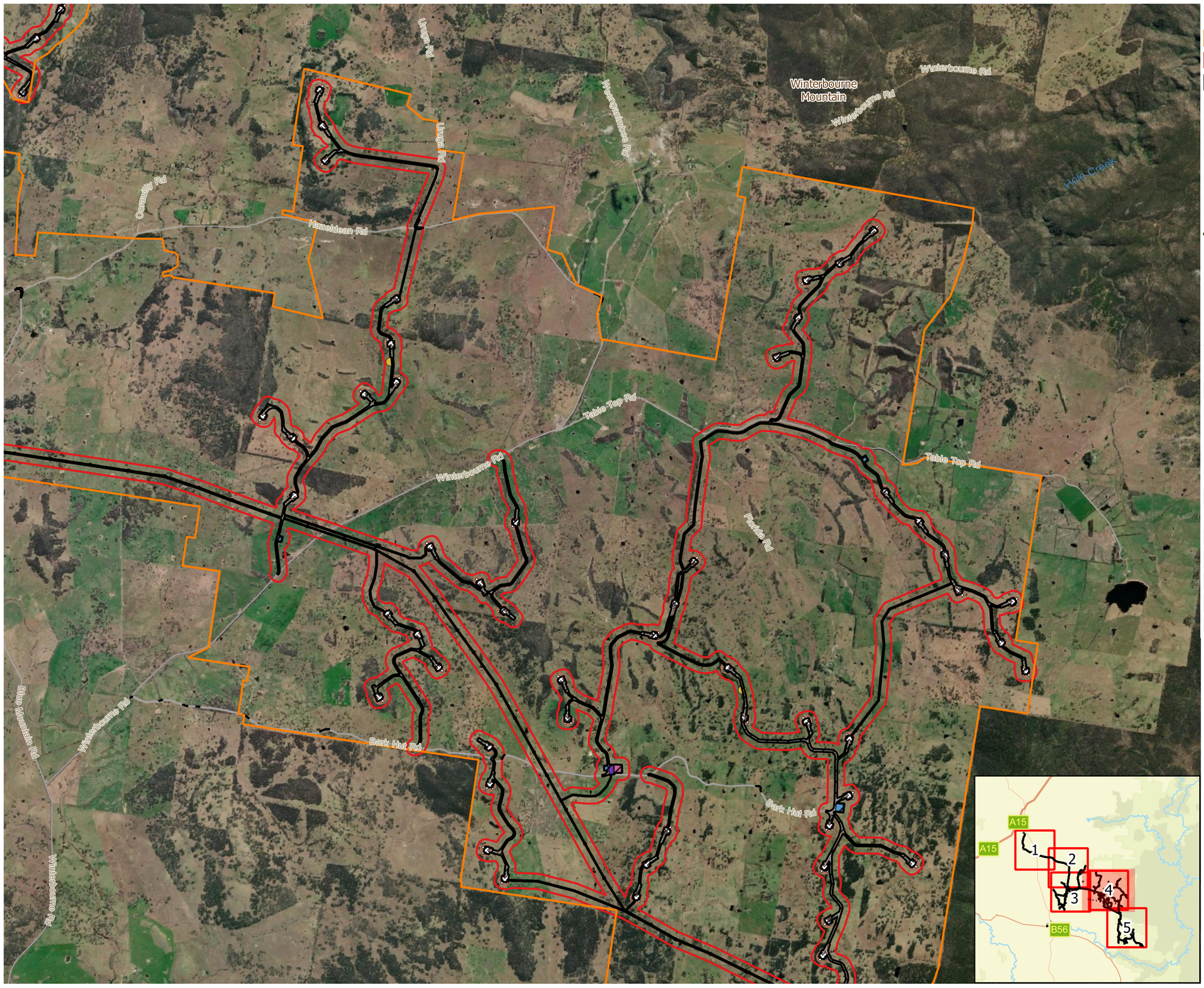

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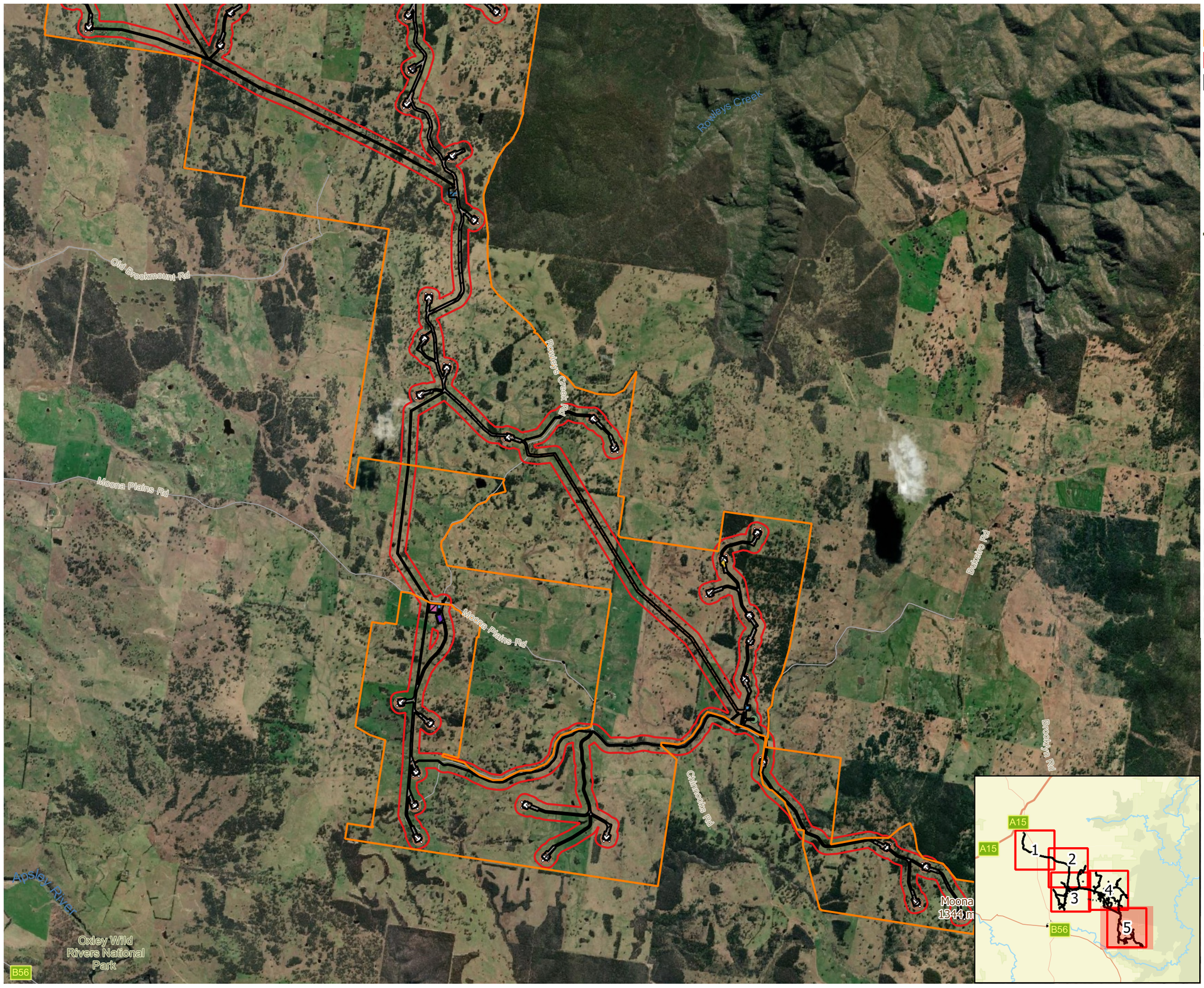

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Appendix O Consultation with BCS

From:	Dimitri Young
To:	Beth Noel
Cc:	Aleksei Atkin; Clancy Bowman; Giorginna Xu; Bill Larkin
Subject:	BCD Response - RE: 21-570 - Winterbourne Wind Farm EIS - Rufous Bettong survey effort
Date:	Tuesday, 14 December 2021 10:31:52 AM
Attachments:	image003.png

Dear Ms Noel

Thank you for your e-mail below to the Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment, seeking advice on Rufous Bettong survey effort for the Winterbourne Wind Farm Environmental Impact Statement (EIS). I appreciate the opportunity to provide input.

The Department's allocated officer for this species liaised with an external species expert for the Rufous Bettong to obtain advice on NGHs proposed approach to survey effort for this species for a development footprint of the size of the Winterbourne Wind Farm.

Based on that advice, 16 cameras across the site should be adequate to target the Rufous Bettong providing they are strategically placed across the subject land in accordance with the following procedures:

1. Patches of denser ground cover vegetation in woodlands or forests should be targeted for camera placement.

2. Cameras should be placed at a density of about four per hectare on obvious game trails by mounting on trees on the sides of trails about 1.5m off the ground.

3. Cameras should be focused on a point diagonally across the trail, 2m from the mounting tree base and left in place for a minimum of 21 days.

4. Baiting of cameras is not essential and can at times be counter-productive by attracting too many non-target species, but if they are to be baited then a mix of peanut butter and oats with truffle oil should be used

The camera locations must be documented and justified in the BDAR to demonstrate strategic placement across the development footprint as per points 1-4 above .

If you have any further questions, or wish to discuss this advice, please do not hesitate to contact Mr Bill Larkin, Senior Conservation Planning Officer, at bill.larkin@environment.nsw.gov.au or on 6659 8216.

Yours sincerely

Dimitri Young
Senior Team Leader Planning, North East Branch

Biodiversity and Conservation | Department of Planning, Industry and Environment
T 02 6659 8272 | **F** 6651 5356 | **E** dimitri.young@environment.nsw.gov.au
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Sent: Wednesday, 24 November 2021 2:20 PM
To: Dimitri Young <Dimitri.Young@environment.nsw.gov.au>
Cc: Aleksei Atkin <aleksei.a@nghconsulting.com.au>; Clancy Bowman <clancy.b@nghconsulting.com.au>; Giorginna Xu <giorginna.x@nghconsulting.com.au>
Subject: 21-570 - Winterbourne Wind Farm EIS - Rufous Bettong survey effort

Dimitri,
I am writing to touch base with BCD in regard to the biodiversity assessment of a large windfarm near Walcha, referred to as the Winterbourne Wind Farm. The Subject Land (Development Footprint plus 100m buffer) is approximately 4,380ha, stretching across an area of approximately 52 kms from north-west to south-east.

In the preparation of the BDAR, NGH is currently seeking BCD input regarding several matters (four in total). This email is in relation to one matter and subsequent emails detail the additional matters. It may be beneficial to have a meeting with the BCD and NGH to discuss these matters in more detail, if there is some uncertainty in NGH's approach or further clarification required.

Rufous Bettong survey effort
One of the candidate species for this proposal is the Rufous Bettong. The survey effort for this species under the DSEWPC 2011 (Federal) Survey Guidelines for Australia's threatened mammals requires a large number of cameras, deployed at a rate of 10 cameras/hectare. For a proposal of this size, we would need to deploy approximately 43,800 cameras to cover the development footprint including a 100m buffer, which is not feasible for a project of this scale. NGH proposes to survey for this species using a combination of camera traps and hair tubes. NGH proposes to deploy 2 Reconnyx cameras and 20 hair tubes at 8 sites (totalling 16 cameras and 160 hair tubes) across the Development Footprint. Camera and hair tube sites will be selected to capture suitable habitat for the species. The cameras will be baited to ensure maximum detection, and if the species are detected their presence will be extrapolated to other areas within the footprint expected to provide suitable/similar habitat. Could BCD please confirm this approach?

Happy to discuss this with you further.
Kind regards

BETH NOËL
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BEGA · BRISBANE · CANBERRA · GOLD COAST · NEWCASTLE · SYDNEY · WAGGA WAGGA
WWW.NGHCONSULTING.COM.AU
NGH acknowledges that we work on the traditional lands of First Nations people across

Australia and recognises the enduring connection to the land. We pay our respects to elders, past present and emerging.

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Appendix P Biodiversity constraints report – ERM



Winterbourne Wind Farm

Biodiversity Constraints Assessment

25 June 2020

Project No.: 0526676

The business of sustainability

ERM

Document details	
Document title	Winterbourne Wind Farm
Document subtitle	Biodiversity Constraints Assessment
Project No.	0526676
Date	25 June 2020
Version	Final
Author	Sebastian Madden
Client Name	WinterbourneWind Pty Ltd

Document history

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				Name	Date	
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Signature Page

25 June 2020

Winterbourne Wind Farm

Biodiversity Constraints Assessment



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Acronyms and Abbreviations

Name	Description
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
DAWE	Department of Agriculture, Water and Environment
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning & Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERM	Environmental Resources Management Australia
IBRA	Interim Biographic Regionalisation of Australia
LGA	Local Government Areas
LLS Act	*Local Land Services Act 2013*
MNES	Matters of National Environmental Significance
NSW	New South Wales
PCT	Plant Community Type
PMST	Protected Matters Search Tool
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
TEC	Threatened Ecological Communities
The Project	Winterbourne Wind Farm Project
VIS	Vegetation Information System
WoNS	Weeds of National Significance
WWF	Winterbourne Wind Farm
WWPL	WinterbourneWind Pty Ltd

1. INTRODUCTION

WinterbourneWind Pty Ltd (WWPL) propose to construct and operate the Winterbourne Wind Farm Project (WWF, or the project), a renewable energy development located to the north and east of Walcha in the Northern Tablelands of New South Wales (NSW).

WWPL is seeking State Significant Development (SSD) Consent under Division 4.7 of Part 4 of the *Environmental Planning & Assessment Act* 1979 (EP&A Act).

As a first step in the SSD Consent process, WWPL engaged Environmental Resources Management Australia (ERM) to prepare a Scoping Report (this report) in support of an application to the Secretary of the Department of Planning, Industry and Environment (DPIE) for Secretary's Environmental Assessment Requirements (SEARs). The SEARs will guide the preparation of an Environmental Impact Statement (EIS) for the project as part of a broader development application.

WWPL also engaged ERM to prepare a Biodiversity Constraints Assessment to inform the Scoping Report and preliminary project design.

1.1 Objectives

The objective of this assessment is to identify and describe biodiversity values within the project boundary. This assessment allows preliminary recommendations to be provided in terms of avoidance, mitigation and/or additional assessment for biodiversity values. For this assessment, biodiversity values include:

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

This report is informed by a combination of:

- Desktop assessment.
- Fieldwork completed during Spring 2019 (November), which included:
  - Biodiversity Assessment Method (BAM) plot surveys;
  - Targeted fauna surveys; and
  - Habitat and landscape values assessments.
- Additional biodiversity survey completed (February 2020), which focused on threatened fauna species (summarised in **Appendix D** of this report).

The report includes:

- Identification of protected/sensitive biodiversity areas, threatened species and threatened ecological communities, important habitat components and landscape features, and fauna species susceptible to turbine strikes.
- A description of outcomes and recommendations to support the ongoing project design and assessment process.

1.2 Project Overview

The project is situated approximately 425 kilometres (by road) from Sydney and 180 kilometres north-west of Port Macquarie. It is located ~75 kilometres north-east of Tamworth and ~35 kilometres south-south-west of Armidale within both Walcha and Uralla Local Government Areas (LGA).

The project boundary extends around an area of approximately 24,400 hectares of which less than 1,000 hectares is expected to be disturbed during the project lifecycle. The project is at an elevation of approximately 1,100 to 1,300 metres (above sea level) and is comprised of hills and ridgelines rising out of the Walcha Plateau.

The project locality and an indicative layout is identified in **Figure 1.1** and **Figure 1.2**.

WWF is proposed to consist of up to 126 wind turbine generator locations with a combined maximum installed capacity of 700 megawatts (MW). A maximum tip height of 250 metres is proposed.

The project would also include:

- An internal electrical reticulation network (both overhead and underground);
- Three on-site substations;
- New and upgraded access roads;
- Temporary construction facilities (including concrete batching plants); and
- Operation and maintenance buildings.

Large-scale battery storage is also proposed for the project to support stabilising the supply of electricity to the National Electricity Market (NEM).

The project is also proposed to include approximately 30 km of 330kV overhead transmission line running through the wind farm and continuing northwest from the project site. This new transmission line would connect to the existing grid network operated by TransGrid at a new switchyard which would be constructed approximately 7 km south of Uralla, NSW.

This switchyard location has also been proposed by WalchaEnergy as part of its Salisbury Solar Farm project, and has been referred to as the “Uralla Hub”. The proposed transmission line route and switchyard location are identified in **Figure 1.2** below.

It should be noted that the biodiversity assessment described herein was undertaken based on an earlier project layout, and does not include several proposed turbine locations or the proposed transmission line route. Additional field surveys and biodiversity assessment will be conducted on these locations as part of the EIS.

SALISBURY PLAINS

OXLEY WILD RIVERS

LONG FLAT

Armidale

ARMIDALE REGIONAL COUNCIL

URALLA SHIRE COUNCIL

TAMWORTH REGIONAL COUNCIL

WALCHA COUNCIL

Tamworth

A15

B54

OXLEY WILD RIVERS

THUNDERBOLTS WAY

WALCHA

OXLEY HIGHWAY

MOONA PLAINS

OXLEY WILD RIVERS

OXLEY WILD RIVERS

Legend

- Project Boundary
- Highway / Major Road
- Local Road
- Existing 66kV Transmission Line
- National Parks

Source:
Base Data - DCDB, DTDB Nov 2019
ESRI World Imagery Apr 2015
ESRI World Street Map

Project Locality

F1.1

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Date:	16/06/2020	Drawing Size: A3	
Drawn By:	VN	Reviewed By: DMS	Client: WWPL

Coordinate System: GDA 1994 MGA Zone 56

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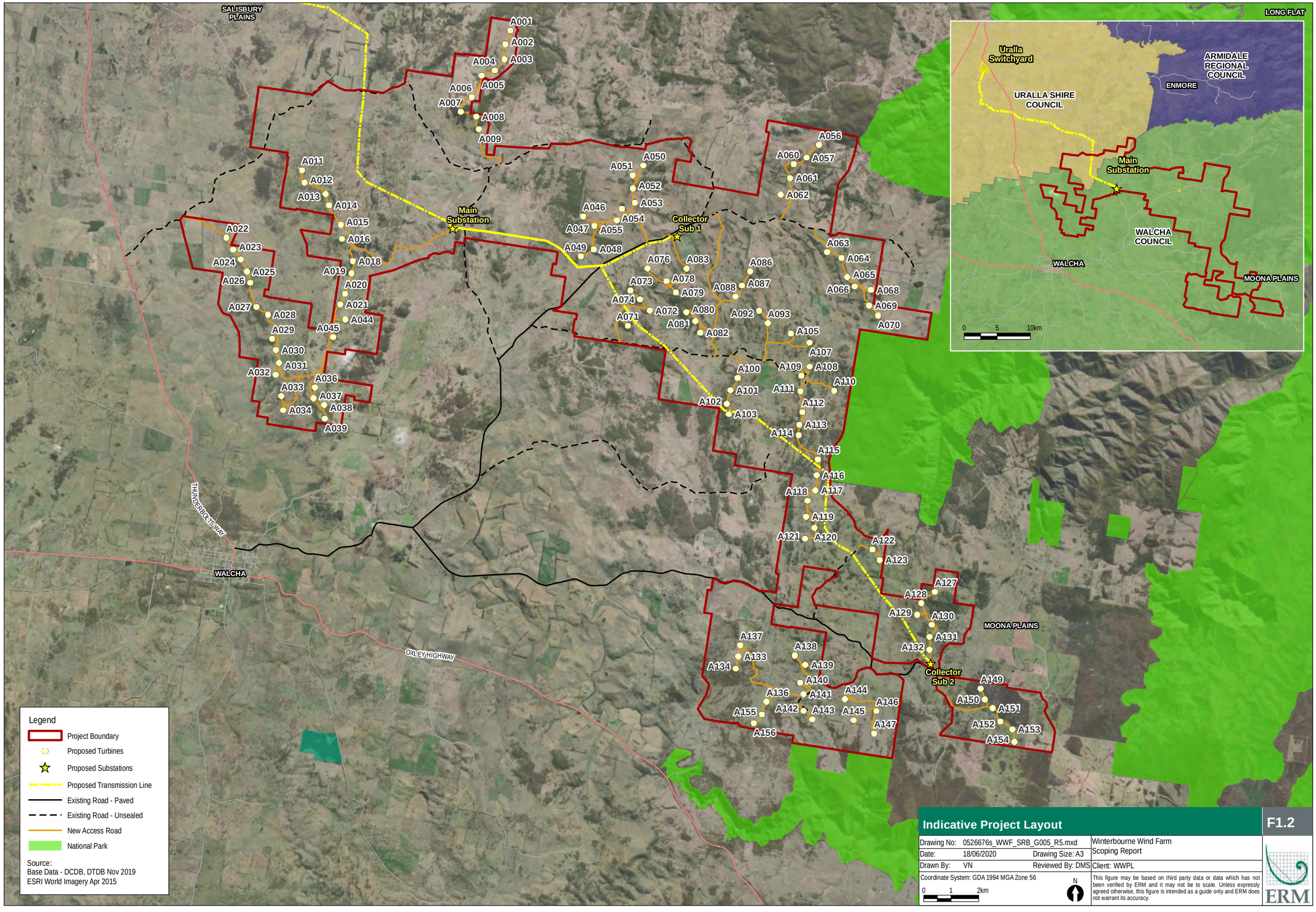
SALISBURY PLAINS
LONG FLAT
THUNDERBOLTS WAY
WALCHA
OXLEY HIGHWAY
MOONA PLAINS
Main Substation
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Collector Sub 2
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Uralla Switchyard
ARMIDALE REGIONAL COUNCIL
ENMORE
URALLA SHIRE COUNCIL
WALCHA COUNCIL
0 5 10km
Legend
Project Boundary
Proposed Turbines
Proposed Substations
Proposed Transmission Line
Existing Road - Paved
Existing Road - Unsealed
New Access Road
National Park
Source:
Base Data - DCDB, DTDB Nov 2019
ESRI World Imagery Apr 2015
Indicative Project Layout
F1.2
Drawing No: 0526676s_WWF_SRB_G005_R5.mxd
Winterbourne Wind Farm
Scoping Report
Date: 18/06/2020
Drawing Size: A3
Drawn By: VN
Reviewed By: DMS
Client: WWPL
Coordinate System: GDA 1994 MGA Zone 56
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2. LEGISLATION

This chapter provides a discussion of the biodiversity-related federal and state legislation and policies relevant to the development of the project.

2.1 Applicable Legislation

A description of the relevant legislative context is provided below. This report addresses the objectives and requirements of the legislation as it relates to the identification of biodiversity values. Impacts to these values will be addressed separately if required as part of the EIS to be prepared under Part 5 of the EP&A Act.

2.1.1 Commonwealth Legislation

2.1.1.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act requires approval of the Commonwealth Minister for Environment (formerly the Minister of Sustainability, Environment, Water, Population and Communities) for actions that may have a significant impact on Matters of National Environmental Significance (MNES).

The EPBC Act is administered by the Commonwealth Department of Environment and Energy (DoEE) and lists threatened species, ecological communities and other MNES, as outlined in **Table 5.1** of this report. Any proposed action that is expected to have an impact on MNES must be referred to the Minister for assessment under the EPBC Act, or assessed under the accredited process between the Commonwealth and the State of NSW.

2.1.2 Statutory Legislation and Guidelines

2.1.2.1 Biodiversity Conservation Act 2016 (BC Act)

The NSW *Biodiversity Conservation Act 2016* came into effect on 25 August 2017. The BC Act replaced the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and parts of the NSW *National Parks and Wildlife Act 1974*. The BC Act establishes mechanisms for:

- The management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TECs).
- The listing of threatened species, TECs and key threatening processes.
- The development and implementation of recovery and threat abatement plans.
- The declaration of critical habitat.
- The consideration and assessment of threatened species impacts in development assessment process.
- Biodiversity Offsets Scheme (BOS), including the Biodiversity Values Map and BAM to identify serious and irreversible impacts.

The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments. Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM.

A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold tool are available to identify the presence of mapped biodiversity values within land proposed for development as well as the clearing thresholds that would trigger application of the BAM.

The Biodiversity Offsets Scheme applies to state significant development and state significant infrastructure projects, unless the Secretary of DPIE determines that the project is not likely to have a significant impact. Based on the assessment of preliminary biodiversity values, the project is likely to require the preparation of a Biodiversity Development Assessment Report (BDAR) to support any EIS being prepared.

2.1.2.2 Biosecurity Act 2015

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

The General Biosecurity Duty states "*Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.*" The general biosecurity duty applies to all weeds listed in Schedule 3 of the Biosecurity Act.

2.1.2.3 Weeds of National Significance

32 Weeds of National Significance (WoNS) have been agreed by Australian governments based on an assessment process that prioritised these weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. Some of the Weeds of National Significance (WoNS) are also listed as primary weeds in LGAs.

Primary weeds have been identified in different LGAs due to the level of threat infestation they represent. A strategic plan for each weed will be required at each site to define responsibilities and identify strategies and actions to control the weed species.

These can be downloaded from:

http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html

2.1.2.4 State Environmental Planning Policy (Koala Habitat Protection) 2019

A State Environmental Planning Policy (SEPP) Koala Habitat Protection now replaces SEPP 44 – Koala Habitat Protection (SEPP 44). The Koala Habitat Protection SEPP includes a new definition of 'core koala habitat', two maps to help protect koalas across NSW, and the list of tree species listed under the SEPP has been expanded from 10 to 123, across nine distinct regions of NSW.

The policy intent of SEPP 44 has been retained in the Koala Habitat Protection SEPP and the former SEPP will be repealed when the new SEPP commences on 1 March 2020.

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

2.1.2.5 Local Land Services Act 2013

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

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

A review of the Native Vegetation Regulatory Map (Regulatory Map) and confirmation of the relevant land categories will be included within any BDAR prepared to support the EIS.

2.1.2.6 Fisheries Management Act 1994

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

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

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

Any waterway crossings will need to consider an appropriately designed structure that does not obstruct fish passage and will be designed in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management and the Policy and Guidelines for Fish Friendly Waterway Crossings.

Notwithstanding this, it is noted that a permit under section 219 would not be required for waterway crossings as Section 5.23 of the EP&A Act excludes SSD projects from requiring "*a permit under section 201, 205 or 219 of the Fisheries Management Act 1994*".

3. METHODOLOGY

This section describes the methods used to conduct the desktop assessment and Spring 2019 (November) field surveys, the latter incorporating BAM plot surveys, targeted fauna surveys and habitat/landscape values assessments.

3.1 Desktop Review

The desktop review included the following online resources:

- NSW Threatened Biodiversity Data Collection, including the Wildlife Atlas (BioNET), Vegetation Information System (VIS) database and threatened species profiles. Accessed October 2019.
- Results of the Commonwealth Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST) identifying threatened species and communities with potential to occur within the locality (10 km buffer around the project boundary). Accessed October 2019.
- NSW SEED mapping to identify Plant Community Types (PCT), threatened species or communities known or likely to occur; Mitchell Landscapes, map of Interim Biographic Regionalisation of Australia (IBRA) version 7.
- IBAT Proximity Report, 2018. Generated under licence 2057-4329 from the Integrated Biodiversity Assessment Tool on 08/10/2019: http://www.ibat-alliance.org.
- Atlas of Living Australia (ALA) Database. Accessed October 2019.
- Local government databases.

3.2 Field Surveys

For the purpose of this Biodiversity Constraints Assessment Report, only the Spring Field Surveys (November 2019) have been used to supplement the report. Additional Field Surveys (Summer February 2020) have been undertaken but do not contribute to this report.

Two ecologists conducted field surveys within the project boundary between 8 November 2019 and 21 November 2019, representing a total of 200 person hours. The field surveys included a range of targeted and general survey methods, which are detailed in **Table 3.1**.

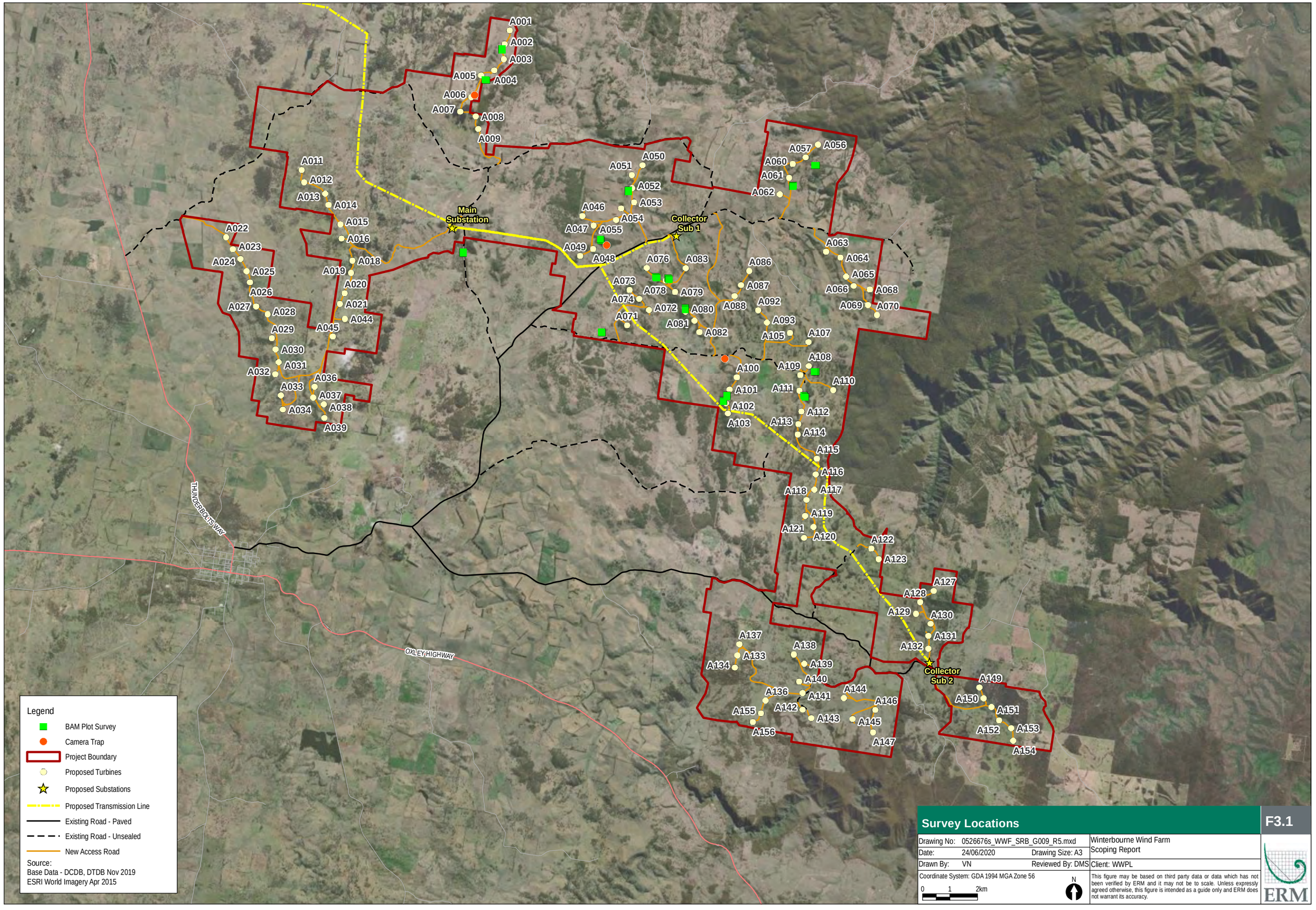
The purpose of the field surveys was to:

- Collect floristic and condition data of Plant Community Types (PCTs) in accordance with the BAM.
- Identify native species and communities with a particular focus on those listed as migratory, vulnerable, endangered or critically endangered under the EPBC Act, the BC Act and avian species susceptible to turbine strikes (e.g. Birds of Prey).
- Identify important habitat components (e.g. hollow-bearing trees) and landscape features.

Due to logistical, property access and safety limitations (e.g. bushfire risk) the survey effort was spatially restricted, as outlined in **Figure 3.1**.

Table 3.1 Field Survey Summary (Spring Surveys – November 2019)

Target	Survey Methods	Survey effort
Vegetation communities	BAM Plot Surveys	■ 15 BAM Plots
Habitat and landscape features	Habitat and Landscape Assessments	■ Opportunistically undertaken over the 12 day survey period
Birds	Waterhole Survey	■ Opportunistically undertaken over the 12 day survey period
	Birds of Prey Survey	■ Opportunistically undertaken over the 12 day survey period
	Diurnal Surveys	■ Opportunistically undertaken over the 12 day survey period
Reptiles & Amphibians	Diurnal Surveys	■ Opportunistically undertaken over the 12 day survey period
Mammals	Camera Trapping	■ 3 Camera Traps ■ 432 hrs (6 days and 6 nights)
	Scat Surveys	■ Opportunistically undertaken over the 12 day survey period
	Diurnal Surveys	■ Opportunistically undertaken over the 12 day survey period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A156
Main Substation
Collector Sub 1
Collector Sub 2
THUNDERBOLTS WAY
OXLEY HIGHWAY
Legend
BAM Plot Survey
Camera Trap
Project Boundary
Proposed Turbines
Proposed Substations
Proposed Transmission Line
Existing Road - Paved
Existing Road - Unsealed
New Access Road
Source:
Base Data - DCDB, DTDB Nov 2019
ESRI World Imagery Apr 2015
Survey Locations
F3.1
Drawing No: 0526676s_WWF_SRB_G009_R5.mxd
Winterbourne Wind Farm
Scoping Report
Date: 24/06/2020
Drawing Size: A3
Drawn By: VN
Reviewed By: DMS
Client: WWPL
Coordinate System: GDA 1994 MGA Zone 56
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3.2.1 Flora Surveys

3.2.1.1 BAM Plot Surveys

A total of 15 floristic plots were conducted in accordance with the BAM (OEH 2018). BAM Plot Surveys were coordinated and organised by Gabrielle Rose - Accredited Assessor (BAAS18091). At each plot location the following was conducted:

- One 20 x 20 metre plot for assessment of composition and structure.
- One 20 x 50 metre plot for assessment of function, including a series of five 1 x 1 metre plots to assess average leaf litter cover.

The assessment of composition and structure recorded species name, stratum, growth form, cover and abundance rating for each species present within the plot. Cover (foliage cover) was estimated for all species rooted in or overhanging the plot, and recorded using decimals (cover values are rounded to the nearest whole number) or estimated to the nearest 5% (5% -100%). Abundance was counted (up to 20) and estimated above 20.

The assessment of function recorded the number of large trees, the presence of tree stem size class, tree regeneration, number of trees with hollows and length of fallen logs, as well as leaf litter cover within the 20 x 50 metre plot and five 1 x 1 metre sub-plots.

3.2.1.2 PCT Identification

The method used for preliminary identification of the Plant Community Types (PCT) included:

- Use of the BioNet Vegetation Classification's Community Identification keys. Search criteria used included Vegetation Formation, Vegetation Class, IBRA Region and selected community species in the upper / mid / low stratum.
- Selection of the PCT was undertaken by comparing the descriptions of each potential PCT with characteristics of the vegetation such as landform location, species composition and other landscape features relevant to the vegetation community. When the vegetation community under assessment was likely to conform to more than one PCT, the decision on a given PCT over other options was based on presence of characteristic species, species richness and other aspects of the PCT description.
- The condition of the PCT was defined based on the absence of upper stratum, dominance of exotics over natives and percentage bare land present.

3.2.2 Habitat Assessments

Prior to conducting habitat assessments, experienced ecologists reviewed vegetation community mapping and aerial photography to assess distribution of habitat types. Assessments included quantifying habitat features present, particularly those relevant to migratory and threatened species.

Key habitat features included relative vegetative cover, abundance of nesting/shelter/basking sites, presence of aquatic habitats, presence of foraging resources, refuge sites, dominant canopy species, connectivity and disturbances.

3.2.3 Fauna Surveys

3.2.3.1 Camera Trapping

Motion sensor camera traps were deployed to target the Tiger Quoll (*Dasyurus maculatus*). Three camera traps were deployed at three locations within the project boundary, which were considered potential Tiger Quoll habitat (refer to **Figure 3.1**).

The camera traps were active for six days and six nights. Camera traps were baited with sardines and chicken necks. Camera traps were deployed in accordance with '*A Guide for the Use of Remote Camera for Wildlife Survey in Northern Australia*' (Gillespie et al., 2015).

3.2.3.2 Waterhole Surveys

Waterhole surveys were conducted in order to target aquatic bird species, particularly migratory species within the region. Waterholes included mostly artificial farm dams but also included small waterbodies in the landscape. During the waterhole surveys, observations were made from a stationary position, and birds were identified by call detection and visual observations.

3.2.3.3 Scat Surveys and Analysis

Scat surveys were opportunistically undertaken within the project boundary. Ecologists targeted large hollow-bearing trees and koala feed trees during the scat surveys. Targeted trees would be subject to at least two minutes of searching.

Scat identification was assisted with 'Tracks, Scats and other Traces: A Field Guide to Australian Mammals' (Triggs 2004). Confirmation and assessment of scats was undertaken by the following mammalian experts:

- Dr David Dique (Koala Expert); and
- Barba Triggs (Author of 'Tracks, Scats and other Traces: A Field Guide to Australian Mammals').

3.2.3.4 Birds of Prey Surveys

Birds of Prey surveys actively targeted diurnal soaring species. Birds of Prey surveys were undertaken at vantage points (e.g. ridgelines) at mid-morning when Birds of Prey become increasingly active.

3.2.3.5 Diurnal Surveys

Diurnal surveys were undertaken to target a range of mammal, bird, reptile and amphibian species. Scats, scratches, diggings, tracks and other signs were investigated to determine the presence of native fauna. Diurnal surveys were conducted opportunistically within the project boundary when practical.

3.3 Field Survey Conditions

Table 3.2 details the daily weather observations that were recorded for Woolbrook weather station during the field survey, which is approximately 25 kilometres from the project. The weather was fine throughout the survey periods, with temperatures ranging from a minimum of 2.7ºC to a maximum of 33ºC. The region has suffered from drought conditions, receiving only 39.6 mm of rain in the previous 3 months. No rainfall was recorded during the survey period.

Table 3.2 Daily Weather Observations at Woolbrook Weather Station

Date	Temperature		Rain	9:00 AM Statistics			
	Min	Max	mm	Temp	Relative Humidity	Wind Direction	Wind Speed (km/h)
	°C	°C		°C	%		
08/11/2019	9.2	26.3	0	20.5	54	NW	15
09/11/2019	8.5	17.5	0	11.0	76	WNW	19
10/11/2019	4.2	21.6	0	12.5	-	NW	11
11/11/2019	10.4	25.0	0	13.0	89	Calm	
12/11/2019	7.0	29.7	0	20.0	-	N	19
13/11/2019	12.5	22.8	0	16.5	-	SW	9
14/11/2019	7.5	24.5	0	15.5	-	NW	4
15/11/2019	2.7	27.5	0	19.5	-	SW	6
16/11/2019	5.6	28.0	0	22.0	52	W	4
17/11/2019	7.6	25.7	0	14.5	84	NNW	4
18/11/2019	13.6	25.2	0	16.4	58	Calm	
19/11/2019	12.3	29.7	0	21.6	27	NW	6
20/11/2019	8.2	33.0	0	24.3	63	Calm	
21/11/2019	13.0	32.0	0	22.0	-	Calm	

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

3.4 Likelihood of Occurrence

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

Desktop sources are indicative only and likelihood rankings, particularly in regard to the presence of preferred habitat, are conservative. The assessment ranks the likelihood of the species occurring within the project boundary through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey.

The criteria applied are outlined in **Table 3.3**. The preliminary likelihood of occurrence assessment is provided in **Appendix C** of this report.

Table 3.3 Likelihood of Occurrence Criteria

Factor	Preferred habitat exists	Suitable habitat exists[1]	Habitat does not exist[2]
Records within project boundary	Known	Known	Known
Records in the locality[3]	Likely	Potential	Unlikely
No records in the locality, but project boundary is within known distribution	Potential	Unlikely	Unlikely
No records in the locality, and Investigation Area is outside of distribution	Unlikely	Unlikely	Unlikely

1. *Habitat may be considered suitable, but not preferred because: some desired habitat features may be present, but not all; habitat may have poor connectivity; or habitat may be known to be disturbed.*
2. *Based on sources reviewed and/or field survey results.*
3. *'Locality' refers to a 10 km buffer of the project boundary.*

3.5 Assumptions and Limitations

The field and desktop assessments provide an overview of the biodiversity values that exist within the project boundary. Surveys were undertaken at discrete locations based on the proposed infrastructure footprint (e.g. turbine and road locations) to gain a general understanding of the types of species and habitat features that occur. While not all portions within the project boundary could be visited during the field survey, the landscape and its features were generally consistent throughout.

The absence of a species from a database list or observational studies does not confirm its absence within the project boundary. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of species. Similarly, the timing of the survey precludes the detection of a number of migratory and wader species that are typically absent from the area at that time of the year. Future biodiversity surveys will aim to cover multiple seasons in order to address temporal variability with a particular focus on migratory species.

In recent years, areas within project boundary and the greater region have suffered from drought conditions. Field survey results that indicate poor condition of vegetation communities, the absence of particular species and a low abundance and diversity of native fauna and flora may be the result of drought conditions.

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

4. BIODIVERSITY VALUES

This chapter summarises the results of the desktop and field investigations used to understand and assess the potential biodiversity values present within the project boundary.

4.1 Desktop Review

4.1.1 Threatened and Conservation Significant Species

4.1.1.1 Protected Matters Search Tool

The Protected Matters Search Tool was used to identify potential threatened and conservation significant species within a 10 kilometre radius of the project boundary (**Table 4.1**). A total of 42 conservation significant species were detected as potentially occurring within this radius. Half of these species are birds, most of which are listed as migratory species. There were ten threatened flora species, eight threatened mammals, two threatened amphibians and one threatened reptile detected as potentially occurring within the 10 kilometre radius.

Table 4.1 Protected Matters Search Tool

Type	Scientific Name	Common Name	BD Act	EPBC Act
Birds	*Anthochaera phrygia*	Regent Honeyeater	CE	CE
	Numenius madagascariensis	Far Eastern Curlew	-	CE
	Lathamus discolor	Swift Parrot	E	CE
	Calidris ferrunginea	Curlew Sandpiper	E	CE, Mi
	Rostratula australis	Australian Painted-snipe	E	E
	Cuculus optatus	Oriental Cuckoo	-	Mi
	Monarcha melanopsis	Black-faced Monarch	-	Mi
	Rhipidura rufifrons	Rufous Fantail	-	Mi
	Calidris acuminata	Sharp-tailed Sandpiper	-	Mi
	Gallinago hardwickii	Latham's Snipe	V	Mi
	Apus pacificus	Fork-tailed Swift	-	Mi
	Symposiachrus trivirgatus	Spectacled Monarch	-	Mi, Ma
	Motacila flava	Yellow Wagtail	-	Mi, Ma
	Actitis hypoleucos	Common Sandpiper	-	Mi, Ma
	Calidris melanotos	Pectoral Sandpiper	-	Mi, Ma
	Pandion cristatus	Osprey	V	Mi, Ma
	Tringa nebularia	Common Greenshank	-	Mi, Ma
	Grantiella picta	Painted Honeyeater	V	V
	Erythrotriorchis radiates	Red Goshawk	CE	V
	Turnix melanogaster	Black-breasted Button-quail	CE	V
	Hirundapus caudacutus	White-throated Needletail	-	V, Mi

Type	Scientific Name	Common Name	BD Act	EPBC Act
Mammals	Chalinolobus dwyeri	Large-eared Pied Bat	V	V
	Petrogale penicillata	Brush-tailed Rock-wallaby	E	V
	Petauroides volans	Greater Glider	E	V
	Phascolarctos cinereus	Koala	V	V
	Potorous tridactylus	Long-nosed Potoroo	V	V
	Pseudomys novaehollandiae	New Holland Mouse	-	V
	Pteropus poliocephalus	Grey-headed Flying-fox	V	V
	Dasyurus maculatus	Tiger Quoll	V	E
Reptiles	*Wollumbinia belli*	Bell's Turtle	E	V
Amphibians	*Litoria piperata*	Peppered Tree Frog	CE	V
	Mixophyes balbus	Stuttering Frog	E	V
Plants	*Euphrasia arguta*	-	CE	CE
	Cynanchum elegans	White-flowered Wax Plant	E	E
	Diuris eborensis	-	E	E
	Callistemon pungens	-	-	V
	Dichanthium setosum	Bluegrass	V	V
	Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V
	Hakea fraseri	Gorge Hakea	V	V
	Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V
	Prostanthera cineolifera	Singleton Mint Bush	V	V
	Thesium australe	Austral Toadflax	V	V

V = Vulnerable; E = Endangered; CE = Critically Endangered; Ma = Marine; Mi = Migratory

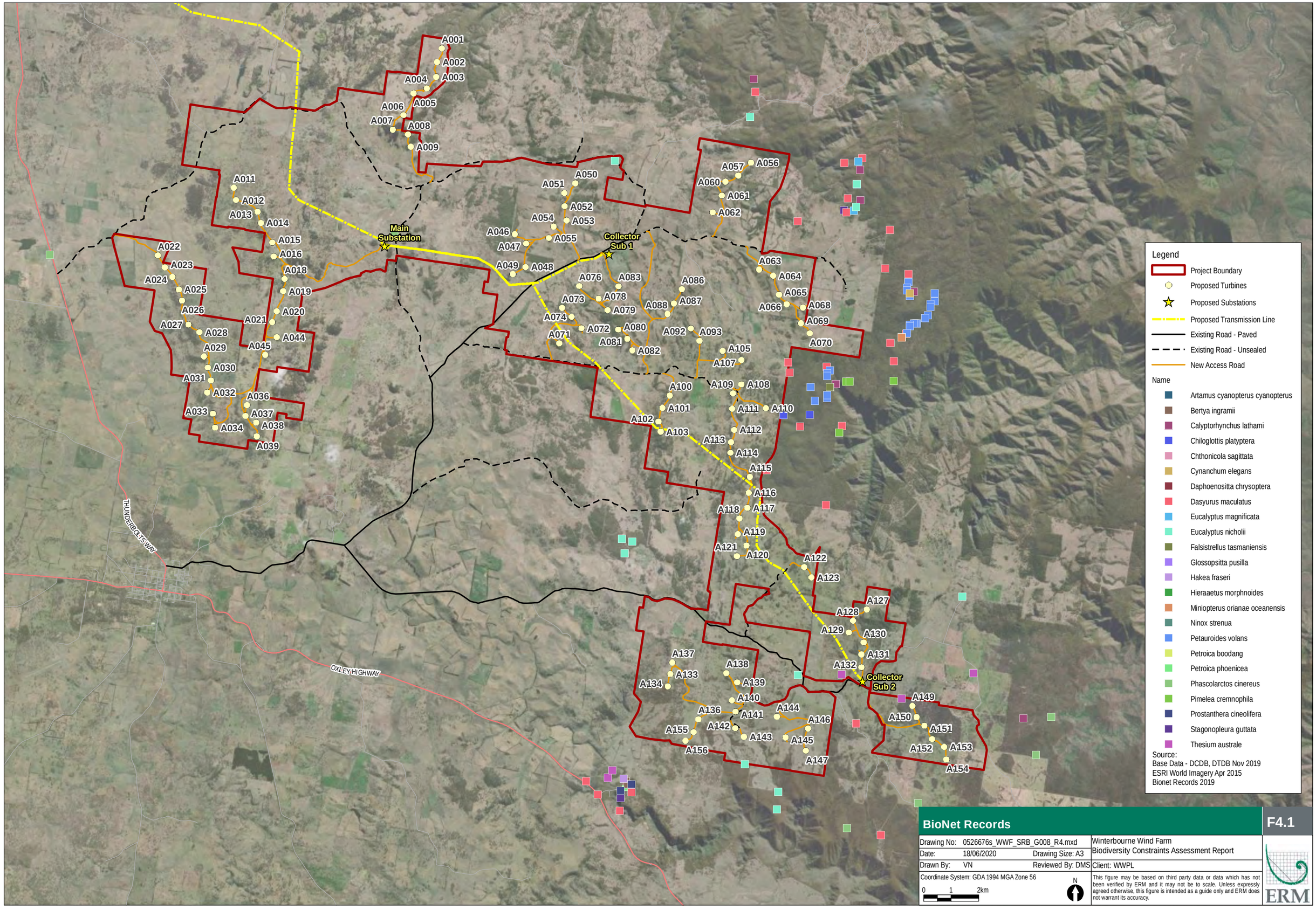
4.1.1.2 BioNet

BioNet records of threatened or conservation significant species within a 10 kilometre radius of the project boundary are detailed in **Table 4.2.** BioNet records within the Project Area are presented in **Figure 4.1**. A total of 32 threatened species have been recorded within this radius. Almost half of those species are threatened birds. There are ten threatened flora species and seven threatened mammalian species recorded within that 10 kilometre radius. Notably, Beadle's Grevillea (*Grevillea beadleana*) has been recorded 2300 times and the Tiger Quoll (*Dasyurus maculatus*) has been recorded 192 times. BioNet indicates that there are Austral Toadflax and Koala records within the project boundary.

Table 4.2 BioNet Records

Type	Scientific Name	Common Name	BC Act	EPBC Act	Individuals recorded within 10 km
Birds	*Hirundapus caudacutus*	White-throated Needletail	-	V, Mi	11
	Stagonopleura guttata	Diamond Firetail	V	-	5
	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	9
	Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	2
	Chthonicola sagittata	Speckled Warbler	V	-	5
	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	1
	Daphoenositta chrysoptera	Varied Sittella	V	-	14
	Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	1
	Glossopsitta pusilla	Little Lorikeet	V	-	n/a
	Haliaeetus leucogaster	White-bellied Sea-Eagle	V	Ma	1
	Hieraaetus morphnoides	Little Eagle	V	-	2
	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	2
	Ninox strenua	Powerful Owl	V	-	2
	Petroica boodang	Scarlet Robin	V	-	n/a
	Petroica phoenicea	Flame Robin	V	-	n/a
Mammals	*Phascolarctos cinereus*	Koala	V	V	1
	Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	1
	Potorous tridactylus	Long-nosed Potoroo	V	V	n/a
	Dasyurus maculatus	Tiger Quoll	V	E	192
	Pteropus poliocephalus	Grey-headed Flying-fox	V	V	n/a
	Petauroides volans	Greater Glider	-	V	1
	Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	70
Flora	*Bertya ingramii*	Narrow-leaved Bertya	E	E	90
	Eucalyptus magnificata	Northern Blue Box	E	-	0
	Pimelea cremnophila	-	CE	-	n/a
	Chiloglottis platyptera	Barrington Tops Ant Orchid	V	-	n/a
	Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	0
	Grevillea beadleana	Beadle's Grevillea	E	E	2300
	Hakea fraseri	Gorge Hakea	V	V	0
	Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V	n/a
	Picris evae	Hawkweed	V	V	n/a
	Thesium australe	Austral Toadflax	V	V	0

1. *Records within a 10 km radius of the project boundary and within last 50 years only.*
2. *V = Vulnerable; E = Endangered; CE = Critically Endangered; Ma = Marine; Mi = Migratory.*



BioNet Records

F4.1

Drawing No:	0526676s_WWF_SRB_G008_R4.mxd		Winterbourne Wind Farm Biodiversity Constraints Assessment Report
Date:	18/06/2020	Drawing Size: A3	
Drawn By:	VN	Reviewed By: DMS	Client: WWPL

Coordinate System: GDA 1994 MGA Zone 56

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4.1.2 Threatened Ecological Communities

In accordance with state vegetation mapping data there are potentially vegetation communities within the Project Boundary that conform to the criteria of four threatened ecological communities (TECs). The TECs include:

- EPBC Act TECs:
  - New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands.
  - Box Gum Grassy Woodland and Derived Grassland communities in NSW.
- BC Act TECs:
  - New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion.
  - Box Gum Woodland in New England Tablelands.

The existing vegetation mapping for the project area indicates that there are several vegetation communities that contain key species for these four TECs (e.g. *Eucalyptus nova-anglica, E. blakelyi, E. albens and E. melliodora*).

Based on the state vegetation mapping data, a number of turbine locations are within or in close proximity (<100 m) to vegetation communities that could support TECs under the EPBC Act or the BC Act. However, further field vegetation mapping is required to determine the actual presence and extent of TECs at the site, with reference to the following guidelines:

- NSW Scientific Committee, 2002. 'White Box-Yellow Box Blakely's Red Gum Woodland'.
- Australian Government, Department of Environment and Heritage EPBC Act Policy Statements. 'White box – Yellow Box – Blakely's Red Gum grass woodlands and derived native grasslands'.
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities. 'Farming and Nationally Protected New England Peppermint Grassy Woodlands'.
- NSW Government, Environment Climate Change & Water. 'New England Peppermint Woodland on Basalts and Sediments in the New England Tableland Bioregion'.

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4.1.3 Protected Areas

No Protected Areas intercept the project. **Table 4.3** details nearby Protected Areas.

Table 4.3 Protected Areas

Protected Areas	Occurrence	Presence within Project Boundary	Distance from Project Boundary
World heritage properties	Gondwana Rainforests of Australia	No	<3.5 km
National heritage places	Gondwana Rainforests of Australia	No	<3.5 km
Other protected areas	Oxley Wild Rivers National Park	No	<1. 5 km
Ramsar wetlands of international importance	No	No	>50 km
Commonwealth marine areas	No	No	>50 km
The Great Barrier Reef Marine Park	No	No	>50 km
Alliance for Zero Extinction Sites	No	No	>50 km
Important Bird and Biodiversity Areas	No	No	>50 km

4.1.4 Native Vegetation and Landscape Features

Native vegetation and landscape characteristics for the current turbine locations (refer **Figure 1.2**) are summarised in **Table 4.4**. Due to the number of turbines, those in close proximity to one another have been assessed in groups (21 turbine groups in total).

The project is located wholly within the New England Tablelands Bioregion and also wholly within the Walcha Plateau Sub-bioregion. In accordance with NSW Hydrography, the proposed turbine locations do not intercept any mapped watercourses, although some turbines are in close proximity (<100 m) to drainage features. The proposed turbine locations do not intercept any high biodiversity value areas as mapped by the NSW Biodiversity Values Map. Although two turbine groups are located approximately 100 m from high biodiversity value areas. The mapped high biodiversity areas follow watercourses in the project area.

Areas within the project boundary have been subject to extensive clearing and are now regularly grazed by livestock. However, there are still some large to moderate vegetation patches scattered within the project boundary and many small vegetation patches and tree lines that maintain connectivity to the surrounding bushland and the Oxley Wild Rivers National Park.

Table 4.4 Native Vegetation and Landscape Characteristics at Turbine Locations

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
1, 2, 3, 4, 5, 6, 7, 8, 9	Several drainage features present, which drain into Scrubby Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area contains a combination of scattered trees, large vegetation patches and grasslands. This area is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	The majority of the area is mapped as non-remnant vegetation. Although there is a portion of this area mapped as remnant vegetation. This includes: ■ a moderate sized patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest; ■ a large patch of Peppermint *(Eucalyptus nova-anglica or Eucalyptus radiata* or *Eucalyptus nicholii*) woodland/forest.	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
12, 13, 14, 15, 16,18, 19, 20 , 21, 44, 45	Several drainage features present, which drain into Emu Creek, Jack Creek, Mihi Creek and Grose Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area contains a combination of scattered trees, large vegetation patches and grasslands. This zone is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	The majority of this area is mapped as remnant vegetation, with only a small portion mapped as non-remnant. Remnant vegetation includes*:* ■ A large contiguous patch of New England Stringy Bark (*Eucalyptus caliginosa*) and Peppermint (*Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) woodland/forest ■ A large contiguous patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
22, 23, 24, 25, 26, 27, 28,29, 30, 31, 32, 33, 34	Several drainage features present, which drain into Ohio Creek and Grose Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area contains a combination of scattered trees, small vegetation patches and grasslands. This area is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	The majority of this zone is mapped as remnant vegetation, with a small portion mapped as non-remnant. Remnant vegetation includes: ■ Large patch of New England Peppermint *(Eucalyptus nova-anglica*) woodland/forest	**Yes** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
36, 37, 38, 39	Several drainage features present, which drain into My Ladys Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	These areas have been subject to extensive vegetation clearing and now exist as grasslands. There is combination of scattered trees, vegetation patches and grasslands. This area is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	The majority of the area is mapped as non-remnant vegetation. A small portion of the area is a part mapped as remnant vegetation. This includes: ■ a small patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ Three small and medium sized patches of Yellow-Box (*Eucalyptus melliodora*) and Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest	**Yes** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW **BC Act:** ■ Box Gum Woodland in New England Tablelands

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
44	Several drainage features present, which drain into Washpool Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains a vegetation patch connected to the greater region.	The majority of the area is mapped as remnant vegetation. It includes: ■ A large patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest	**No**
46, 47, 48, 49	Several drainage features present, which drain into Lambing Flat Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches connected to the greater region.	The majority of the area is mapped as non-remnant vegetation. A small portion is mapped as remnant vegetation. This includes: ■ A moderate sized patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ A small linear patch and moderate patch of Yellow Box (*Eucalyptus melliodora*) – Blakely's Red Gum (*Eucalyptus blakelyi*) woodland/ forest	**Yes** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW **BC Act:** ■ Box Gum Woodland in New England Tablelands

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
50, 51, 52, 53, 54, 55	Several drainage features present, which drain into Scrubby Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches connected to the greater region.	The majority of the area is mapped as non-remnant vegetation. A small portion is mapped as remnant vegetation. This includes: ■ A moderate sized patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ Several small patches of New England Stringybark (*Eucalyptus caliginosa*) - *(Eucalyptus nova-anglica* or *Eucalyptus radiate* or *Eucalyptus nicholii*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
56, 57, 60, 61, 62	Several drainage features present and Eagle Gully, which drain into Hole Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area contains a combination of scattered trees, linear vegetation patches and grasslands. This area is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	This area is mapped as non-remnant.	**No**

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
63, 64, 65, 66, ,68, 69, 70	Several drainage features present that drain into Winterbourne Creek and Port Macquarie Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches connected to the greater region. It is immediately adjacent to Oxley Wild Rivers National Park.	The majority of this area is mapped as non-remnant vegetation, with a relatively small portion mapped as remnant vegetation. Remnant vegetation includes: ■ Moderate sized patches of montane Stringybark – Gum woodland/forest ■ Small patches of Dry Open New England Blackbutt (*Eucalyptus campanulata*) woodland/ forest	**Possible** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW **BC Act:** ■ Box Gum Woodland in New England Tablelands
71, 72, 73, 74, 76, 78, 79, 80, 81, 82, 83	Several drainage features present that drain into Dog Trap Creek and Lambing Flat Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area contains a combination of scattered trees, large vegetation patches and grasslands. This zone is connected to the surrounding vegetation communities and also to Oxley Wild Rivers National Park.	The majority of this area is mapped as remnant vegetation, with only a small portion mapped as non-remnant. Remnant vegetation includes: ■ Several moderate to large patches of Yellow-Box (*Eucalyptus melliodora*) and Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ A large contiguous patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest	**Yes** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW **BC Act:** ■ Box Gum Woodland in New England Tablelands

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
86, 87, 88, 92, 93, 105, 107	Several drainage features present that drain into Winterbourne Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains tree lines connected to the greater region.	The majority of this area is mapped as non-remnant vegetation, with a small portion mapped as remnant vegetation. Remnant vegetation includes: ■ Scattered patches of New England Peppermint *(Eucalyptus nova-anglica*) woodland/forest ■ Large patches of Peppermint *(Eucalyptus nova-anglica* or *Eucalyptus radiate* or *Eucalyptus nicholii*), Mountain Gum (*Eucalyptus cypellocarpa*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest	**Yes** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
108, 109, 110, 111, 112, 113, 114	Several drainage features present that drain into Snake Creek and Brookmount Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches connected to the greater region. It is in close proximity to Oxley Wild Rivers National Park.	This area has an almost equal amount of mapped remnant and non-remnant vegetation. Remnant vegetation includes: ■ A moderate sized contiguous patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ Moderate sized patches of montane Stringybark –Gum woodland/forest	**Possible** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW **BC Act:** ■ Box Gum Woodland in New England Tablelands

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
100, 101, 102, 103	Several drainage features present that drain into Snake Creek.	The creek is mapped on the Biodiversity Value Map, and is located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains tree lines that are connected to the greater region.	This area has an almost equal amount of mapped remnant and non-remnant vegetation. Remnant vegetation includes: ■ Moderate and small sized patches of Peppermint (Eucalyptus *nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
115, 116, 117, 118, 119, 120, 121	Several drainage features present.	Creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains tree lines that are connected to the greater region.	This area has an almost equal amount of mapped remnant and non-remnant vegetation. Remnant vegetation includes: ■ Moderate and small sized patches of Peppermint *(Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest ■ A large contiguous patch of New England Stringy Bark (*Eucalyptus caliginosa*) and Peppermint *(Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
122, 123,	Several drainage features present that drain into Rowleys Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains scattered trees that are connected to the greater region.	The majority of this area is mapped as non-remnant vegetation, with only a small portion mapped as remnant vegetation. Remnant vegetation includes: ■ Large patches of Peppermint (Eucalyptus *nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*), Mountain Gum (*Eucalyptus cypellocarpa*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest ■ A small patch of New England Peppermint *(Eucalyptus nova-anglica*) woodland/forest	**Yes** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
127, 128, 129, 130, 131, 132	Several drainage features present that drain into Ellas Creek and Rowleys Creek.	Within 100m of a patch of vegetation mapped by the Biodiversity Values Map.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains scattered trees and vegetation patches that are connected to the greater region.	The majority of this zone is mapped as non-remnant vegetation, with only a small portion mapped as remnant vegetation. Remnant vegetation includes: ■ A small patch of Broad–leaved Stringy Bark (*Eucalyptus caliginosa*) woodland/forest ■ A large patch of Peppermint *(Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*), Mountain Gum (*Eucalyptus cypellocarpa*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
133, 134, 137	Several drainage features present that drain into Majors Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches that are connected to the greater region.	The majority of this area is mapped as non-remnant vegetation, with a small portion mapped as remnant vegetation. Remnant vegetation includes: ■ A large contiguous patch of New England Stringy Bark (*Eucalyptus caliginosa*) and Peppermint *(Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) woodland/forest	**No**

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
138, 139, 140	Several drainage features present that drain into Graveyards Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains scattered trees that are connected to the greater region.	This Zone is mapped as non-remnant.	**No**
141, 142, 143, 136, 155, 156	Several drainage features present that drain into Graveyards Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains scattered trees that are connected to the greater region.	This Zone is mapped as non-remnant except for: ■ Large patches of Peppermint (Eucalyptus *nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*), Mountain Gum (*Eucalyptus cypellocarpa*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest	**Possible** **EPBC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
144, 145, 146, 147	Several drainage features present that drain into Graveyards Creek and Stockyard Creek.	Within 100m of a patch of vegetation mapped by the Biodiversity Values Map.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands, however, contains vegetation patches that are directly connected to Oxley Wild Rivers National Park.	The majority of this area is mapped as non-remnant vegetation, with a small portion mapped as remnant vegetation. Remnant vegetation includes: ■ Apple (*Angophora floribunda*) and Manna Gum (*Eucalyptus viminalis*) Woodland ■ Dry Grassy Stringybark woodland/forest	**No**

Turbine Number	Rivers, streams, estuaries and wetlands	Biodiversity Values Map	Landscape Connectivity	Vegetation Communities	Associated Threatened Ecological Community
149, 150, 151, 152, 153, 154	Several drainage features present that drain into Moona Creek.	The creeks are mapped on the Biodiversity Value Map, and are located over 100m from any proposed turbine locations.	Large parts of the area have been subject to extensive vegetation clearing and now exist as grasslands. This area is mostly characterised by cleared grasslands and forest patches that are connected to the greater region. This area is immediately adjacent to Oxley Wild Rivers National Park.	This area has an almost equal amount of mapped remnant and non-remnant vegetation. Remnant vegetation includes: ■ A moderate and large patch of Dry Grassy Stringybark woodland/forest ■ Large patches of Peppermint (*Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*), Mountain Gum (*Eucalyptus cypellocarpa*) and Manna Gum (*Eucalyptus viminalis*) woodland/forest ■ A large patch of New England Stringy Bark (*Eucalyptus caliginosa*) and Peppermint (*Eucalyptus nova-anglica* or *Eucalyptus radiata* or *Eucalyptus nicholii*) woodland/forest ■ A moderate sized patch of montane Stringybark –Gum woodland/forest	**Possible** **EPBC Act:** ■ Box – Gum Grassy Woodland and Derived Grassland communities in NSW ■ New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands **BC Act:** ■ New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion ■ Box Gum Woodland in New England Tablelands

4.2 Field Results

The following section summaries the findings of the Spring field surveys conducted by two ecologists between 8 November 2019 and 21 November 2019.

4.2.1 Overview

A large proportion of the area within the project boundary is currently and has historically been subject to grazing from livestock, predominantly sheep and cattle. Consequently, large expanses have been converted to non-native grasslands.

It is likely that these areas were historically dominated by *Eucalyptus* woodland and forest communities. It is also likely these areas still contain some large to moderate sized patches of *Eucalyptus* woodland and forest communities as well as many small vegetation patches and treelines. In addition to the *Eucalyptus* woodland and forest communities, there are also rocky outcrops, escarpments, native sedgelands, rolling hills, gullies and artificial dam habitats.

A large proportion of the lands within the project boundary have been subject to environmental degradation, most of which is likely attributable to anthropogenic actions. Major biodiversity impacts already impacting the area include: habitat clearing, proliferation of invasive flora and fauna, dieback, native fauna mortality events (roadkill and hunting), overgrazing, exclusion fencing and changes to natural hydrology.

4.2.2 Aquatic Values

The project is located within the Macleay River catchment. Due to the elevated nature of turbine infrastructure and the presence of existing access tracks, the majority of the project's infrastructure will avoid watercourses, most drainage features, wetlands and artificial dams. Therefore, these preliminary field surveys did not aim to assess aquatic fauna and flora communities. However, field ecologists did investigate aquatic areas of high biodiversity value.

During the field surveys, aquatic habitats assessed were exclusively in the form of artificial dams created for livestock. These dams were generally small (<0.5 hectares) and had few microhabitat features (e.g. woody debris). These dams provided habitat for aquatic-associated bird species and are considered likely to be important for local macropod populations.

4.2.3 Habitat and Landscape Features

During the field surveys, ecologists aimed to identify habitat and landscape features important for threatened and migratory fauna species. The locations of large hollows (> 20 centimetre diameter), den habitat, rocky outcrops and possum dreys were recorded.

Hollow bearing trees were identified within the project boundary. Many Eucalyptus trees contained fauna scratch marks, mostly likely from native arboreal fauna. Woody debris was abundant throughout, which may be attributable to the severe storm (190 km/hr winds) the Walcha region experienced in December 2018. Den habitats were identified in rocky areas and outcrops that were common on hilltop areas. Several species of Eucalyptus identified within the project boundary are considered food sources for Koalas (Phascolarctos cinereus), which included:

- Yellow Box (*Eucalyptus melliodora*);
- Blakely's Red Gum (*Eucalyptus blakelyi*);
- Mountain Gum (*Eucalyptus dalrympleana*);
- Candle Bark (*Eucalyptus rubida*);
- Messmate (*Eucalyptus obliqua*); and
- Manna Gum (*Eucalyptus viminalis*).

4.2.4 Threatened Ecological Communities

Two vegetation communities were identified, which conformed to the criteria of two TECs under the BC Act:

- New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion (BC Act).
- Box Gum Woodland in New England Tablelands (BC Act).

Six vegetation patches (14.4 hectares) aligned with the species composition and community structure of the Box Gum Woodland in accordance with the BC Act based on the following reasons:

- Located within NSW New England Tablelands.
- Vegetation patches would likely respond to assisted natural regeneration.
- White Box, Yellow Box or Blakely's Red Gum, or a combination of these species, are or were present.
- The site is predominantly grassy.

At this preliminary stage of assessment, it is not confirmed if these six vegetation patches are considered Box Gum Woodland in accordance with the EPBC Act. Further field surveys will be required to determine if the vegetation patches have a predominantly native understorey (a key criteria for EPBC Box-Woodland TEC).

Three vegetation patches (24.2 hectares) aligned the species composition and community structure of the New England Peppermint Woodland in accordance with the BC Act based on the following reasons:

- Located within NSW New England Tablelands.
- Vegetation is an open grassy forest or woodland with sparse or no shrubs.
- The tree layer contains mainly New England Peppermint.

Again, at this preliminary stage of assessment it is not confirmed if these three vegetation patches are considered New England Peppermint Woodland in accordance with the EPBC Act. Further field surveys will be required to determine if the vegetation patches have a predominantly native understorey[1] (a key criteria for EPBC New England Peppermint TEC).

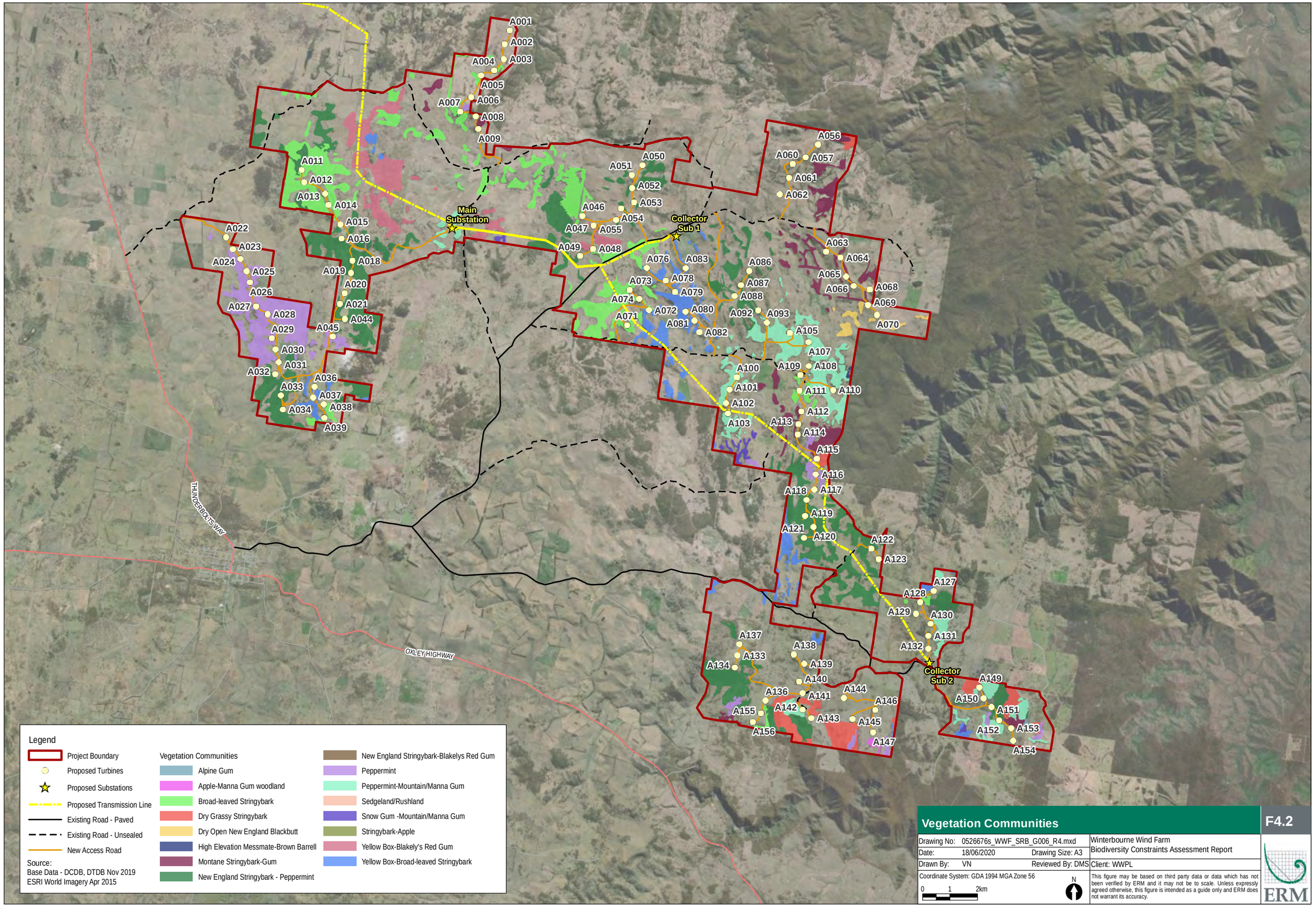
4.2.5 Flora and Vegetation Communities

The majority of the areas within the project boundary are characterised by non-native grasslands resulting from vegetation clearing and livestock farming. A variety of Eucalyptus woodland and forest communities exist as tree lines and small, moderate and large patches. These communities are the dominant native extant vegetation communities in the project boundary. Paddock trees (*Eucalyptus* spp.) are common throughout the non-native grasslands. Vegetation communities within the project boundary are outlined in **Figure 4.2**.

To date, flora species were only counted during BAM Plot Surveys, which only cover a limited extent of the area within the project boundary. A total of 36 flora species were identified and of the 36 species, 30 are considered native species. A full list of species recorded during the field surveys is provided in **Appendix B** of this report.

One threatened flora species was identified during the field surveys, *Eucalyptus nicholli*. *Eucalyptus nicholli* was recorded 15 times as isolated individuals within the project boundary, as well as six records within vegetation communities (more than one individual present).

[1] A predominantly native ground layer is one where at least 50% of the perennial vegetation cover in the ground layer is made up of native species.



Legend

- Project Boundary
- Proposed Turbines
- Proposed Substations
- Proposed Transmission Line
- Existing Road - Paved
- Existing Road - Unsealed
- New Access Road

Vegetation Communities

- Alpine Gum
- Apple-Manna Gum woodland
- Broad-leaved Stringybark
- Dry Grassy Stringybark
- Dry Open New England Blackbutt
- High Elevation Messmate-Brown Barrell
- Montane Stringybark-Gum
- New England Stringybark - Peppermint
- New England Stringybark-Blakelys Red Gum
- Peppermint
- Peppermint-Mountain/Manna Gum
- Sedgeland/Rushland
- Snow Gum -Mountain/Manna Gum
- Stringybark-Apple
- Yellow Box-Blakely's Red Gum
- Yellow Box-Broad-leaved Stringybark

Source:
Base Data - DCDB, DTDB Nov 2019
ESRI World Imagery Apr 2015

Vegetation Communities

F4.2

Drawing No:	0526676s_WWF_SRB_G006_R4.mxd		Winterbourne Wind Farm Biodiversity Constraints Assessment Report
Date:	18/06/2020	Drawing Size: A3	
Drawn By:	VN	Reviewed By: DMS	Client: WWPL

Coordinate System: GDA 1994 MGA Zone 56

0 1 2km

N

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

4.2.6 Native Fauna

A total of 50 bird species and eight mammal species were recorded during the Spring Surveys (November 2019) and are described below. No reptile species or amphibian species were recorded during these surveys.

4.2.6.1 Birds

A combined total of 50 bird species were identified during the Spring Surveys (November 2019) (refer to **Appendix A** of this report). Birds were recorded in a variety of habitats including, roadsides, dams, Eucalyptus woodland and forest communities, sedgelands and non-native grasslands.

No EPBC listed Marine species were identified during the Spring Surveys (November 2019). The project is not located or likely to impact any Commonwealth Marine Protected Areas. Therefore, an impact assessment under the EPBC Act of these marine species is not required.

One threatened bird species was identified during the field surveys, Scarlet Robin (*Petroica boodang).* The Scarlet Robin was detected within Eucalyptus woodland habitat at three locations within the project boundary, as depicted in **Image 4.1**

The majority of bird species identified during the field surveys were woodland species. Five bird of prey species were identified during the surveys, which included the Wedge-tailed Eagle (*Aquila audax* – refer to **Figure 4.3**), Brown Falcon (*Falco berigora*), Australian Hobby (*Falco longipennis*), Nankeen Kestrel (*Falco cenchroides*) and Black Kite (*Milvus migrans*). The Wedge-tailed Eagle (refer to **Image 4.2)** and Nankeen Kestrel were regularly recorded during the survey period. These five bird of prey species are considered vulnerable to turbine strikes.

Nine parrot species were detected during the surveys, which included the King Parrot (*Alisterus scapularis*), Little Corella (*Cacatua sanguinea*), Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*), Sulphur-crested Cockatoo (*Cacatua galerita*), Galah (*Eolophus roseicapilla*), Crimson Rosella (*Platycercus elegans*), Eastern Rosella (*Platycercus eximius*), Red-rumped Parrot (*Psephotus haematonotus*) and Musk Lorikeet (*Glossopsitta concinna*, refer to **Image 4-3)**

Eight aquatic-associated species were detected during the surveys, which included the Masked Lapwing (*Vanellus mil*es), Pacific Black Duck (*Anas superciliosa*), Hard Head Duck (*Aythya australis*), Australian Wood duck (*Chenonetta jubata*), White-faced Heron (*Egretta novaehollandiae*), Purple Swamphen (*Porphyrio porphyrio*), Straw-necked Ibis (*Threskiornis spinicollis*), and Australasian Grebe (*Tachybaptus novaehollandiae*, refer to **Image 4.4**).

Image 4-1 Scarlet Robin



Observed during Spring Surveys (November 2019)

Image 4-2 Wedge-tailed Eagles



Observed during Spring Surveys (November 2019)

Image 4-3 Musk Lorikeet

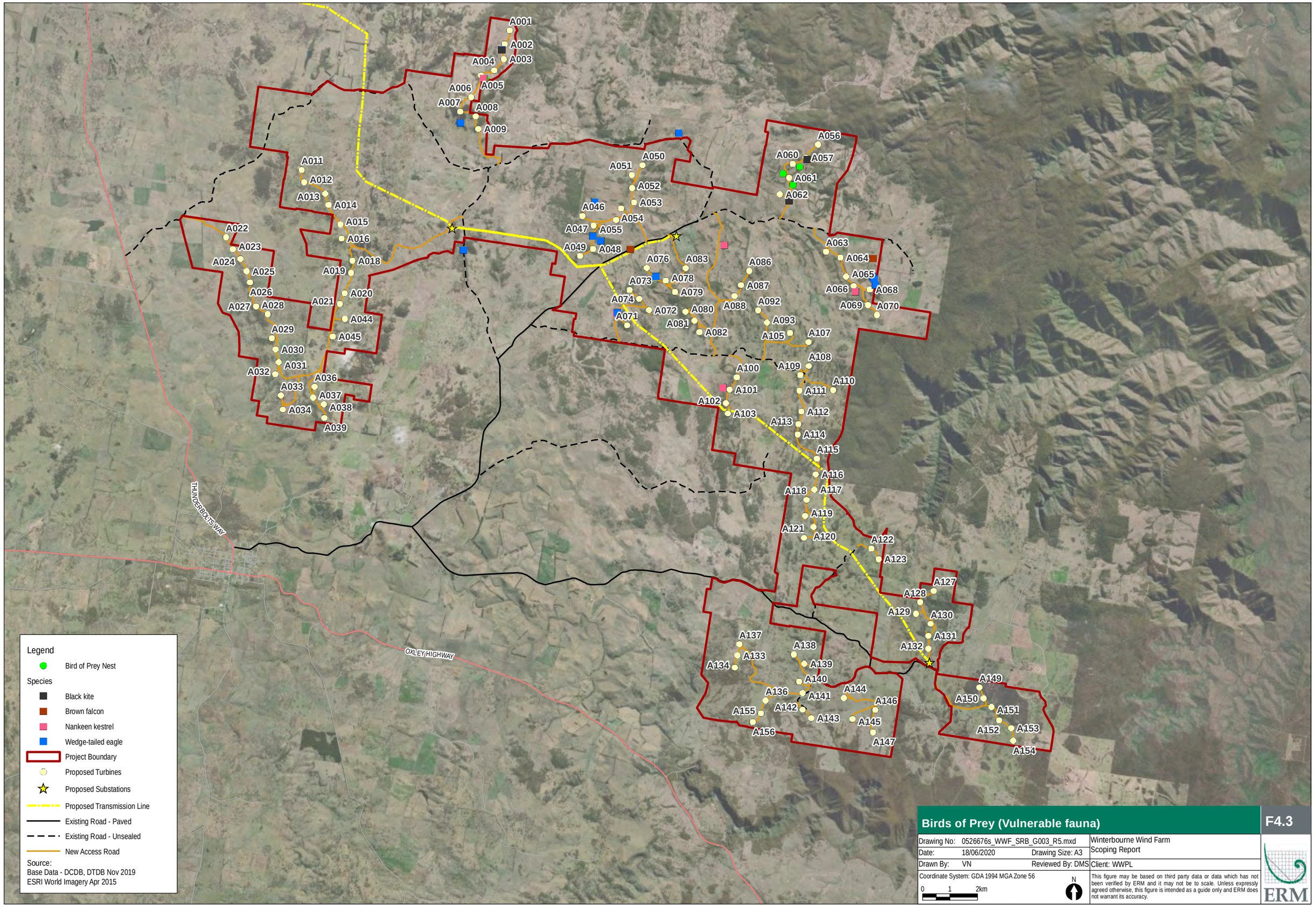


Observed during Spring Surveys (November 2019)

Image 4-4 Australasian Grebe



Observed during Spring Surveys (November 2019)



Birds of Prey (Vulnerable fauna)

F4.3

Drawing No:	0526676s_WWF_SRB_G003_R5.mxd		Winterbourne Wind Farm Scoping Report
Date:	18/06/2020	Drawing Size: A3	
Drawn By:	VN	Reviewed By: DMS	Client: WWPL

Coordinate System: GDA 1994 MGA Zone 56

0 1 2km

N

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

4.2.6.2 Mammals

Six native mammal species were detected within the project boundary during the Spring Surveys (November 2019). Three Macropod species were detected, which included Eastern Grey Kangaroo (*Macropus giganteus*), Wallaroo (*Macropus robustus*) and Red-necked Wallaby (*Macropus rufogriseus*).

Macropod species were regularly identified during the surveys. A Tiger Quoll (*Dasyurus maculatus*) and Brushtail Possum (*Trichosurus vulpecula*) were also identified via camera traps as shown in image 4-5.

Image 4-5 Tiger Quoll



Observed during Spring Surveys (November 2019)

4.2.6.3 Amphibians

Zero amphibian species were recorded during the Spring Surveys (November 2019), though these surveys did not include targeted fauna surveys.

4.2.6.4 Reptiles

Zero reptile species were recorded during the Spring Surveys (November 2019), though these surveys did not include targeted fauna surveys.

4.2.7 Introduced Species

4.2.7.1 Flora

Eight introduced flora species were identified during the field surveys. One of these introduced flora species, Sweet Briar (*Rosa rubiginosa*), is a restricted species in accordance with the *NSW Biosecurity Act 2015* and considered a Noxious Weed as outlined in **Table 4.5**.

Table 4.5 Invasive Flora known within Project Boundary

Scientific name	Common name	Weed of National Significance	NSW Noxious Weed
Cirsum virgue	Creeping Thistle	No	No
Hyacinthoides non-scripta	Blue Bell	No	No
Hypochaeris radicata	Flatweed	No	No
Onopordum sp.	Thistle	No	n/a
Rosa rubiginosa	Sweet Briar	No	Yes
Cirsum virgue	Creeping Thistle	No	No
Hyacinthoides non-scripta	Blue Bell	No	No

4.2.7.2 Fauna

Four introduced fauna species were identified during the Spring Surveys (November 2019). These included the Red Fox (*Vulpes vulpe*s), Hare (*Lepus*), Common Starling (*Sturnus vulgaris*) and the European Rabbit (*Oryctolagus cuniculus*). These species are likely to have a negative impact on native species through predation, habitat degradation and resource competition.

4.2.8 Threatened and Migratory Species

Of the 50 threatened and migratory species considered in this constraints assessment, six are known to occur and 14 are considered likely to occur within the project boundary. Three of these likely species are considered vulnerable to turbine strikes (**Table 4.6**). Threatened Species recorded within the Project Area are displayed in **Figure 4.6.**

There are also 18 threatened species considered to have the potential to occur within the project boundary. The remaining 25 threatened species are considered to be unlikely to occur within the project boundary. Threatened species that are known or considered likely to occur within the project boundary are detailed in **Table 4.6**.

Table 4.6 Threatened Species: Known or Likely to occur within the Project Boundary

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Habitat within Project Boundary	Vulnerability to impact
Petroica boodang	Scarlet Robin	V	-	Known[1]	Areas within the project boundary contain preferred habitat for the Scarlet Robin, which is characterised by the grassy *Eucalyptus* woodlands (minimal shrub cover). The ridges, hills and foothills provide breeding habitat for the Scarlet Robin. It is likely that the grazed grasslands with scattered paddock trees would be considered suitable habitat for this species.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	Known[1]	Areas within the project boundary contain suitable vegetation communities for this species to grow amongst (e.g. sclerophyll woodland or dry grassy woodland). The project boundary contains slopes and ridges and infertile soils, which is preferred by this species.	■ Loss of native vegetation ■ Edge effects
Dasyurus maculatus	Tiger Quoll	V	E	Known[1]	The Tiger Quoll utilises a variety of habitat types, several of which are present within the project boundary (e.g. open forest, woodland). Surveyed areas within the project boundary contained an abundance of fallen logs and many rocky outcrops, which could be used as denning habitat.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects
Thesium australe	Austral Toadflax	V	V	Known[2]	The Austral Toadflax has potential to utilise shrubland, grassland or woodland ecosystems, particularly damp areas. These ecosystems are dispersed throughout the majority of the project area.	■ Loss of native vegetation ■ Edge effects

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Habitat within Project Boundary	Vulnerability to impact
Phascolarctos cinereus	Koala	V	V	Known[2,3]	The *Eucalyptus* woodlands and forest within the project boundary are considered suitable habitat for the Koala. In addition, several trees abundant in the project boundary (e.g. Ribbon Gum, Blakely's Red Gum, Mountain White Gum, Yellow Box, Apple Box and New England Peppermint) are considered feed trees for Koalas.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects
Petauroides volans	Greater Glider	E	V	Likely[3]	The Greater Glider would be associated with the *Eucalyptus* forest communities within the project boundary. The forests in close proximity to Oxley Wild Rivers National Park would be important for this species.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Likely	This species is able to utilise existing dry *Eucalyptus* woodlands and farmland within the project boundary. Areas within the project boundary contain also provide artificial waterbodies and an abundance of prey (invertebrates).	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light (during construction) and vibration impacts ■ Edge effects
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Likely	The Glossy Black-cockatoo can utilise the *Eucalyptus* woodlands. Notably, areas within the project boundary contain *Casuarinas*, which is a critical food source for the species.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Habitat within Project Boundary	Vulnerability to impact
Chthonicola sagittata	Speckled Warbler	V	-	Likely	The Speckled Warbler would utilise the grassy *Eucalyptus* woodlands. The species is associated with rocky ridges and gullies, which are common within the project boundary. The species requires large areas of undisturbed remnant vegetation, which is present in the region (e.g. Oxley Wild Rivers National Park).	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Likely	This species is associated with Box-Gum Woodlands, which are present within the project boundary. It is also found within open forest communities along the inland slopes.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects
Daphoenositta chrysoptera	Varied Sittella	V	-	Likely	The Varied Sittella would utilise the remnant *Eucalyptus* woodlands and forest communities. It would likely be associated with the rough barked species like *Eucalyptus calignosa*.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Likely	The Eastern False Pipistrelle would likely be associated with *Eucalyptus* forest in close proximity to Oxley Wild Rivers National Park. It would roost in large hollow-bearing trees.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from turbine strikes ■ Mortality and injury from vehicle strikes and vegetation clearing

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Habitat within Project Boundary	Vulnerability to impact
Hieraaetus morphnoide	Little Eagle	V	-	Likely	The Little Eagle would utilise farmland, roadsides and *Eucalyptus* woodlands. Farmland and roadsides could provide carrion and *Eucalyptus* woodlands could provide hunting opportunities and nesting habitat.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from turbine strikes ■ Mortality and injury from vehicle strikes and vegetation clearing
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	Likely	This species would be restricted to open woodlands within the project boundary. The abundance of fallen timber would provide important refuge habitat.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effect
Ninox strenua	Powerful Owl	V	-	Likely	The Powerful Owl could utilise a range of *Eucalyptus* woodland and forest habitats within the project boundary. It may be associated with habitat in close proximity to the Oxley Wild Rivers National Park. The project boundary contains suitable prey (e.g. possums).	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects
Stagonopleura guttata	Diamond Firetail	V	-	Likely	The Diamond Firetail would be able to utilise most *Eucalyptus* woodlands, farmland and grasslands. Nesting habitat is restricted to dense areas, which are restricted to forest communities.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Noise, light and vibration impacts ■ Edge effects

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence	Habitat within Project Boundary	Vulnerability to impact
Bertya ingramii	Narrow-leaved Bertya	E	E	Likely	The Narrow-leaved Bertya individuals could propagate and establish along rocky ledges and crevices within gullies within the project boundary.	■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects
Grevillea beadleana	Beadle's Grevillea	E	E	Likely	The Beadle's Grevillea has been identified over 2000 times within the locality. It would establish within *Eucalyptus* woodland communities.	■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Likely	This species utilises forested areas for hunting, therefore, it is likely to inhabit areas in close proximity to Oxley Wild Rivers National Park. The rocky escarpments and ledges could provide roosting habitat for the species.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury turbine strikes ■ Mortality and injury from vehicle strikes and vegetation clearing
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	Likely	This species could use a variety of habitats within the project boundary. It would be closely associated with the rocky escarpments, outcrops and cliffs. It could occasionally use farmland and forest and woodland communities.	■ Loss of native vegetation ■ Increased habitat fragmentation ■ Mortality and injury from vehicle strikes and vegetation clearing ■ Edge effects

1 = Visual observation; 2 = BioNet Record; 3 = confirmed from scat analysis E = Endangered; V = Vulnerable

5. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

This chapter provides a summary of the assessment against the MNES relevant to the project. Based on the results of the desktop assessment and the field survey, a preliminary assessment of MNES within the project boundary has been provided in **Table 5.1**.

Table 5.1 MNES within the Project Boundary (Known and Likely)

MNES	Relevance to the Project
World heritage properties	Gondwana Rainforests of Australia located within 3.5 kilometres of the project boundary
National heritage properties	
Wetlands of international importance	Not identified within the project boundary or within 50-kilometre radius
Threatened species and ecological communities	**Known species include:** ■ Narrow-leaved Black Peppermint (*Eucalyptus nicholii*) ■ Tiger Quoll (*Dasyurus maculatus*) ■ Koala (*Phascolarctos cinereus*) ■ Austral Toadflax (*Thesium australe*) ■ Greater Glider (*Petauroides volans*) **Likely species include:** ■ Narrow-leaved Bertya (*Miniopterus orianae oceanensis*) ■ Beadle's Grevillea (*Grevillea beadlea*na) ■ Brush-tailed Rock-wallaby (*Petrogale penicillata*)
Migratory species	Migratory species are likely to occur within the project boundary
Commonwealth marine area	Not identified within the project boundary or within 50-kilometre radius
The Great Barrier Reef Marine Park	Not identified within the project boundary or within 50-kilometre radius
Nuclear actions	Not applicable
Water resources	Not applicable

5.1 Outcomes

Under the EPBC Act a referral is required to the Australian Government DoEE for projects, or 'actions', that are likely to have a significant impact on a MNES or the environment on Commonwealth land. The Australian Government Minister for the Environment and Energy determines whether the approval of the Minister would be required for a referred project. If so, that project is a controlled action under the EPBC Act.

The findings of preliminary environmental investigations carried out to date have confirmed the presence of threatened species listed under the EPBC Act in the project boundary. Therefore, the project should be referred to the Australian Government Minister for the Environment and Energy through the preparation of a separate referral.

6. PRELIMINARY IMPACT ASSESSMENT

This chapter provides an overview of the potential preliminary impacts to areas of known ecological significance within the project boundary.

This project has the potential to cause impacts to threatened species and communities listed under the BC Act and the EPBC Act. Therefore, they will need to be considered as part of the EIS to be prepared under Part 5 of the NSW EP&A Act.

As the Biodiversity Offsets Scheme applies to Part 5 projects and based on the confirmed presence of biodiversity values within the project boundary, application of the BAM and the preparation of a BDAR would be required.

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

- Clearing of the following TECs:
  - EPBC Act TECs:
    - New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands;
    - Box – Gum Grassy Woodland and Derived Grassland communities in NSW;
  - BC Act TECs:
    - New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion; and
    - Box Gum Woodland in New England Tablelands.
- Loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local population of native species, particularly threatened and migratory species.
- Increased habitat fragmentation.
- Mortality and injury of avian and microchiropteran bat species from turbine strikes.
- Mortality and injury from vehicle strikes and vegetation clearing.

Potential indirect impacts to biodiversity that may result from the project include:

- Changes to hydrology through run off and sedimentation and erosion from construction works.
- Construction and operational noise, light and vibration impacts.
- Increased edge effects (specifically spread of weeds) and any inadvertent impacts on adjacent habitat or vegetation.

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

7. SUMMARY, RECOMMENDATIONS AND NEXT STEPS

This chapter provides a summary of the recommendations that are to be considered to reduce and manage impacts to areas of known ecological significance. The recommendations are established on the basis of the Spring Surveys (November 2019) and the Summer Surveys (February 2020). Summer Survey (February 2020) results are detailed **Appendix D** of this report. The key constraints identified within the project boundary from the Spring Surveys (November 2019) are listed below.

Three threatened species were recorded within the Project Boundary during the biodiversity surveys, which included:

- Scarlet Robin (*Petroica boodang*);
- Narrow-leaved Black Peppermint (*Eucalyptus nicholii*); and
- Tiger Quoll (*Dasyurus maculatus*).

In addition to these field records, BioNet records and scat analyses indicate that the following threatened species occur or have occurred within the project boundary:

- Koala (*Phascolarctos cinereus*);
- Greater Glider (*Petauroides volans*); and
- Austral Toadflax (*Thesium australe*).

All of the threatened species are listed under the BC Act, except for the Greater Glider. All of the threatened species except the Scarlet Robin are also listed under the EPBC Act. It is expected that an additional 14 threatened species are 'likely' to occur within the project boundary. All 14 likely threatened species are listed under the BC Act, while only five of them are listed under the EPBC Act.

Two TECs listed under the BC Act were recorded, which include:

- New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion.
- Box Gum Woodland in New England Tablelands.

Five bird of prey species were recorded and are considered vulnerable to turbine strikes. In addition to these five species, there are three bird of prey species considered likely to occur that are considered vulnerable to turbine strikes.

The species listed above would need to be addressed in detail within the EIS.

7.1 Recommendations

The desktop assessment and field surveys have highlighted a range of known and potential biodiversity constraints. To effectively avoid and minimise impacts to these constraints the following biodiversity management recommendations are suggested:

- Commit to a nil net loss of TECs within the project boundary.
- Minimise removal of existing native vegetation.
- Aim to minimise habitat loss for threatened and migratory species within the project boundary.

The authors of this report acknowledge that the project design and layout is only at a preliminary stage, but effort to avoid these constraints has already occurred and will continue to occur as part of future design revisions.

7.2 Next Steps

The following steps are considered essential to ensure an adequate assessment of ecological features is continued throughout future stages of the project:

- Conduct a detailed assessment of potential Koala habitat in accordance within the requirements of the Koala Habitat Protection SEPP.
- Prepare and submit an EPBC referral to address MNES.
- Prepare and submit a BDAR in accordance with the Biodiversity Assessment Methodology to address Matters of State Environmental Significance.
- Conduct detailed habitat mapping and native vegetation community mapping for all direct impact areas.
- Conduct further targeted fauna and flora surveys for species considered likely or potentially occurring within the project boundary in accordance with relevant Federal or State survey guidelines.

8. REFERENCES

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Appendix A FAUNA SPECIES OBSERVED DURING FIELD SURVEYS

Type	Scientific name	Common name	EPBC Act	BC Act
Birds	*Acanthiza nana*	Yellow Thornbill	-	-
	Alisterus scapularis	King Parrot	-	-
	Anas superciliosa	Pacific Black Duck	-	-
	Anthus novaeseelandiae	Australasian Pipit	-	-
	Aquila audax	Wedgetail Eagle	-	-
	Artamus personatus	Masked Woodswallow	-	-
	Artamus superciliosus	White-browed Woodswallow	-	-
	Aythya australis	Hard Head Duck	-	-
	Cacatua sanguinea	Little Corella	-	-
	Calyptorhynchus funereus	Yellow-tailed Black Cockatoo	-	-
	Cacatua galerita	Sulphur-crested cockatoo	-	-
	Chenonetta jubata	Australian Wood Duck	-	-
	Colluricincla harmonica	Grey Shrike Thrush	-	-
	Corcorax melanorhamphos	White winged choughs	-	-
	Cormobates leucophaea	White-throated Treecreeper	-	-
	Corvus orru	Toresian Crow	-	-
	Cracticus tibicen	Australian Magpie	-	-
	Cracticus torquatus	Grey Butcherbird	-	-
	Dacelo novaeguineae	Laughing Kookaburra	-	-
	Egretta novaehollandiae	White-faced Heron	-	-
	Eolophus roseicapilla	Galah	-	-
	Eopsaltria griseogularis	Yellow Breasted Robin	-	-
	Eurystomus orientalis	Dollar Bird	-	-
	Falco berigora	Brown Falcon	-	-
	Falco cenchroides	Nankeen Kestrel	-	-
	Falco longipennis	Australian Hobby	-	-
	Gerygone olivacea	White-throated Greygone	-	-
	Glossopsitta concinna	Musk Lorikeet	-	-
	Grallina cyanoleuca	Magpie Lark	-	-
	Hirundo neoxena	Welcome Swallow	-	-
	Lalage tricolor	White-winged Triller	-	-
	Manorina melanocephala	Noisy Miner	-	-
	Melithreptus lunatus	White naped honeyeater	-	-

Type	Scientific name	Common name	EPBC Act	BC Act
Birds	*Milvus migrans*	Black Kite	-	-
	Myzomela sanguinolenta	Scarlet Honeyeater	-	-
	Ocyphaps lophotes	Crested Pigeon	-	-
	Pardalotus striatus	Striated Pardalote	-	-
	Petroica boodang	Scarlet Robin	-	V
	Platycercus elegans	Crimson Rosella	-	-
	Platycercus eximius	Eastern Rosella	-	-
	Porphyrio porphyrio	Purple Swamphen	-	-
	Psephotus haematonotus	Red-rumped Parrot	-	-
	Rhipidura leucophrys	Willie Wagtail	-	-
	Strepera	Currawong	-	-
	Sturnus vulgaris	Common Starling	*	-
	Tachybaptus novaehollandiae	Australasian Grebe	-	-
	Threskiornis spinicollis	Straw-necked Ibis	-	-
	Todiramphus macleayii	Forest Kingfisher	-	-
	Todiramphus sanctus	Sacred Kingfisher	-	-
	Vanellus miles	Masked Lapwing	-	-
Mammals	*Dasyurus maculatus*	Tiger Quoll	E	V
	Macropus giganteus	Eastern Grey Kangaroo	-	-
	Macropus robustus	Wallaroo	-	-
	Macropus rufogriseus	Red-necked Wallaby	-	-
	Trichosurus vulpecula	Brushtail Possum	-	-
	*Vulpes vulpes**	Red Fox*	-	-
	*Lepus europaeus**	European Hare*	-	-
	*Oryctolagus cuniculus**	European Rabbit*	-	-

*CE = Critically Endangered; E = Endangered; V = Vulnerable; - = not listed, * = introduced species.*

Appendix B FLORA SPECIES OBSERVED DURING FIELD SURVEYS

Scientific name	Common name	EPBC Act	BC Act
Acacia implexa	Hickory Wattle	-	-
Acaena ovina	Sheep's Burr	-	-
Allocausurina littoralis	Black She-oak	-	-
Bursaria spinosa	Blackthorn	-	-
Cheilanthes sp.	Fern	-	-
Dichondra Inglewood or repens	n/a	-	-
Eucalyptus andrewsii	New England Blackbutt	-	-
Eucalyptus blakelyi	Blakely's Red Gum	-	-
Eucalyptus bridgesiana	Apple Box	-	-
Eucalyptus calignosa	Broad-leaved Stringybark	-	-
Eucalyptus cameronii	Diehard Stingybark	-	-
Eucalyptus dalrympleana	Mountain Gum	-	-
Eucalyptus malacoxylon	Apple Box	-	-
Eucalyptus mellidora	Yellow Box	-	-
Eucalyptus nicholii	Narrow-leaved Peppermint	V	V
Eucalyptus nortonii	Bundy	-	-
Eucalyptus nova-angelica	New England Peppermint	-	-
Eucalyptus obliqua	Messmate	-	-
Hypochaeris radicata	Flatweed	-	-
Juncus filicaulis	Thread Rush	-	-
Lissanthe strigose	Peach Heath	-	-
Lomandra filiformis	Wattle Mat-rush	-	-
Lomandra multiflora	Many-flowered Mat-rush	-	-
Melichrus urceolatus	Urn-heath	-	-
Mistletoe sp.	n/a	-	-
Olearia viscidula	Wallaby Weed	-	-
Pimelea neo-angelica	Poison Pimelea	-	-
Poa sieberiana	Grey Tussock Grass	-	-
Pteridium esculentum	Bracken Fern	-	-
Solancea sp.	n/a	-	-
*Cirsum virgue**	Creeping Thistle*	-	-
*Hyacinthoides non-scripta**	Blue Bell*	-	-
*Hypochaeris radicata**	Flatweed*	-	-
*Onopordum sp.**	Thistle*	-	-
*Rosa rubiginosa**	Sweet Briar*	-	-

*V = Vulnerable; - = not listed, * = introduced species.*

Appendix C LIKELIHOOD OF OCCURRENCE

Type	Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act)	BioNet Records with 10 km	Habitat Summary	Likelihood of Occurrence	Recorded during field surveys
Amphibians	*Litoria piperata*	Peppered Tree Frog	CE	V	0	The Peppered Tree Frog occupies rocky streams in open forest and wet sclerophyll forest at altitudes of 800 to 1120m. The general area in which this species has been recorded has been referred to as the 'dry eastern escarpment'. Common streamside vegetation at sites where records of this species were made includes *Lomandra, Leptospermum* and *Casuarina.*	Considering the lack of records within the locality yet the presence of preferred habitat, the species has the **potential** to occur in the project boundary.	No
	Mixophyes balbus	Stuttering Frog	E	V	0	The Stuttering Frog is typically found on the eastern side of the Great Dividing Range often in association with permanent streams throughout temperate and sub-tropical rainforest and wet sclerophyll forest. The species is rarely found in dry open tableland riparian vegetation or in moist gullies in dry forest. The species shows a preference for the interiors of large forest tracts in areas with relatively cool mean annual temperatures, sites typically free from any disturbance with a thick canopy and relatively simple understorey. The species occurs along first order streams and is occasionally associated with springs. The species is not associated with ponds or ephemeral pools. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	Considering the lack of records within the locality and lack of preferred habitat, the species is **unlikely** to occur in the project boundary.	No

Birds	*Actis hypoleucos*	Common Sandpiper	-	Mi	0	The Common Sandpiper is a migratory bird inhabiting coastal habitats and sometimes freshwater wetlands. It also occurs in non-tidal swamps, streams, lakes and lagoons on the coast and sometimes inland. In Australia, the Common Sandpiper is a non-breeding visitor. It is found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No
rds	*Anthochaera phrygia*	Regent Honeyeater	CE	CE	0	The Regent Honeyeater mainly inhabits temperate woodlands and open forests, particularly Box – Ironbark woodland and riparian forests of River She-oak. The species inhabits woodlands that support a significantly high abundance and species richness of birds. These types of woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. The species can also be found in drier coastal woodlands and forests in some years. Non-breeding flocks of the species can be seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests. Although the species is a generalist forager, it feeds mainly on the nectar from a small number of eucalypts that produce high volumes of nectar (e.g. Mugga Ironbark, Yellow Box, White Box and Swamp Mahogahy).	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Birds	*Apus pacificus*	Fork-tailed Swift	-	Mi	0	The Fork-tailed Swift is a migratory bird that visits Australia during its non-breeding season. The species is almost exclusively aerial, flying up to hundreds of metres above ground, but also less than 1 m above open areas or over water. It is an aerial eater believed to forage on insects. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur in areas of updraughts around cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Birds	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V	-	9	The Dusky Woodswallow primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. The species forages on invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. It builds an open, cup-shape nest made of twigs, grass, fibrous rootlets and occasionally casuarina needles. Generally, nests are located on shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Calidris acuminata*	Sharp-tailed Sandpiper	-	Mi	0	The Sharp-tailed Sandpiper is a migratory wader bird that occurs across Australia, including inland and coastal areas during its non-breeding season. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Calidris ferrunginea*	Curlew Sandpiper	E	CE, Mi	0	The Curlew Sandpiper is a small migratory shorebird that visits Australia during its non-breeding season. The species is present in Australia between August and November. The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Calidris melanotos*	Pectoral Sandpiper	-	Mi, Ma	0	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No
Birds	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	-	2	The glossy black-cockatoo lives in coastal woodlands and drier forest areas, open inland woodlands, or timbered watercourses where its main food source, the casuarina (she-oak) is common. The glossy black-cockatoo generally prefers to feed from the seeds of mature casuarina trees. The bird's presence is often indicated by a layer of cracked cones and fragments that have accumulated under favoured casuarina trees. The glossy black-cockatoo prefers to nest in the hollows of large, old eucalypt trees, alive or dead. The typical nest site will be around 3 to 30 metres above the ground, and the nest hollow is generally lined with decayed debris.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Chthonicola sagittata*	Speckled Warbler	V	-	5	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is typically located in a slight hollow in the ground or at the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed often the nestlings. Speckled Warblers join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V	-	1	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Cuculus optatus*	Oriental Cuckoo	-	Mi	0	The Oriental Cuckoo is a full migrant found in northern America, eastern Asia and Australasia. The species inhabits hill country within forest canopy, open wooded areas and orchards. It also utilises forest edges, riversides, ravines, wetland fringes and slopes of wooded hills and mountains.	Considering the lack of records within the locality and the lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No
Birds	*Daphoenositta chrysoptera*	Varied Sittella	V	-	14	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Varied Sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. It feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.The time between two consecutive generations in Varied Sittelas' is estimated to be 5 years.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Erythrotriorchis radiates*	Red Goshawk	CE	V	0	The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. The Red Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. Breeding is likely to be in spring and summer in southern Queensland and NSW. In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. Forests of intermediate density are favoured, or ecotones between habitats of differing densities. Immature birds have been reported from mangroves, open river floodplains, low open woodland, agricultural land and pasture, but such habitats are not used regularly.	Considering the lack of records within the locality and the project boundary is outside its known distribution the species is **unlikely** to occur within the project boundary.	No
Birds	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V	-	1	The Eastern False Pipistrelle prefers moist habitats, with trees taller than 20m. Generally roosts in Eucalypt hollows and under loose bark on trees or buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.	Considering the record within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Gallinago hardwickii*	Latham's Snipe	V	-	0	Latham's Snipe is a wader and the largest snipe in Australia. It is a non-breeding visitor to south-eastern Australia and an occasional visitor to Norfolk Island, Lord Howe Island and possibly to Macquarie Island. It usually occurs singly or in small, loose groups of less than a dozen birds. Migrating flocks may contain up to 200 birds when they arrive in Australia. In Australia, Latham's Snipe occurs in temperate and tropical regions. It inhabits permanent and ephemeral wetlands from sea level up to 2000 m above sea-level. They usually occupy open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Other freshwater habitats that can be used by the species include bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Glossopsitta pusilla*	Little Lorikeet	V	-	0	Little Lorikeets forage primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards They roost in treetops, often distant from feeding areas however nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Nest entrances are small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees are often chosen, including species like Allocasuarina.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the **potential** to occur within the project boundary.	No
Birds	*Grantiella picta*	Painted Honeyeater	V	V	0	The Painted Honeyeater inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nests hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Birds	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V	Ma	1	The White-bellied Sea-eagle is a large eagle that occurs around the Australian coast, including most of NSW and its oceanic waters. The species may be solitary or live in pairs or small family groups consisting of a pair of adults and dependent young. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.	Considering the record within the locality and the presence of suitable habitat, this species has the **potential** to occur within the project boundary.	No

Birds	*Hieraaetus morphnoide*	Little Eagle	V	-	2	The Little Eagle is found throughout the Australian mainland except in the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. She-oak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. It nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Females lay two or three eggs during spring, and young fledge in early summer. The species preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Considering the records within the locality and the presence of preferred habitat, this species has the **likely** to occur within the project boundary.	No
Birds	*Hirundapus caudacutus*	White-throated Needletail	-	V, Mi	11	The White-throated Needletail is a large swift species widespread in eastern and south-eastern Australia during its non-breeding season. The species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. They almost always forage aerially, above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats.	Considering the records within the locality and the presence of suitable habitat, this species is **potential** to occur within the project boundary	No

Birds	*Lathamus discolor*	Swift Parrot	E	CE	0	The Swift Parrot breeds in Tasmania and migrates to south-east Australia during its non-breeding stage (March to October). In the mainland, the species occurs in areas where eucalypts are flowering profusely or where there are abundant lerp infestations. Favoured feed trees include Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*) and White Box (*E. albens*).	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No
Birds	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V	-	2	The Hooded Robin (south-eastern form) prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. This species requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. Small nests are built in tree forks less than 1m to 5m above ground.	Considering the records within the locality and the presence of preferred habitat, this species has the **likely** to occur within the project boundary.	No

Birds	*Monarcha melanopsis*	Black-faced Monarch	-	Mi	0	The Black-faced Monarch is an insectivorous bird widespread in eastern Australia. In New South Wales and the Australian Capital Territory, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. It is rarely recorded farther inland. The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. The species also occurs in selectively logged and 20—30 years old regrowth rainforest. It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. The species especially occurs in 'marginal' habitats during winter or during passage (migration).	Considering the lack of records within the locality and presence of suitable habitat, this species has the **unlikely** to occur within the project boundary.	No

Birds	*Motacila flava*	Yellow Wagtail	-	Mi	0	The Yellow Wagtail is a non-breeding bird in Australia. It is insectivorous and inhabits open country near water. This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range it is also found in large forest clearings. It breeds from April to August, although this varies with latitude. The nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape. Normally it lays four to six eggs. It feeds on a wide variety of terrestrial and aquatic invertebrates as well as some plant material, particularly seeds.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Ninox strenua*	Powerful Owl	V	-	2	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 also occur in fragmented landscapes. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart *(Exocarpus cupressiformis*) and a number of eucalypt species. Most prey species, gliders and possums, require hollows and a shrub layer, therefore making these 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 him.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Birds	*Numenius madagascariensis*	Far Eastern Curlew	-	CE	0	The Eastern Curlew is a wader bird with primarily coastal distribution in Australia. In NSW the species occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures. The Eastern Curlew is carnivorous, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs, as well as some insects.	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No
	Pandion cristatus	Eastern Osprey	V	Mi,Ma	0	The Eastern Osprey favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. The species breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Petroica boodang*	Scarlet Robin	V	-	0	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Its habitat usually contains abundant logs and fallen timber. It breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. It breeds between July and January. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. It builds nests in the fork of branches, usually more than 2 metres above the ground.	This species was recorded during the Spring Surveys (November 2019). Known	Yes

Birds	*Petroica phoenicea*	Flame Robin	V	-	0	The Flame Robin is a small insectivorous robin endemic to south eastern Australia. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas. Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Birds	*Rhipidura rufifrons*	Rufous Fantail	-	Mi	0	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. *Rhipidura rufifrons* has breeding populations occurring from about the South Australia-Victoria border, through south and central Victoria, on and east of the Great Divide in New South Wales (NSW), and north to about the NSW-Queensland border. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (*Eucalyptus microcorys*), Mountain Grey Gum (*E. cypellocarpa*), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (*E. delegatensis*), Blackbutt (*E. pilularis*) or Red Mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (*Acmena smithi*) rainforest, with Grey Myrtle (*Backhousia myrtifolia*), Sassafras (*Doryphora sassafras*) and Sweet Pittosporum (*Pittosporum undulatum*) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (*Eucalyptus maculata*), Yellow Box (*E. melliodora*), Ironbarks or Stringybarks, often with a shrubby or heath understorey.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Birds	*Rostratula australis*	Australian Painted-snipe	E	E	0	The Australian Painted Snipe is small freshwater wader. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No
Birds	*Stagonopleura guttata*	Diamond Firetail	V	-	5	Diamond Firetails are found in open grassy woodland, heath and farmland or grassland with scattered trees. They generally eat ripe or partially ripe seeds and can be seen hopping around on the ground to forage. They occasionally eat insects and their larvae. The Diamond Firetail builds a nest with green grass blades and stems and lines it with fine grasses and feathers. The nest can be found in trees and shrubs with dense foliage and has sometimes been known to build in the base of a hawk's nest.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No
Birds	*Symposiachrus trivirgatus*	Spectacled Monarch	-	Mi,Ma	0	This species is a full migrant and distributed throughout southern Indonesia and Papua New Guinea and eastern Australia. The species utilises subtropical and tropical lowland forest and montane forest.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Tringa nebularia*	Common Greenshank	-	Mi,Ma	0	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. During breeding seasons the species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh. It will occasionally feed on exposed seagrass beds.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Birds	*Turnix melanogaster*	Black-breasted Button-quail	CE	V	0	The Black-breasted Button-quail is restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes. Deep leaf litter layers are fundamental to the foraging requirements of the species. Many reports are from dry forest described as Bottletree Scrub, comprising Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*) and Bottletree (*Brachychiton rupestris*), with or without emergent Hoop Pine (*Araucaria cunninghamii*), with a shrub understorey and thick litter layer. In littoral areas, the species associates with vegetation behind dunes, namely vine scrubs and thickets, acacia thickets and areas densely covered in shrubs, particularly Midgen Berry *Austromyrtus dulcis* and Lantana. In the Great Sandy region of southeast Queensland, Black-breasted button-quail occur in Brush Box (*Tristania conferta*), Pink Bloodwood (*Eucalyptus intermedia*) and Forest Red Gum (*E. tereticornis*) forest, with an understorey of Black She-oak (*Allocasuarina littoralis*), acacias, lantana and berry-bearing shrubs. The species has also been recorded from vine forest remnants between Hoop Pine plantations and agricultural land	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No

						and occasionally in areas of pasture grass adjacent to habitat areas.		
Flora	*Bertya ingramii*	Narrow-leaved Bertya	E	E	90	*Bertya ingramii* grows on rocky ledges and in crevices in gorge country on the edge of the east coast escarpment in an area with an average annual rainfall of 730mm. Grows among rocks or in thin soils close to cliff-edges in dry woodland with she-oaks, wattles and tea-trees. It occurs on shallow loamy soils (in dense heathland, shrubland or low forest. Male and female flowers occur on the same plant. Female flowers have about 8 weeks of intermittent synchrony with male flowers. Flowers from August to November. Capable of self-pollination, although fruit set is higher when outcrossed pollination occurs. Seed viability is high but seedling establishment is low. Individuals can live in excess of 20 years. Native ants move close to 100% of seeds to their nests	Considering the records within the locality and presence of suitable habitat, this species is **likely** to occur within the project boundary.	No
Flora	*Callistemon pungens*	-	-	V	0	Habitats range from riparian areas dominated by Casuarina cunninghamiana subsp. cunninghamiana to woodland and rocky shrubland. Often in rocky watercourses, usually with sandy granite (occasionally basalt) creek beds. Flowers over spring and summer, mostly in November.	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No
Flora	*Chiloglottis platyptera*	Barrington Tops Ant Orchid	V	-	0	Grows in moist areas in tall open eucalypt forest with a grassy understorey, and also around rainforest edges. It generally occurs in rich brown loam soils.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Flora	*Cynanchum elegans*	White-flowered Wax Plant	V	-	0	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree Leptospermum laevigatum – Coastal Banksia Banksia integrifolia subsp. integrifolia coastal scrub; Forest Red Gum (*Eucalyptus tereticornis*) aligned open forest and woodland; Spotted Gum (*Corymbia maculate*) aligned open forest and woodland; and Bracelet Honeymyrtle (*Melaleuca armillaris*) scrub to open scrub. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific. The fruit can take up to six months to mature. Seed production is variable and unreliable. Seeds are wind dispersed. It is considered to be unlikely that a soil seed bank for this species exists.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Flora	*Dichanthium setosum*	Bluegrass	V	V	0	*Dichanthium setosum* is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. It is often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched. The species may tolerate or benefit from disturbance, otherwise, disturbance is indicative of threatening processes in its habitat. *Dichanthium setosum* is associated with heavy basaltic black soils and red-brown loams with clay subsoil. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea species*	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

	Diuris eborensis	-	E	E	0	*Diuris eborensis* is found mainly in damp grassland and woodland habitat or in areas of sedge and swamps of the tablelands. Main locations are higher altitude sites in the eastern New England Plateau, with known locations in the Ebor, Yarrowitch and Backwater areas. Typically in brown clay loam soil over an igneous substrate (basalt most commonly in the sites visited, but not always), but the soil may have large amounts of organic matter.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No
Flora	*Eucalyptus magnificata*	Northern Blue Box	E	-	0	Usually found in grassy open forest or woodland on shallow, sandy or loamy soils. Occurs on moderately hilly sites and at the edge of gorges, usually at altitudes from 900 - 1050 m. Known populations are small, numbering 5-400 plants per location.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No
Flora	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	0	Typically grows in sclerophyll woodland or dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. Tends to grow on lower slopes in the landscape. Often found in association with other eucalypts that grow in the region, including New England Blackbutt (*E. andrewsii*) and many of the stringybarks, such as Broad-leaved Stringybark (*E. caliginosa*)	This species was recorded during the Spring Surveys (November 2019). **Known**	Yes

Flora	*Euphrasia arguta*	-	*CE*	*CE*	*0*	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once. Euphrasia arguta has an annual habit and has been observed to die off over the winter months, with active growth and flowering occurring between January and April. As with other species of Euphrasia, this species is semi-parasitic and attaches to the roots of other associated plants	Considering the lack of records within the locality and presence of suitable habitat, this species is **unlikely** to occur within the project boundary.	No
Flora	*Grevillea beadleana*	Beadle's Grevillea	E	E	2300	Often found in open eucalypt forest with a shrubby understorey. It is usually found on steep granite slopes at high altitudes, although the population at Shannon Creek is at a lower elevation on sandstone.	Considering the extensive records within the locality and presence of preferred habitat, this species is **likely** to occur within the project boundary.	No

Flora	*Hakea fraseri*	Gorge Hakea	V	V	0	Mainly occurs in woodlands and on the dry and steep rocky slopes of river gorges. Sometimes grows in open woodland on gorge rims.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No
Flora	*Haloragis exalata subsp. velutina*	Tall Velvet Sea-berry	V	V	0	Grows in damp places near watercourses. This subspecies also occurs in woodland on the steep rocky slopes of gorges.	Considering the lack of records within the locality and presence of suitable habitat, this species is **unlikely** to occur within the project boundary.	No
Flora	*Picris evae*	Hawkweed	V	V	0	Where collected, the species abundance has been rare, locally occasional and locally frequent. All recent collections appear to come from modified habitats such as weedy roadside vegetation and paddocks. Its main habitat is open Eucalypt forest including a canopy of *Eucalyptus melliodora, E. crebra, E. populnea, E. albens, Angophora subvelutina, Allocasuarina torulosa* , and/or *Casuarina cunninghamiana* with a Dichanthium grassy understory. Soils are black, dark grey or red-brown (specified as shallow, stony soil over basalt for one collection) and reddish clay-loam or medium clay soils. The flowering and fruiting period is mainly October to January, with a few plants collected in flower or fruit until May.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No

Flora	*Pimelea cremnophila*	-	CE	-	0	Occurs in open forest along the rim of the Macleay River gorge at approximately 1,000 m altitude. Grows on exposed cliff tops or more sheltered cliff-side sites with south-westerly to south-easterly aspects in shallow skeletal loam soils over metasediments. Known to flower in October. Likely to flower throughout spring.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No
Flora	*Prostanthera cineolifera*	Singleton Mint Bush	V	V	0	Grows in open woodlands on exposed sandstone ridges. Usually found in association with shallow or skeletal sands. Fire response is unknown, but other Prostanthera species are fire sensitive, with recruitment occurring from the soil seed bank following a fire. Life span is unknown but is expected to be in the vicinity of 10-20 years while the estimated minimum time to produce seed is approximately 3-4 years.	Considering the lack of records within the locality and lack of preferred habitat, this species is **unlikely** to occur within the project boundary.	No

Flora	*Thesium australe*	Austral Toadflax	V	V	0	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass (*Themeda triandra*). It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams. It occurs in shrubland, grassland or woodland, often on damp sites. Vegetation types include open grassy heath dominated by Swamp Myrtle (*Leptospermum myrtifolium*), Small-fruit Hakea (*Hakea microcarpa*), Alpine Bottlebrush (*Callistemon sieberi*), Woolly Grevillea (*Grevillea lanigera*), Coral Heath *(Epacris microphylla*) and Poa spp.; Kangaroo Grass grassland surrounded by Eucalyptus woodland; and grassland dominated by Barbed-wire Grass (*Cymbopogon refractus*).	According to BioNet, Austral Toadflax has been within the project boundary on two occasions. Records are in the southern portion of the Project Area. This species is **known**.	No

Mammals	*Chalinolobus dwyeri*	Large-eared Pied Bat	V	V	0	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	Considering the lack of records within the locality but the presence of preferred habitat, this species has the potential to occur within the project boundary.	No
Mammals	*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	192	The Tiger Quollis recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	This species was recorded during the Spring Surveys (November 2019). **Known**	Yes

Mammals	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V	-	1	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No
Mammals	*Petauroides volans*	Greater Glider	E	V	1	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevation range from sea level to 1200 m above sea level. The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. During the day it shelters in tree hollows, with a particular selection for large hollows in large, old trees. The greater glider is considered to be particularly sensitive to forest clearance.	Considering the records within the locality and the presence of preferred habitat, this species has the **likely** to occur within the project boundary.	No

Mammals	*Petrogale penicillata*	Brush-tailed rock-wallaby	E	V	70	In NSW the Brush-tailed rock-wallaby occurs from the Queensland border in the north to Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Considering the records within the locality and the presence of preferred habitat, this species is **likely** to occur within the project boundary.	No
Mammals	*Phascolarctos cinereus*	Koala	V	V	0	The Koala is an arboreal marsupial that inhabits eucalypt woodlands and forests. The species feed on the foliage of more than 70 species of eucalypt and 30 non-eucalypt species.	According to BioNet Records and scat analysis, this species has been recorded within the project area. This species is therefore considered **known**.	No

Mammals	*Potorous tridactylus*	Long-nosed Potoroo	V	V	0	The Long-nosed Potoroo (SE Mainland) is sparsely distributed along the coast and Great Dividing Range of south-east Queensland through NSW. The species inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours.	Considering the lack of records within the locality and lack of suitable habitat, this species is **unlikely** to occur within the project boundary.	No

Mammals	*Pseudomys novaehollandiae*	New Holland Mouse	-	V	0	The New Holland Mouse has been found from coastal areas and up to 100 km inland on sandstone country. The species has been recorded from sea level up to around 900 m above sea level. Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows. In Victoria, the species has been recorded on deep siliceous podsols, sandy clay, loamy sands, sand dunes and coastal dunes. Other factors such as slope, geology and the amount of sun received in an area may also influence site selection. Across the species' range, the New Holland Mouse is known to inhabit open heathland, open woodland with a heathland understorey and vegetated sand dunes. Due to the largely granivorous diet of the species, sites where the New Holland Mouse is found are often high in floristic diversity, especially leguminous perennials.	Considering the lack of records within the locality, and despite the presence of suitable habitat, this species is **unlikely** to occur within the project boundary.	No

Mammals	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	0	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.	Considering the lack of records within the locality and the presence of preferred habitat, this species has **potential** to occur within the project boundary.	No

Reptiles	*Wollumbinia belli*	Bell's Turtle	E	V	0	The Bell’s Turtle is restricted to upland streams (between 600 and 1100 m altitude) that contain permanent pools deeper than about 2 m, granite boulders and bedrock. Its habitat is often complex, with underwater caverns formed by boulders, logs and overhanging banks. In areas of lower velocity, the typical substratum is coarse granitic sand overlain by fine silt, algal growth, and dense beds of macrophytes. It is absent from areas away from flowing streams, such as farm ponds and natural wetlands. Bell’s Turtles prefer narrow stretches of river, 30 to 40 m wide, with shallow to deep pools. Pools most commonly occupied by Bell's Turtle are less than 3 m deep with rock or sandy riverbed bottoms and small patches of weed. Nests are dug out in riverbanks of sand or loam.	Considering the lack of records within the locality and the presence of suitable habitat, this species is **unlikely** to occur within the project boundary.	No

CE = Critically Endangered; E = Endangered; V = Vulnerable; Mi = Migratory

Appendix D SUMMER SURVEY (INTERIM) SUMMARY

Type	EPBC Listed Species	BC Listed Species	Native Species	Introduced Species
Birds	2	8	104	2
Mammals	2	1	11	5
Reptiles	0	0	3	0
Amphibians	0	0	10	0
Fish	0	0	0	0

Type	Scientific name	Common name	EPBC Act	BC Act
Birds	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	-	V
	Neophema pulchella	Turquoise Parrot	-	V
	Petroica boodang	Scarlet Robin	-	V
	Stagonopleura guttata	Diamond Firetail	-	V
	Apus pacificus	Fork-tailed Swift	Mi	-
	Calyptorhynchus lathami	Glossy Black Cockatoo	-	V
	Glossopsitta pusilla	Little Lorikeet	-	V
	Chthonicola sagittata	Speckled Warbler	-	V
	Hieraaetus morphnoides	Little Eagle	-	V
	Hirundapus caudacutus	White-throated Needletail	Mi	V
Mammals	*Dasyurus maculatus*	Tiger Quoll	E	V
	Petauroides volans	Greater Glider	V	-

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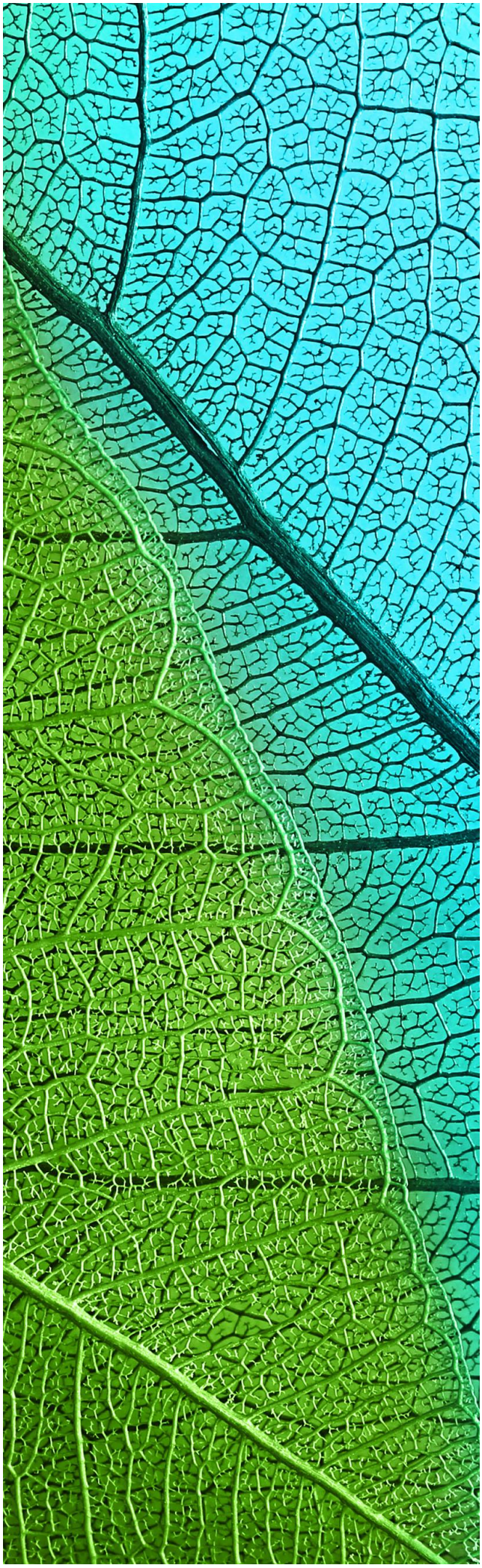
Appendix Q White Throated Needletail survey report



Winterbourne Wind Farm

Targeted White-throated Needletail Survey

Prepared for NGH consulting

January 2022
Report No 19180.5 (1.0)

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1. Introduction

NGH Consulting engaged Nature Advisory Pty Ltd to undertake targeted surveys for threatened White-throated Needletail *Hirundapus caudacutus* at Winterbourne Wind Farm.

This investigation was commissioned to provide information on the presence or otherwise of threatened White-throated Needletail in the study area and outline any implications under the national *Environmental Protection and Biodiversity Conservation Act 1999*.

Specifically, the scope of the investigation included:

- Detect the seasonality use of White-throated Needletail (WTNT) at the site from late spring to early autumn
- Determine any flight movement patterns and flight heights across the proposed wind farm site
- Determine if there are any roosts at the proposed wind farm site or surrounding forested area.

This report presents the findings of the first targeted survey of needletails, provide preliminary advice and recommendations in relation to the findings.. It is divided into the sections described below:

Section 2 presents the sources of information and biology of White-throated Needletail.

Section 3 presents the methods of the surveys.

Section 4 presents the results of the assessments.

Section 5 presents the regulatory implications.

Section 6 presents the conclusions and recommendations.

This investigation was undertaken by a team from Nature Advisory, comprising Peter Lansley (senior Zoologist), Ahmad Barati (Zoologist and Khalid Al-Dabbagh (Senior Zoologist), Bernard O'Callaghan (Director) and Brett Lane (Principal Consultant).

2. White-throated Needletail

2.1. Existing reporting and documentation

The following information was used to inform this initial survey:

- Conservation Advice *Hirundapus caudacutus* White-throated Needletail (Threatened Species Scientific Committee 2019).
- Nature Advisory 2022, Winterbourne Wind farm: Bird Utilisation Surveys - Baseline data 2020/21, Report No. 19180.02 (1.0).
- Tarburton M.K. 2014, Status of the White-throated Needletail *Hirundapus caudacutus* in Australia, Evidence of marked Decline, *Australian Field Ornithology*, 31, 122-140.
- Tarburton M.K. 2021, Recent increase in knowledge about numbers and flight behaviour in the White-throated Needletail *Hirundapus caudacutus*, *Australian Field ornithology*, 38, 124-130.
- NSW Bionet Atlas. Viewed January 2022.

2.2. Species Desciption

The White-throated Needletail is a large swift with long-pointed wings (20 cm in length), weighing approximately 115–120 grams. The sexes are alike, with no seasonal variation in plumage. Juveniles have a similar appearance to the adults, but can be separated by duller plumage, with little gloss.

The White-throated Needletail is generally gregarious when in Australia, sometimes occurring in large flocks, though they are occasionally seen singly. Occasionally the species occurs in mixed flocks with other aerial insectivores, including Fork-tailed Swifts (Higgins 1999).

2.2.1. Distribution

This species is widespread in eastern and south-eastern Australia and is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. The species is also widespread in Victoria and Tasmania and occurs in south-eastern South Australia (Threatened Species Scientific Committee 2019).

The White-throated Needletail subspecies that occurs in Australia is *Hirundapus caudacutus caudacutus*. This subspecies is a trans-equatorial migrant that breeds in the Northern Hemisphere summer and migrates south for the Southern Hemisphere summer. The White-throated Needletail is mostly aerial in Australia, flying at heights of less than one metre up to more than 1000 metres above the ground. It has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (Threatened Species Scientific Committee 2019). It is often observed flying in flocks ahead of weather fronts.

The White-throated Needletail enters Australia mainly via the Torres Strait, usually during September and October, and sometimes in early November. After reaching Australia, it moves south along both sides of the Great Dividing Range in Queensland and NSW in October and November, arriving in Victoria and Tasmania in November with numbers there increasing in December. On their return journey to their breeding grounds, the majority pass through New Guinea in March and April (Higgins 1999).

The presence and abundance of the White-throated Needletails in certain locations of Australia are not consistent and there are spells of several years in which these birds were not seen or have been in continuous decline, particularly in south-eastern Australia. Elsewhere, for example, north-eastern NSW, numbers of needletails were reported to be reasonably consistent (Tarburton 2014).

The species' total population is unknown. It is described as 'abundant' in some regions of Australia during the non-breeding season. There is little data to indicate a population trend in the species except a

comparison between reporting rates and distribution in Australia between 1977–81 and 1998–2002; this comparison indicates that the species has undergone a decline in the extent of occurrence in Australia (Barrett *et al*. 2003; Blakers *et al*. 1984; Tarburton 2014). The number of Needletails recorded in eastern and south-eastern Australia may vary between years, but it is unclear whether this reflects fluctuations in the actual overall population numbers.

2.2.2. Habitat

The White-throated Needletail is widespread in eastern and south-eastern Australia with the species being almost exclusively aerial over most habitat types while in Australia. It occurs over most habitat types and is recorded most often above wooded areas, including open forest and rainforest, and it may also fly below the canopy between trees or in clearings. When flying above farmland, it is more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Threatened Species Scientific Committee 2019).

In Australia, confirmed and high confidence records of White-throated Needletail roosting indicate the species roosts in dense foliage of canopy trees in large tracts of treed remnant vegetation along or contiguous with mountain ranges as detailed in the records below:

- very dense foliage in the crown of a eucalypt (16 metre tall) on a spur at Mt Coot-tha, Brisbane Queensland (D'Aguilar Range) (Corben et al. 1982).
- fairly thick foliage in the crown of two acacias (14 metre tall) and one banksia at Little Waterloo Bay, Wilsons Promontory, Victoria (mainland southern extremity of Great Dividing Range) (Day 1993).
- eucalypt on a spur at Nearum, Queensland (Gongiberoo Range) (Tarburton 1993).
- outer branch of a large Narrow-leaved Ironbark (Eucalyptus crebra) and near the top of mid-sized White Cypress Pine (Callitris glaucophylla) in West Pilliga, New South Wales (remnant vegetation contiguous with Warrumbungle Mountain Range and mountain range within Pilliga Nature Reserve) (Stanton 2011).

It is also noted the species has been recorded landing in the crown of a Rough-barked Apple at Munghorn Gap New South Wales (Great Dividing Range) where the individual remained for four minutes (Quested 1982) although this is not considered a confirmed or high confidence record of the species roosting as the individual was only observed in the tree for a short period of time.

The species is also reported to roost in tree hollows (Threatened Species Scientific Committee 2019), on bark on trees, or on rock faces and it may have traditional roost sites. During extreme conditions including bushfires and cold, hot or inclement weather, the species is also known to take refuge in tree hollows, trees and stunted scrub (Department of Agriculture, Water and the Environment 2021).

2.2.3. Threats

The White-throated Needletail is subject to various hazards that could cause mortality that might impact on its population; these may include the following (Threatened species scientific committee 2019):

- Logging of forest in their northern breeding grounds;
- Mortality caused by collision with operating wind turbines; overhead electricity wires, windows, and lighthouses.
- Mortality caused by the use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in the prey.
- Loss of roosting sites as a result of reduction in their habitats.

Tarburton (2014, 2021) provided some evidence of the decline of the White-throated Needletail numbers and attributed the decline to the increase of mortality triggered by the causes listed above.

2.2.4. Legislative protection

The White-throated Needletail (*Hirundapus caudacutus*) is listed as Vulnerable and Migratory under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The White-throated Needletail is also protected under international bird migratory agreements including: JAMPA *Japan-Australia Migratory Birds Agreement*, ROKAMBA *Republic of Korea--Australia Migratory Birds Agreement*, and CAMBA *China-Australia Migratory birds agreement*.

3. Methods

3.1. Existing information

Existing information on the status of the White-throated Needletail was obtained from the NSW Bionet Atlas, a public database held by the Department of Planning, Industry and Environment, NSW. These records were obtained from a wider area, termed the 'search region' defined for this assessment as an area with radius 30 kilometres from the approximate centre point of the study area.

The likelihood of suitable habitat in the study area for nationally threatened fauna species was ascertained through a search of the online *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool (DEWHA 2008) using the same search region.

One previous report on the study area was reviewed prior to the current survey. Nature Advisory, Winterbourne Wind Farm, Bird Utilisation Survey baseline data, Report No. 19180 (1.0), October 2021.

3.2. Field methodology

The White-throated Needletail survey was undertaken using a slightly modified fixed-point bird count survey method.

The fixed-point bird count method involved an observer stationed at a survey point for 30 minutes. This period was considered adequate to generate representative data on the presence of White-throated Needletail in the area during the survey.

During this period of observation, the numbers of individual White-throated Needletail observed at any distance were recorded. The following data was documented for each flight observed during the survey;

- Species name
- Number of birds
- Time first observed
- Time the bird/s flew out of sight or landed
- Distance and bearing from observer
- Height of the bird when first observed
- The height range of the bird while observed (minimum and maximum heights)
- Direction of flight
- Flight behaviour (either soaring, foraging, circling or roosting etc.)
- Flight paths were mapped on either paper aerial photographs of the area or using a iPad and the Collector application.

The survey was undertaken by two observers (Peter Lansley and Ahmad Barati). Records were made from ten observation points, equally divided between the two observers (Peter: Points BUS7, BUS8, BUS12, BUS13, REF2; Ahmad: Points BUS2, BUS3, BUS4, BUS5, REF1) (Figure 1). Each of the survey points was counted on eight occasions over the 5-day survey period, totalling 80 counts, or some 40 hours of observation in total.

The survey points were distributed as evenly as possible (subject to access constraints) across the wind farm to sample the various habitat types and maximise coverage in areas where wind turbines are proposed.

3.3. Timing of bird surveys

Table 1 indicates when each point was counted on each survey day. This schedule ensured that all points were visited equally at different times of day to allow for time-of-day differences in bird movements and activity. Every survey point was visited eight times over the survey period.

The bird utilisation surveys were undertaken during five days (3rd-7th) in January 2022. The survey was undertaken during a suitable period as the needletails were at their summering grounds including north-eastern NSW. This schedule ensured that all points were visited at all times of day so that no time-of-day biases affected the pooled count data.

Table 1: Fixed-point count schedule for each fixed-point bird count survey day in Summer 2022. Black points were surveyed by Peter Lansley; Red points by Ahmad Barati.

Date/time	3-Jan 22	4-Jan 22	5-Jan 22	6-Jan 22	7-Jan 22
6:30					BUS 8
7:00				BUS2	REF2
7:30			BUS3	BUS 7	
8:00			BUS 13	REF1	BUS 13
8:30			REF 2/REF1	BUS 8/BUS4	BUS2
9:00			BUS 12		BUS 7
9:30		BUS3	BUS4	BUS12/BUS5	BUS5
10:00		BUS 7	BUS 8/BUS3	REF2/REF1	
10:30	BUS 8				BUS 12
11:00	BUS2	REF1	BUS5	BUS 13/BUS5	BUS4
11:30	BUS2	BUS 13	BUS 7	BUS 12	
12:00		REF 2/BUS4			
12:30		BUS 12	BUS13/BUS3		BUS 8
13:00	BUS 7/REF1		REF2/BUS2		
13:30	REF1	BUS8/BUS5		BUS 8	BUS7/BUS2
14:00	BUS4		BUS12/BUS5	REF 2	BUS3
14:30	REF2/BUS4	BUS 13			BUS3
15:00		REF2/BUS2	REF1		
15:30		BUS 12	BUS4		BUS3
16:00	BUS12/BUS5	BUS3	BUS 7		
16:30	BUS5	BUS 8	REF1		BUS2
17:00	BUS 13			BUS 13	BUS4
17:30		BUS 7			

3.4. Habitat assessment

At each survey site, the vegetation type, structure and habitat quality were examined during the day before the commencement of survey. These habitat components, considered important in influencing the distribution of White-throated Needletail, were assessed for each survey site. Table 2 has summarised the main habitat characteristics of each site.

Table 2: Habitat associated with each survey point at Winterbourne Wind Farm

Survey Point	Habitat Description
BUS2	Sheep pasture with a few paddock trees, and one riparian strip close by.
BUS3	Scrappy stringybark timbered ridge adjacent to pasture.
BUS4	Stringybark grassland ridge.
BUS5	Sheep pasture with few, small scattered trees, approximately 500m away from woodland patch.
BUS7	Mid-slope pasture surrounded by open woodland with mature New England Peppermint (*Eucalyptus nova-anglica*) and Blakely's Red Gum - adjacent to large ridge.
BUS8	Pasture surrounded by open woodland with mature New England Peppermint and small tree ferns.
BUS9	Top of ridge in cleared grassland paddock.
BUS12	Cleared mixed native and exotic pasture on a saddle between two hills, scattered paddock eucalypts and some bracken and little or no shrub cover with few fallen branches.
BU13	Ridge line, with cleared pasture, mostly exotic grass and forest block close by to the south-east and degraded understorey.
Ref1	Stringybark grassland gully with stream.
Ref2	Open paddock near roadside with scattered mature New England Peppermint and stringy bark.

3.5. Limitations of field assessment

The timing of the survey, its duration and the weather conditions under which surveying was undertaken, were considered suitable for detecting the species.

The overall survey effort (80 replicated surveys from 10 sites) was considered sufficient to detect the species in the study area if it was using the area consistently.

Observations in the same week elsewhere in Victoria and New South Wales showed that needletails were active and observable in a number of locations (Nature Advisory data).

It is recommended that an additional survey be undertaken in late February – March to ascertain the species' status on the proposed wind farm site as it is moving northwards in Australia.

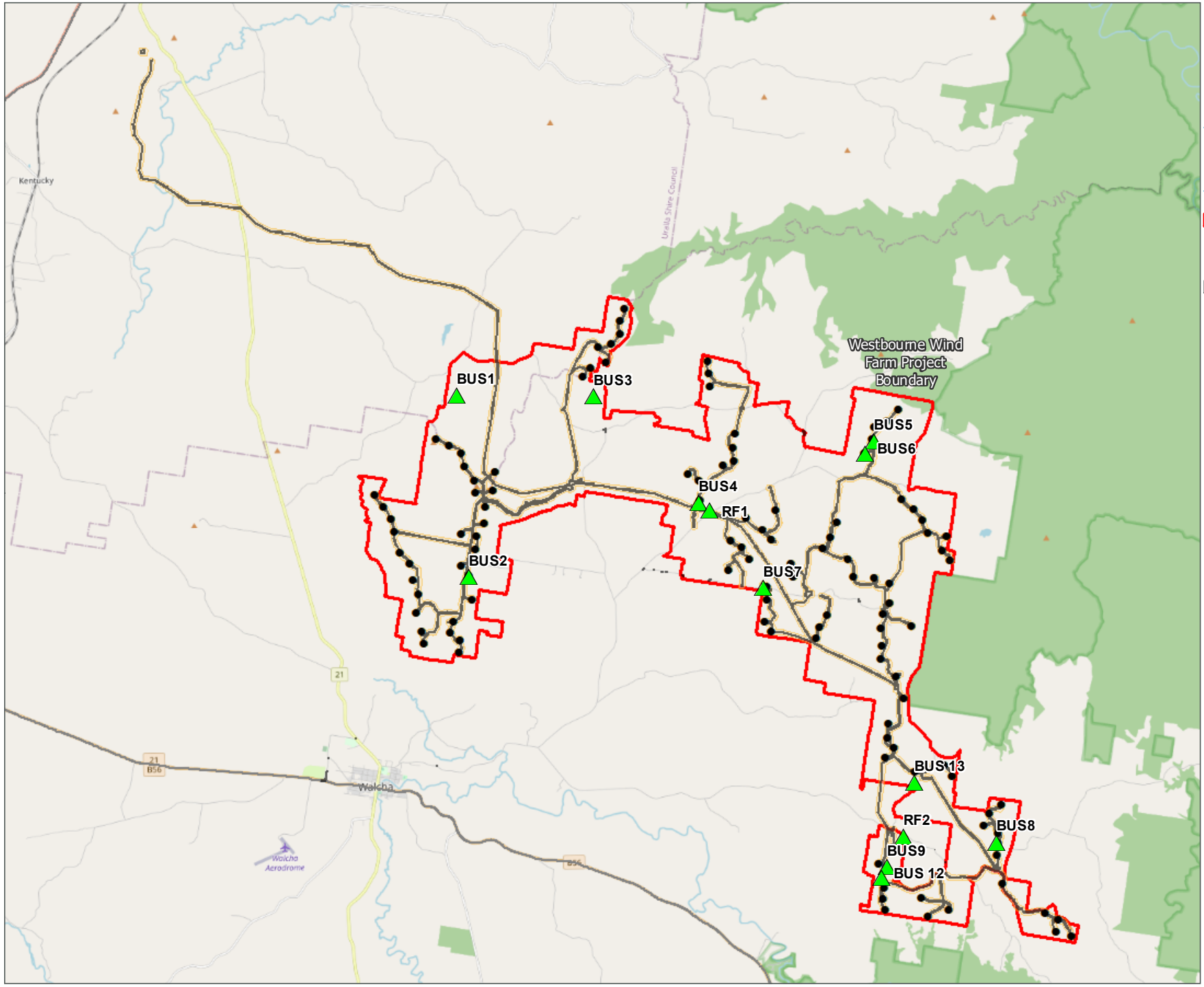

Figure 1: Location of bird utilisation survey sites at Winterbourne Wind Farm

Project: Winterbourne Wind Farm
Client: NGH Consulting
Date: 30/03/2022

- Winterbourne wind farm boundary
- Development site
- Development footprint
- Turbines
- BUS points

N

Metres
0 3,600

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4. Results

4.1. Existing information

The NSW Bionet Atlas holds six records of White-throated Needletail within 30 kilometres of the study area, dated between 1997 and 2005. Five of the records did not report the number of individuals observed at the time of recording, and the sixth record reported 10 individuals together as a small flock.

A second assessment of eBird (Cornell University Laboratory of Ornithology public domain bird database) has been conducted which assessed the records of WTNT in the region of the proposed Wind Farm with the followng is noted:

- Records of WTNT were noted within 10 km of the Wind Farm in October 2018, January 2019, February 2019, February 2021 and March 2021;
- The numbers of WTNT recorded were between 3 and 40- 60 individuals;
- A group of 40 individuals WTNT were recorded 2.49 km from proposed turbine B117.

No other published information exists on the occurrence of the species in the area.

4.2. Survey Results

No White-throated Needletail was recorded within the study area during the current investigation.

Habitat on the site comprises mostly cleared or semi-cleared pasture with fragments of remnant or planted treed vegetation occupying less than approximately 30% of the area. Immediately to the east of the site is the New England escarpment, which is heavily forested, including several national parks. Habitat within the project area was not suitable for roosting by this species based on previous roosting habitat observations (section 3.2.2 above).

While treed remnant vegetation is present within the wind farm site, consisting of remnant patches of eucalypt woodland on rocky rises/ridges, and scattered mature eucalypts within open paddocks, it did not occur was as large contiguous areas or contiguous with areas f forest to the east. It is known that the species favours forested areas for foraging ((Threatened Species Scientific Committee 2019). Given site habitat conditions and the lack of observations on the site is is considered to provide less favourable habitat for foraging and few opportunities for roosting by needletails.

5. Conclusions and recommendations

The White-throated Needletail was not confirmed as occurring within the wind farm study area during the targeted survey, conducted from the 3rd to the 7th January 2022. Similarly, no needletails were recorded during BUS at this wind farm, both in October 2020 and April 2021. It is noteworthy that the October 2020 surveys was earlier than the species normally arrives in northern NSW and therefore is not relevant; the early April 2021 survey however is useful.

An eBird survey (Cornell University Laboratory of Ornithology public domain bird database) has been provided to NGH and it reported sightings of small- (3 birds) to medium-sized flocks (40-60 birds) of needletails during October 2018, January 2019, February 2019, February 2021 and March 2021 for an area within a 50 km radius of the proposed wind farm site; thus, needletails may occasionally pass over the site.

Given its usual movement patterns, the presence of needletails at the wind farm site is likely to be inconsistent and unpredictable . Although not seen during BUS in April 2021 or during this targeted survey in January 2022, it might still fly over the wind farm.

Given this, it is recommended that a further targeted needletail survey be undertaken after late February 2022, when the species is starting to move northwards in Australia. The combination of a third survey when the species is in Australia, combined with the results of the April 2021 and January 2022 surveys will provide a higher level of confidence in the status of the species on the wind farm site.

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