Department of Planning and Environment

Biodiversity Development Assessment Report
Proposed Residential Lifestyle Community at
303 & 283 Wollombi Road, Farley 2320

Prepared by Sarah Jones, BAAS18020

Site Details:	303 & 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894)			
Prepared by:	***Sarah Jones B.Env.Sc., G.Dip.DBPA (Design in Bushfire Prone Areas)*** ***Firebird ecoSultants Pty Ltd*** **A**BN – 16 105 985 993 PO Box 354, Newcastle NSW 2300 M: 0414 465 990 Email: sarah@firebirdeco.com.au T: 02 4910 3939 Fax: 02 4929 2727			
Prepared for:	Vivacity Property			
Reference No.	Farley – Vivacity Property			
Document Status & Date:	Version	Description	Date	Author(s)
	1	Version 1	14/08/2023	Sarah Jones
	2	Version 2	7/09/2023	Sarah Jones

Summary

Development Description

Firebird ecoSultants Pty Ltd has been engaged by Vivacity Property, to provide a Biodiversity Development Assessment Report (BDAR) for a proposed residential lifestyle community with moveable dwellings ('the proposal') and associated infrastructure at 303 Wollombi Road, Farley 2320 (Lot 2 and 4 DP 810894) and ('the site' or 'the subject site'). See Figure 1-1 for the Location Map and Figure 1-2 for the Site Map.

The proposal includes a residential lifestyle community with moveable dwellings (2 lots into 207 manufactured homes as well as 47 multi-dwelling sites) of 303 and 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894) to provide development space for the construction of 207 dwellings as well as associated infrastructure such as site access, services and asset protection zones (APZ).

The site is ~32 ha in size and is located in the eastern periphery of the residential portion of Farley. The majority of the site is zoned as RU2 Rural Landscape, with the north-eastern corner of the site zoned as R1 General Residential.

The northern western half of the site is covered predominantly in native and exotic grasses with Spotted Gum and Ironbark tree species scattered throughout. Spotted Gum – Ironbark Forest vegetation occurs over the majority of the south eastern half of the site. Forest adjoins the site from the west, south and east. A residential subdivision is being developed in the adjoining property to the north-east. Medium and large rural lots occur to the north across Wollombi Road, followed by an approved subdivision.

There are five ephemeral gullies which occur within the site.

The site does not contain important mapped areas for threatened species or any mapped biodiversity values the site does however the gullies have been identified as Key fish habitat (see map extract below) however it is unlikely the development will have significant impacts on Key Fish Habitat within the site, in any case this will be addressed in the SOEE. This requires consideration of Division 12 of the Fisheries Management Act 1994.

- The proposed operational footprint would include the same areas as the construction footprint indicated in Figure 1-2; that being the developed areas for the residential lots, site access and the APZs.

Refer to Appendix A for Site Plans.

Habitat Assessment

The following describes the habitat attributes of the study area;

• The study area provides open grassland habitat within the site's cleared exotic grassland areas which may provide habitat for species adapted to open areas.

The site contains two medium sized artificial dams in the centre of the site either side of the entry drive and a small dam in the south-east of the site.

• The site contains three Plant Community Types (PCT's) including:
  - PCT 3433: Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
  - PCT 3444: Lower Hunter Spotted Gum-Ironbark Forest
  - PCT 4036: Hunter Coast Lake Flats Apple Forest

PCT 3433 covers the majority of the site.

• No Allocasuarinas or casuarinas occur within the study area which are a food source for species such as Calyptorhynchus lathami (Glossy Black-Cockatoo) – as such, the site provides limited habitat for these species.

• The site contains many hollow-bearing trees with variable hollow sizes which would likely provide habitat for a wide range of species, including microbats, hollow-dependant arboreal mammals, woodland birds and in some cases owls; however, none occur within the development footprint.

• The study area contains fallen logs and timber which may provide habitat for reptiles and foraging birds.

• No caves, tunnels, mines or culverts occur within the study area or the site.
• No stick nests occur within the study area or the site (at the time of surveys)
• No flying fox camps occur within or near the site.

Measures to avoid and minimise

A Significant Tree Survey has been undertaken within the site. This included trees that would provide habitat for potential threatened species that may utilise the site. All of these identified trees will be retained.

Avoidance and minimisation actions are outlined in Section 7.

Biodiversity Offsets Scheme (BOS) – Threshold Assessment

Based on the supplied plans provided by Perception Planning, the development enters the Biodiversity Offset Scheme due to:

- The proposed development will impact 5.26ha of native vegetation which exceeds the area clearing threshold of the site being 1ha.

Threatened Species

Threatened species that require assessment are initially identified based upon the following criteria:

· the distribution of the species includes the IBRA subregion in which the subject land occurs

· the study area is within any geographic constraints of the distribution of the species within the IBRA subregion.

· the species is associated with any of the PCTs identified within the study area

· the native vegetation cover within an assessment area including a 1500m buffer around the study area is equal to or greater than the minimum required for the species.

· the patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species.

· the species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM Calculator. The PCTs identified within the study area, patch sizes and native vegetation cover, as outlined in Section 3, were entered into the BAM Calculator and a preliminary list of threatened species were identified.

Impacts, including direct, indirect, prescribed, and serious and irreversible impacts (SAII)

The subject site contains three (3) PCTs two of which contain two (2) separate vegetation zones.

- Vegetation zone 1 (PCT 3433) – Intact: This vegetation zones is made up of an intact canopy stratum, saplings of canopy species, numerous hollow-bearing trees and ground hollows and moderate density of native ground cover.
- Vegetation zone 2 (PCT 3433) – Derived Grassland: this vegetation zone is made up of a mix of native and exotic ground cover, lacking an upper and mid stratum
- Vegetation zone 1 (PCT 3444) – Moderate: This vegetation zone occurs in a moderate condition, with an intact canopy stratum, some hollow-bearing trees, high density of native ground cover. This area also contains a moderate density of shrub layer and some exotic grasses and forbs in the ground layer.
- Vegetation zone 2 (PCT 3444) – Derived Grassland: this vegetation zone is made up of a mix of native and exotic ground cover, lacking an upper and mid stratum
- PCT 4036 occurs on site however this PCT will not be impacted by removal of vegetation as the site has been designed to leave PCT 4036 intact and conserved.

Lower Hunter Spotted Gum Ironbark Forest is an NSW Threatened Ecological Community which has been identified on site within PCT 3433 and PCT 3444. Both of these PCTs will be directly impacted by the proposed vegetation clearing (ha). All PCTs will be indirectly impacted by changes in edge effects, noise, light pollution and dust from construction phase activities and post-development activities.

Most of the direct impacts to these PCT's occur within vegetation zone 2 which is in a lower condition than vegetation zones 1 and. Impacts to vegetation zone 1 have largely been avoided by the positioning of the development footprint within the northern portion of the site.

All of the hollow-bearing trees and most of the ground hollows on site have been avoided. As such, the proposal has avoided significant impacts to nesting habitat for hollow-dependant threatened species.

It is recommended that the retained areas of the site are protected in perpetuity. See the recommendations in Section 3.1.2 of this BDAR for more information on these mitigation measures. Overall, the recommended mitigation measures would serve to minimise the net area of TEC loss and would ensure that the existing areas of retained TEC are protected.

To offset residual impacts of the proposal upon identified biodiversity values, the proposal would require a total of **7 x PCT 3433 VZ1, 30 x PCT 3433 VZ2 Ecosystem Credits** and **20 x PCT 3444 VZ1, 0 x PCT 3444 VZ2 Ecosystem Credits** (or equivalent).

Serious and Irreversible Impacts

The OEH (2017) *Guidance to Assist a Decision-maker to Determine a Serious and Irreversible Impact* lists the ecological communities and species that are 'potential serious and irreversible impact (SAII) entities. There are no series and irreversible impact (SAII) entities relevant to this assess.

Mitigation measures

Mitigation measures are proposed to minimise potential impacts to the site's biodiversity values; these are summarised in Table 3-1. These include measures to be implemented in the pre-construction, construction and post-construction phases. It is considered that these measures would serve to minimise any potential direct or indirect impacts.

Final Recommendations

Table E1 Impacts that require an offset – ecosystem credits

Vegetation zone	**PCT**	**TEC/EC**	**Impact area** (ha)	**Number of ecosystem credits required**
VZ 1 Intact-under scrubbed	PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	0.28ha	7
VZ 2 Derived Grassland	PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	1.9ha	30
VZ 1 Moderate	PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	1.18ha	20
VZ 2 Derived Grassland	PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	1.9ha	0

Table E2 Impacts that require an offset – species credits

Common name	**Scientific name**	**Loss of habitat** (ha) or individuals	**Number of species credits required**

Contents

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Shortened forms

APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
EC	ecological community listed under the EPBC Act
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EEC	endangered ecological community
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia
LLS Act	*Local Land Services Act 2013* (NSW)
MNES	matters of national environmental significance
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	vulnerable ecological community
Vegetation SEPP	*State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (NSW)

Declarations

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

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

Signature:

Date:11/04/2023

BAM Assessor Accreditation no: BAAS18020

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

Authors and contributors

Name	**BAM Assessor Accreditation no.** (if relevant)	**Position/Role**	**Tasks performed**	**Relevant qualifications**
Sarah Jones	BAAS18020	Ecologist / Bushfire Planner	Principal Author / Fieldwork	B.Env.Sc., G.DIP.DBPA (Design for Bushfire Prone Areas)
Andrew Carty	BAAS19007	Ecologist/Botanist	Fieldwork	B.Envs.Sc. (Environmental Science)
Ollie Broun	N/A	Ecologist/ Bushfire Planner	Author/Fieldwork	B.Envs.Sc. (Environmental Science)
Kurtis Mumford	N/A	Ecologist/ Bushfire Planner	Author/Fieldwork	B.Envs.Sc. (Environmental Science)

Theo Tasoulis	N/A	Ecologist/ Bushfire Planner	Fieldwork	B.Envs.Sc. (Environmental Science)

iii. Conflict of interest

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

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

Signature: 

Date: 04/11/2022

BAM Assessor Accreditation no: BAAS 18020

Stage 1: Biodiversity assessment

1. Introduction

Firebird ecoSultants Pty Ltd has been engaged by Vivacity Property, to provide a Biodiversity Development Assessment Report (BDAR) for a proposed residential lifestyle community with moveable dwellings and associated infrastructure at 303 and 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894). See Figure 1 for Site Map and Figure 2 for the Site Location. This BDAR has been prepared to satisfy the requirements of the Biodiversity Conservation Act 2016 (BC Act). This assessment has been undertaken in accordance with the Biodiversity Assessment Method 2020.

1.1 Proposed development

1.1.1 Development overview

The proposal includes a residential lifestyle community with moveable dwellings (2 lots into 207 manufactured homes) of 303 & 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894) to provide development space for the construction of 207 dwellings as well as associated infrastructure such as site access, services and asset protection zones (APZ).

The development footprint has largely been located in the northern portion of the site, which is predominately covered by a mixture of native and exotic grasses and weeds.

The proposed development footprint is indicated in Figure 1-2. It totals an area of 12.66 ha of land/vegetation and encompasses the following areas:

- The designated area for residential lots, building envelopes and site access (12.66 ha)
- The site contains 23.962ha of native vegetation. The extent of native vegetation to be assessed in this BDAR (i.e. the area of native vegetation within or potentially impacted by the construction and operational footprint) is 5.26 ha. Derived Grassland found on site consisted of native and exotic grasses was determined by a native grassland assessment conducted in accordance with Appendix A – Method for calculating native vegetation extent in grassland areas that contain a mix of native and exotic species in disturbed plant community types of the document Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

  Therefore, the ha area of Derived Grassland found on site were able to be reduced due to only having a cover percentage of 35% across the site

Table 1-1: Native grassland assessment

Plot (1mx1m)	Native grassland (%)	Exotic grassland (%)
1	100	75
2	100	45
3	100	10
4	95	15

5	100	30
6	100	10
7	100	90
8	95	40
9	90	10
10	100	25
Average	98	35

Given, there is 35% native groundcover using the Native Vegetation Extent adjustment ruleset we can calculate the extent of native vegetation found within Derived Grassland within PCT 3433 and 3444. If there is between 15% and 75% native groundcover – the calculation of native vegetation extent is adjusted by multiplying the proportion (%) of native groundcover by the total area to be cleared Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

Using this ruleset, the extent of native grass cover within the site was calculated by;

PCT 3433 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

PCT 3444 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

- The proposed operational footprint would include the same areas as the construction footprint indicated in Figure 1; that being the developed areas for the residential lots and site access and the APZs.

Refer to Figure 1 for Site Map and Figure 2 for Location Map.

1.1.2 Location

The site is ~30.39 ha in size and is located in the eastern periphery of the residential portion of Farley. The majority of the site is zoned as RU2 Rural Landscape, with the north-eastern corner of the site zoned as R1 General Residential. The northern western half of the site is covered predominantly in native and exotic grasses with Spotted Gum and Ironbark tree species scattered throughout. Spotted Gum – Ironbark Forest vegetation occurs over the majority of the south eastern half of the site. Forest adjoins the site from the west, south and east. A residential subdivision is being developed in the adjoining property to the north-east. Medium and large rural lots occur to the north across Wollombi Road. There are five ephemeral gullies which occur within the site.

Refer to Figure 1 for Site Map and Figure 2 for Location Map.

1.1.3 Proposed development and the subject land

The proposal includes a residential lifestyle community with moveable dwellings (2 lots into 207 manufactured homes) of 303 & 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894) to provide development space for the construction of 207 dwellings as well as associated infrastructure such as site access, services, and asset protection zones (APZ).

The study area is the area of land within the site that has been assessed in this report, which is the area of vegetation within the site that is relevant to this BDAR i.e., the area of vegetation within or potentially impacted by the construction and operational footprint. Land within the site that is not considered to be impacted by the proposal (either directly or indirectly) is considered to be outside the study area. In this case however, the entire site was surveyed.

1.1.4 Other documentation

This report has been not been written in conjunction with any other report.

1.2 Biodiversity Offsets Scheme entry

The proposed development area is mapped on the Biodiversity Values Map. In addition, the proposed clearing exceeds the minimum clearing threshold of the area which is 10,000m$^{2.}$ The proposal therefore requires entry into the Biodiversity Offset Scheme.

1.3 Excluded impacts

The proposed development footprint primarily covers the north portion of the site. This area contains a vegetation zone in a lower condition (Vegetation zone 2) which is covered in native and exotic grasses. Only scattered native trees are located within this area, none of which have been identified as habitat trees. PCT 4036 which has a high vegetation integrity score will be wholly avoided by the proposal. Refer to Figure 3 to see the large areas of intact vegetation which have been avoided by the proposal.

Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (as defined in Part 5A of the LLS Act), other than prescribed impacts (as defined in clause 6.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation)). Prescribed impacts must therefore be assessed for category 1-exempt land.

1.4 Matters of national environmental significance

83 MNES records within a 10 km radius of the site were found. These included; 1 Wetland of international importance, 8 listed threatened ecological communities, 56 listed threatened species and 18 listed migratory birds. A review was conducted using the Commonwealth Department of Environment and Energy (DEE), EPBC Act Protected Matters Search Tool.

1.4.1 Database Searches

The following database searches were undertaken, in order to compile a list of threatened flora and fauna species predicted to occur in the area:

- Review of threatened fauna and flora records within a 10 km radius of the site, contained in the OEH Atlas of NSW Wildlife (NSW BioNet).
- Review of the MNES records within a 10 km radius of the site, using the Commonwealth Department of Environment and Energy (DEE), EPBC Act Protected Matters Search Tool.

1.5 Information sources

Information sources reviewed included, but were not limited to:

- Aerial Photograph Interpretation (API)
- Relevant guidelines, including:
    - OEH *Biodiversity Assessment Method*, 2020
    - *Surveying Threatened Plants and their Habitats (DPIE, 2020)*
    - *'Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method* (OEH, 2018)
    - *NSW Survey Guide for Threatened Frogs: A guide for the survey of frogs and their habitats for the Biodiversity Assessment Method (DPI&E, 2020)*
    - *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (Department of Environment and Conservation (DEC), 2004)
    - Environmental / planning reports relevant to the site / area, including: *Port Stephens Local Environmental Plan 2013*
    - *Maitland LEP 2011*
    - *Maitland (DCP) 2011;*
    - Any environmental / ecological reports relevant to the site or area, including vegetation mapping
    - Online tools and resources, including:
    - State Environmental Planning Policy (Koala Habitat Protection) 2020

BAM Calculator (OEH, 2020)

BioNet Vegetation Classification (OEH, 2020)

BioNet Threatened Biodiversity Data Collection (OEH, 2020)

Directory of Important Wetlands in Australia (Department of Environment

and Energy (DEE), 2010)

NSW Scientific Committee Final Determinations (NSW Scientific

Committee various dates)

Commonwealth Threatened Species Scientific Committee (TSSC) Final Determinations for threatened species (TSSC Various Dates)

OEH Threatened Species, Populations and Ecological Communities website

Commonwealth DEE Species, Profile and Threats Database

PlantNET NSW (Botanic Gardens Trust, 2018).

2. Methods

2.1 Site context methods

2.1.1 Landscape features

Have been determined by the following:

• This section details the landscape features occurring on the Subject Land or within the assessment area (i.e., a 1.5km buffer) surrounding the Subject Land. Refer to Section 3.2.

2.1.2 Native vegetation cover

The site contains ~30 ha of native vegetation. The extent of native vegetation relevant to this BDAR (i.e., the area of native vegetation within or potentially impacted by the construction and operational footprint) is 5.26 ha; see Figure 7 for the native vegetation extent within the site.

The site contains 23.962ha of native vegetation. The extent of native vegetation to be assessed in this BDAR (i.e. the area of native vegetation within or potentially impacted by the construction and operational footprint) is 5.26 ha. Derived Grassland found on site consisted of native and exotic grasses was determined by a native grassland assessment conducted in accordance with Appendix A – Method for calculating native vegetation extent in grassland areas that contain a mix of native and exotic species in disturbed plant community types of the document Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

Therefore, the ha area of Derived Grassland found on site were able to be reduced due to only having a cover percentage of 35% across the site

Table 1-1: Native grassland assessment

Plot (1mx1m)	Native grassland (%)	Exotic grassland (%)
1	100	75
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5	100	30
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8	95	40
9	90	10
10	100	25
Average	98	35

Given, there is 35% native groundcover using the Native Vegetation Extent adjustment ruleset we can calculate the extent of native vegetation found within Derived Grassland within PCT 3433 and 3444. If there is between 15% and 75% native groundcover – the calculation of native vegetation extent is adjusted by multiplying the proportion (%) of native groundcover by the total area to be cleared Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

Using this ruleset, the extent of native grass cover within the site was calculated by;

PCT 3433 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

PCT 3444 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Plant Community Type/s (PCTs) on the site were identified according to the NSW PCT classification described in the BioNet Vegetation Classification.

2.2.2 Mapping native vegetation extent

A patch is defined in the BAM as an area of intact native vegetation that occurs on the subject land. The patch may extend onto adjoining land beyond the footprint of the subject land, and for woody ecosystems, includes native vegetation separated by ≤100 metres from the next area of intact native vegetation. For non-woody vegetation, this gap is reduced to ≤30 metres. Intact vegetation must contain all structural layers (strata) characteristic of the PCT. Plot data should not be solely relied upon when determining whether vegetation is intact. If all structural growth form groups expected to exist within the community are present within the vegetation zone and/or adjoining off-site native vegetation, then the vegetation meets the definition of intact. For example, if all structural growth form groups except the shrub layer are present in the plots but species that belong to the shrub growth form group occur elsewhere within the vegetation zone, then the shrub growth form group is present, and the vegetation is intact.

There are large patches of native vegetation adjacent to the site's native vegetation. There is limited native shrub/ground layer of vegetation within the sites forested areas. This is likely due to the current and historic agricultural land practices in the Farley area. In any case the patch size has been assessed as >100ha.

2.2.3 Plot-based vegetation survey

Plot-based floristic vegetation surveys were undertaken within each PCT area in accordance with s.5.2.1.9 of the BAM on 19 May 2023. The 50 m x 20 m plots were sampled for the presence of flora species; see Figure 2-3 for the plot locations undertaken within the impacted PCTs (the study area) and see Appendix I for photos. The plots were carefully examined to identify all flora species present. This search continued until it was confident that all flora species within the plots were detected. Data collected for each species included:

- Stratum and layers in which each species occurs;
- Growth form for each species;
- Scientific and common name for each species;
- Percentage foliage cover (PFC) across the plot, of each species rooted in or overhanging the plot; and
- Abundance rating for each species.

Plant Community Type/s (PCTs) on the site were identified according to the NSW PCT classification described in the BioNet Vegetation Classification. Three (3) native PCTs have been identified within the site; these PCTs are described below. See Figure 6 for the plot locations undertaken within the impacted PCTs (the study area) and see Appendix I for photos.

2.2.4 Vegetation integrity survey

For the purposes of the BAM, a vegetation zone is an area of native vegetation on the site that is the same PCT and has a similar broad condition state. The site's impacted PCTs have been divided into several vegetation zones (as detailed in Table 2-4) (see Appendix I for photos). A patch size area has been assigned to each vegetation zone, as a class (as detailed in Table 4-3). See Appendix I for photos of each vegetation zone.

The site's impacted PCTs has been categorised into a vegetation zone (as detailed in Table 4-3) (see Appendix I for photos). A patch size area has been assigned to the vegetation zone, as a class (as detailed in Table 4-3).

Vegetation Integrity Scores

Each vegetation zone identified on the site has been surveyed to obtain a quantitative measure for each zone, of the composition, structure and function attributes listed in Table 3 of the BAM. These attributes are listed below:

- Growth form groups used to assess composition and structure:
  - Tree
  - Shrub
  - Grass and grass like
  - Forb
  - Fern
  - Other
- Attributes used to assess function:
  - Number of large trees
  - Tree regeneration
  - Tree stem size class
  - Total length of fallen logs
  - Litter cover
  - High threat exotic vegetation cover
  - Hollow-bearing trees

Plot-based surveys were conducted, in accordance with s.5.3.4 of the BAM on 19 May 2023. Survey plots were established around a central 50m transect and included:

- One 400 m² (20 m x 20 m) plot to assess the composition and structure attributes listed above.
- One 1000 m² (20 m x 50 m) plot to assess the function attributes: number of large trees, stem size class, tree regeneration and length of logs.
- Five 1 m² sub-plots to assess average litter cover (and other optional groundcover components).

See previous Figure 6 for plot locations. Vegetation survey data is provided in Appendix E.

2.3 Threatened flora survey methods

2.3.1 Review of existing information

Threatened species that require assessment are initially identified based upon the following criteria:

- the distribution of the species includes the IBRA subregion in which the subject land occurs

- the study area is within any geographic constraints of the distribution of the species within the IBRA subregion.
- the species is associated with any of the PCTs identified within the study area
- the native vegetation cover within an assessment area including a 1500m buffer around the study area is equal to or greater than the minimum required for the species.
- the patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species.
- the species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM Calculator. The PCTs identified within the study area, patch sizes and native vegetation cover, as outlined in Section 3, were entered into the BAM Calculator and a preliminary list of threatened species were identified

2.3.2 Field surveys

Refer to Figure 6 Field survey locations

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

The following database searches were undertaken, in order to compile a list of threatened flora and fauna species predicted to occur in the area:

Review of threatened fauna and flora records within a 10 km radius of the site, contained in the OEH Atlas of NSW Wildlife (NSW BioNet).

Review of the MNES records within a 10 km radius of the site, using the Commonwealth Department of Environment and Energy (DEE), EPBC Act Protected Matters Search Tool.

2.4.2 Habitat constraints assessment

The Southern Myotis (*Myotis macropus*) and Little Bentwing-bat (*Miniopterus australis*) are a dual Species and Ecosystem Credit Species (species credit species for breeding habitat). The habitat constraint listed for Southern Myotis (*Myotis Macropus)* species in the Threatened Biodiversity Data Collection (habitat constraint: hollow bearing trees, within 200m of riparian zone /other, includes rivers, creeks billabongs, lagoons, dams and other waterbodies on within 200m of the site) is present within the Study Area. As such, this species was determined as a candidate species. Refer to Figure 11 for Species Polygon. Habitat constrains for *Burhinus grallarius* were also present on site as this species requires fallen/standing dead timer including logs.
Habitat constraints for *Callocephalon fimbriatum* and *Calyptohynchus lathami* were present on site, these being hollow bearing eucalypt tree species the site also contains suitable habitat for *Haliaeetus leucogaster* as well as *Hieraaetus morphnoides* and *Lophoictinia isura* in the form of large mature eucalypt species in close proximity to large bodies of water.

The habitat constraint listed for *Anthochaera phrygia, Calidris canutus, Calidris ferruginea, Calidris tenuirostris, Charadrius leschenaultii, Charadrius mongolus, Lathamus discolor,*

Limicola falcinellus and *Limosa lapponica baueri* were not present as the site has not been mapped on the important area habitat map.

2.4.3 Field surveys

Targeted species surveys have been undertaken for some of the candidate species credit species in accordance with section 5.3 of the BAM.

The following Table 2-1 identifies whether each of the confirmed candidate species are present or absent, based on the results of the targeted surveys (or assumed presence where targeted surveys have not been undertaken); The following sections 2.4.4.1 to 2.4.4.6 outline the survey effort and results for each species. Table 2-5 shows the weather conditions for each day during the survey effort.

Table 2-1: Presence or Absence of Candidate Species

Species Presence	Confirmed presence
Acacia bynoeana Bynoe's Wattle	No – surveyed
Angophora inopina Charmhaven Apple	No – surveyed
Burhinus grallarius Bush Stone-curlew	No – surveyed
Callistemon linearifolius Netted Bottle Brush	No – surveyed (No Callistemon species occur on site)
Callocephalon fimbriatum Gang-gang Cockatoo (Breeding)	To be Surveyed at a later date in accordance with TBDC specified months.
Calyptorhynchus lathami Glossy Black-Cockatoo (Breeding)	To be Surveyed at a later date in accordance with TBDC specified months.
Cercartetus nanus Eastern Pygmy-possum	No – surveyed
Cynanchum elegans *White-Flowered Wax Plant*	No – surveyed
Delmar impar Striped Legless Lizard	No – surveyed
Eucalyptus Glaucina Salty Red Gum	No – surveyed
Eucalyptus parramattensis subsp. Decadens Eucalyptus parramattensis subsp. Decadens	No – surveyed
Eucalyptus pumila Pokolbin Mallee	No – surveyed
Grevillea parviflora subsp.	No – surveyed

Small-flower grevillea	(No grevilia species occur on site)
Haliaeetus leucogaster White-bellied Sea-Eagle	To be Surveyed at a later date in accordance with TBDC specified months.
Hieraaetus morphnoides Little Eagle	To be Surveyed at a later date in accordance with TBDC specified months.
Hoplocephalus stephensii Stephens' Banded Snake	To be Surveyed at a later date in accordance with TBDC specified months.
Litoria aurea Green and Golden Bell Frog	Surveys for species of threatened frogs will occur at a later date during the TBDC specified months. (Species has been classed as assumed present until surveys can be conducted at a later date)
Litoria brevipalmata Green-thighed Frog	Surveys for species of threatened frogs will occur at a later date during the TBDC specified months. (Species has been classed as assumed present until surveys can be conducted at a later date)
Lophoictinia isura Square-tailed Kite	To be Surveyed at a later date in accordance with TBDC specified months.
Myotis macropus Southern Myotis	To be Surveyed at a later date in accordance with TBDC specified months. (Species has been classed as assumed present until surveys can be conducted at a later date)
Ninox connivens Barking Owl	No – surveyed
Ninox strenua Powerful Owl (Breeding)	No – surveyed
Pandion cristatus Eastern Osprey	No – surveyed
Petauroides volans Southern Greater Glider	No – surveyed
Petauroides norfolcensis Squirrel Glider	No - surveyed
Phascogale tapoatafa Brush-tailed Phascogale	No – surveyed
Phascolarctos cinereus Koala	No – surveyed
Planigale maculata Common Planigale	No – surveyed
Pomaderris queenslandica Scant Pomaderris	No – surveyed

Prasophyllum sp. Wybong Prasophyllum sp. Wybong	To be Surveyed at a later date in accordance with TBDC specified months.
Prostanthera cineolifera Singleton Mint Bush	To be Surveyed at a later date in accordance with TBDC specified months.
Pterostylis chaetophora Pterostylis chaeterophora	To be Surveyed at a later date in accordance with TBDC specified months.
Rutidosis heterogams Heath Wrinklewort	No – surveyed
Spyridium burragorang - endangered population	No – surveyed
Syzygium paniculatum Magenta Lilly Pilly	No – surveyed
Tetratheca juncea Black-eyed Susan	To be Surveyed at a later date in accordance with TBDC specified months.
Tyto novaehollandiae Masked Owl (Breeding)	No – surveyed
Uperoleia mahonyi Mahony's Toadlet	Surveys for species of threatened frogs will occur at a later date during the TBDC specified months. (Species has been classed as assumed present until surveys can be conducted at a later date)

2.4.4 Targeted surveys for *Acacia bynoeana* (Bynoe's Wattle), *Angophora inopina* (Charmhaven Apple), *Eucalyptus glaucina* (Slaty Red Gum), *Eucalyptus parramattensis* (Parramatta Red Gum),

Areas of Potential Habitat in the Site:

Acacia bynoeana (Bynoe's Wattle), *Angophora inopina* (Charmhaven Apple), *Eucalyptus glaucina* (Slaty Red Gum), *Eucalyptus parramattensis* (Parramatta Red Gum)

Table 2-2: Potential Habitat on the Site for *Acacia bynoeana (Bynoe's Wattle), Angophora inopina (Charmhaven Apple), Eucalyptus glaucina (Slaty Red Gum), Eucalyptus parramattensis (Parramatta Red Gum)*

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the above Flora Species as follows;

Acacia bynoeana (Bynoe's Wattle), *Angophora inopina* (Charmhaven Apple), *Eucalyptus glaucina* (Slaty Red Gum) and *Eucalyptus parramattensis* (Parramatta Red Gum) are all able to be surveyed Year-round.

See **Table 2-3** for dates that these species were surveyed on.

Table 2-3 Survey Effort:

Species	Date Surveyed
Acacia bynoeana (Bynoe's Wattle),	21/06/2023
Angophora inopina (Charmhaven Apple),	
Eucalyptus glaucina (Slaty Red Gum),	
Eucalyptus parramattensis (Parramatta Red Gum)	
Acacia bynoeana (Bynoe's Wattle),	

Survey Effort:

- **Field Transect Surveys**

The entirety of the site was systematically traversed by two ecologists to determine the presence of candidate flora species.

Results:

Field surveys conducted on the 21/06/2023 determined the presence of 4 *Eucalyptus parramattensis* (Parramatta Red Gum) as present on site, however the individuals present will not be removed or impacted by the proposal, due to the maintained nature of the site from the presence of livestock and mowing no saplings of the species were recorded as present on site. No other threatened flora species were found within the site despite best surveys efforts.

2.4.4 Targeted surveys for *Cynanchum elegans* (White-Flowered Wax Plant), *Pomaderris queenslandica* (Scant Pomaderris), *Rutidosis heterogama* (Heath Wrinklewort), *Spyridium burragorang*, *Syzygium paniculatum* (Magenta Lilly Pilly)

Areas of Potential Habitat in the Site:

Cynanchum elegans (White-Flowered Wax Plant), *Pomaderris queenslandica* (Scant Pomaderris), *Rutidosis heterogama* (Heath Wrinklewort), *Spyridium burragorang*, *Syzygium paniculatum* (Magenta Lilly Pilly)

Table 2-4: Potential Habitat on the Site for *Cynanchum elegans (White-Flowered Wax Plant), Pomaderris queenslandica (Scant Pomaderris), Rutidosis heterogama (Heath Wrinklewort), Spyridium burragorang, Syzygium paniculatum (Magenta Lilly Pilly)*

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the above Flora Species as follows; *Cynanchum elegans* (White-Flowered Wax Plant), *Pomaderris queenslandica* (Scant Pomaderris), *Rutidosis heterogama* (Heath Wrinklewort), *Spyridium burragorang* can be surveyed during any month of the year (Year-Round).
Syzygium paniculatum (Magenta Lilly Pilly): April, May, June
See **Table 2-5** for dates that these species were surveyed on.

Table 2-5 Survey Effort:

Species	Date Surveyed
Cynanchum elegans (White-Flowered Wax Plant)	28/06/2023
Pomaderris queenslandica (Scant Pomaderris)	
Rutidosis heterogama (Heath Wrinklewort)	
Spyridium burragorang	

Syzygium paniculatum (Magenta Lilly Pilly)	

Survey Effort:

- **Field Transect Surveys**

The entirety of the site was systematically traversed by two ecologists to determine the presence of candidate flora species.

Results:

No target flora species were recorded on site despite sufficient survey effort.

2.4.3.1 Koala Assessment Protection SEPP 2021 (This was in the original BDAR document not sure if needed in this one)

A development proposal must be assessed under the development assessment process under the SEPP in LGAs where no approved Koala Plan of Management is in place. The includes all land:

with an area of at least 1 hectare, including adjoining land (meaning land the next cadastre over) within the same ownership, and

that is within an LGA to which the SEPP applies

The site is greater than 1 hectare and Farley occurs within the Maitland LGA which lies within the Central Coast Koala Management Area. There is no Koala Plan of Management for the Maitland LGA and so this development proposal must be assessed under the development assessment process under the Koala Habitat Protection SEPP 2021.

The definition of core koala habitat under the Koala SEPP 2021 includes a reference to highly suitable habitat. Highly suitable habitat is where 15% or greater of the total number of trees within any Plant Community Type (PCT) are the regionally relevant species of those listed in Schedule 2 of the SEPP.

An area of land is defined as – including both the development footprint and the surrounding area that may have indirect impacts from the development (that is contained within the subject lot and adjoining land within the same ownership). The Koala SEPP 2021 applies to both direct and indirect impacts to habitat on the site area, therefore all habitat on the landholding should be considered even if no vegetation is to be cleared, however this does not mean all habitat must be surveyed – see below.

• For development applications, to determine the size of the surrounding area that needs to be surveyed, the suitably qualified person needs to consider the extent of potential indirect impacts from the development, such as vehicle strikes, drowning in pools, increased risk of fire, disturbance, and impediments to movement. It is not always necessary to survey the entire landholding

• Historical koala occupation of the site area is determined by considering koala records within the last 18 years, within the following maximum distances from the external boundary of the site area: o 2.5 kilometres of the site (for North Coast, Central Coast, Central Southern Tablelands, South Coast KMAs).

The field survey undertaken found no evidence of P. cinereus (Koala) occurring in the site. A review of the OEH Atlas of NSW Wildlife indicated no historical records of Koala within the last 18 years.

The isolated nature of the site, lack of scats and no recordings of Koala's suggest that the site would not constitute 'Core Koala Habitat' as defined by SEPP. No further provisions of the Koala Habitat Protection SEPP apply.

2.4.4 Targeted surveys for Large Forest Owls; Ninox strenua (Powerful Owl), Ninox connivens (Barking Owl) and Tyto novaehollandiae (Masked Owl)

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for *Ninox strenua* (Powerful Owl), *Ninox connivens* (Barking Owl) and *Tyto novaehollandiae* (Masked Owl).

Table 2-6: Potential Habitat on the Site for *Ninox strenua* (Powerful Owl), *Ninox connivens* (Barking Owl) and *Tyto novaehollandiae* (Masked Owl)

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the above Owls, these months include; May, June, July, August. As such these species of Owls were targeted for surveys during these months. See **Table 2-7** for dates that these species were surveyed on.

Table 2-7 Survey Effort:

Species	Date Surveyed
Ninox strenua (Powerful Owl)	25th May 2023
Ninox connivens (Barking Owl)	29th May 2023
Tyto novaehollandiae (Masked Owl)	30th May 2023 28th June 2023

Survey Effort:

- **Stag watching and quiet listening** – Stag watching and quiet listening was undertaken on four (4) separate nights, with larger hollows begins surveyed to detect the presence of threatened Owl species.

Results – No targeted owl species were seen or heard.

• **Call Playback Surveys** – Targeted call-playback surveys were undertaken for each owl species over four (4) separate nights. This survey method was only used over four (4) nights to limit the risk of potentially disrupting the breeding behaviour of any potentially occurring owls. The call playback method is also known to be unreliable because owls may choose to not respond to the call playback. If owls do respond to call playback the results are potentially misleading because the calls have drawn to bird into or near the site, thus giving misleading results as to the bird's home base.
Results – No targeted owl species were seen or heard.

• **Nocturnal Spotlighting** – The entire site was traversed during night hours on four (4) separate occasions. The purpose of this survey effort was to search for individuals within the site using a hand-held spotlight.
Results – No targeted owl species were seen or heard.

Results:

No targeted owl species were seen or heard despite survey efforts.

2.4.5 Targeted survey for arboreal mammals (excluding microbats); *Cercartetus nanus* (Eastern Pygmy-possum), *Petaurus norfolcensis* (Squirrel Glider), *Petauroides Volans* (Greater Glider) and *Phascogale tapoatafa* (Brush-tailed Phascogale).

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for Cercartetus nanus (Eastern Pygmy-possum), *Petaurus norfolcensis* (Squirrel Glider), *Petauroides Volans* (Greater Glider) and *Phascogale tapoatafa* (Brush-tailed Phascogale).

Table 2-8: Potential Habitat on the Site for Cercartetus nanus (Eastern Pygmy-possum), *Petaurus norfolcensis* (Squirrel Glider), *Petauroides Volans* (Greater Glider) *and Phascogale tapoatafa* (Brush-tailed Phascogale).

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the above arboreal mammals, the species *Petaurus norfolcensis* (Squirrel Glider) and *Petauroides Volans* (Greater Glider) are able to be surveyed year-round where-as,
Cercartetus nanus (Eastern Pygmy-possum); January, February, March, October, November, December.

Phascogale tapoatafa (Brush-tailed Phascogale); January, February, March, April, May, June, December.
As such targeted surveys were conducted during the specified months. See **Table 2-9** for dates that these species were surveyed on.

Table 2-9 Survey Effort:

Species	Date Surveyed
Spotlighting/Stag watching	
Petaurus norfolcensis (Squirrel Glider)	25th May 2023 29th May 2023 30th May 2023 28th June 2023
Petauroides Volans (Greater Glider)	
Phascogale tapoatafa (Brush-tailed Phascogale)	
Camera Trapping	
Petaurus norfolcensis (Squirrel Glider)	14th April 2023 – 28th March 2023
Petauroides Volans (Greater Glider)	
Phascogale tapoatafa (Brush-tailed Phascogale)	
Spotlighting/Stag watching	
Cercatetus nanus (Eastern Pygmy-possum)	
Elliot Trapping	
Cercatetus nanus (Eastern Pygmy-possum)	

Survey Effort:

- **Stag watching** – Stag watching was undertaken on four (4) separate nights (see **table 2-5** for surveyed dates), with suitable stags/ hollows being monitored for emergent movement of targeted species from dusk until nightfall.
Results – No targeted species were seen or heard.

- **Nocturnal Spotlighting** – The entire site was traversed during night hours on four (4) separate nights (see **table 2-5** for surveyed dates). The purpose of this survey effort was to search for individuals within the site using a hand-held spotlight.
Results – No targeted owl species were seen or heard.

- **Elliot Trapping** – Elliot trapping was deployed to determine the presence of *Cercatetus nanus* (see **Table 2-5** for surveyed dates).

Results:

No targeted arboreal mammal species were seen or captured on camera during targeted species surveys despite suitable survey practices. Elliot trapping will occur on site at a later date in accordance with Bam threatened species survey guidelines

2.4.6 Targeted survey for microbats *Myotis macropus* (Southern Myotis)

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for *Myotis Macropus* (Southern Myotis).

Table 2-10: Potential Habitat on the Site for *Myotis macropus* (Southern Myotis).

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for microbats, as such the *Myotis macropus* can only be surveyed during the months of; January, February, March, April, May, June, December. As such targeted surveys were conducted during the specified months. See **Table 2-11** for dates that these species were surveyed on.

Table 2-11 Survey Effort:

Species	Date Surveyed
ANABAT Recorders	
Myotis macropus (Southern Myotis)	28th March 2023 – 3rd April 2023

Survey Effort:

- **ANABAT Recorders** – Three (3) ANABAT we deployed on site to recorded possible calls of passing microbats during flight, this is used to detect species of microbats using the site for foraging and/or breeding purposes. (See **table 2-11 Survey effort** for survey dates).

Results:

Surveys are to be conducted at later date in accordance with TBDC survey timing guidelines. As such species has been listed as assumed present within the BAM-C however survey to determine Prescence will be conducted at later dates within TBDC guidelines.

2.4.7 Targeted survey for Avian species; *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Calyptorhynchus lathmi* (Glossy Black-Cockatoo), *Haliaeetus leucogaster* (White-bellied Sea-Eagle), *Hieraaetus morphnoides* (Little Eagle) and *Lophoictinia isura* (Square-tailed Kite)

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for *Callocephalon fimbriatum (Gang-gang Cockatoo), Calyptorhynchus lathmi (Glossy Black-Cockatoo), Haliaeetus leucogaster (White-bellied Sea-Eagle), Hieraaetus morphnoides (Little Eagle) and Lophoictinia isura (Square-tailed Kite).*

Table 2-12: Potential Habitat on the Site for *Callocephalon fimbriatum (Gang-gang Cockatoo), Calyptorhynchus lathmi (Glossy Black-Cockatoo), Haliaeetus leucogaster (White-bellied Sea-Eagle), Hieraaetus morphnoides (Little Eagle) and Lophoictinia isura (Square-tailed Kite)*.

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the avian species these months include;

Burhinus grallarius (Bush Stone-curlew): Year-round (All months)

Callocephalon fimbriatum (Gang-gang Cockatoo): January, October, November, December

Calyptorhynchus lathmi (Glossy Black-Cockatoo): January, February, Marc, April, May, June, July, August, September

Haliaeetus leucogaster (White-bellied Sea-Eagle): July, August, September, October, November, December

Hieraaetus morphnoides (Little Eagle): August, September, October

Lophoictinia isura (Square-tailed Kite): January, October, November, December

As such targeted surveys were conducted during the specified months. See **Table 2-13 survey effort** for dates that these species were surveyed on**.**

Table 2-13 Survey Effort:

Species	Date Surveyed
Diurnal/Dusk Bird Watching	
Burhinus grallarius (Bush Stone-curlew)	21/06/2023 28/06/2023
Callocephalon fimbriatum (Gang-gang Cockatoo)	Surveys to be conducted during September in accordance with TBDC survey guidelines.
Calyptorhynchus lathmi (Glossy Black-Cockatoo)	Surveys to be conducted during September in accordance with TBDC survey guidelines.
Haliaeetus leucogaster (White-bellied Sea-Eagle)	Surveys to be conducted during September in accordance with TBDC survey guidelines.
Hieraaetus morphnoides (Little Eagle)	Surveys to be conducted during September in accordance with TBDC survey guidelines.

Lophoictinia isura (Square-tailed Kite)	Surveys to be conducted during September in accordance with TBDC survey guidelines.

Survey Effort:

- **Diurnal Bird Surveys –** The site was traversed during the day, monitoring large mature trees for sign of nesting or perching by predatory bird species as well as observing large stick and log piles for activity of *Burhinus gralllarius* (Bush Stone-curlew). Time was also spent listening out for possible calls of adult and juvenile individuals.
  Results – No species were recorded

- **Dusk Bird Surveys –** Large hollow bearing trees with large hollows for cockatoo species were monitored in the hours leading up to dusk for signs of roosting threatened avian species
  Results – Surveys to be conducted during September in accordance with TBDC survey guidelines.

Results: (update after surveys are complete)

No targeted avian species were sighted or heard on site during targeted species surveys despite suitable survey practices/effort. Raptor species are to be surveyed during September coinciding with BAM species survey guidelines.

2.4.8 Targeted survey for Frog Species; Litoria aurea (Green and Golden Bell Frog), Litoria brevipalmata (Green-thighed Frog), Crinia tinnula (Wallum Froglet) & Uperoleia mahonyi (Mahoney Toadlet)

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for *Litoria aurea (Green and Golden Bell Frog), Litoria brevipalmata (Green-thighed Frog) & Uperoleia mahonyi (Mahoney Toadlet)*

Table 2-14: Potential Habitat on the Site for *Litoria aurea (Green and Golden Bell Frog), Litoria brevipalmata (Green-thighed Frog) & Uperoleia mahonyi (Mahoney Toadlet)*

PCT	Vegetation Zone (VZ)	Potential Habitat?
PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the amphibian species these months include;
Litoria aurea (Green and Golden Bell Frog): January, February, March, November, December

Litoria brevipalmata (Green-thighed Frog): January, February, March, November, December

Uperoleia mahonyi (Mahony's Toadlet): January, February, March, October, November, December

As such targeted surveys were conducted during the specified months. See **Table 2-15 survey effort** for dates that these species were surveyed on**.**

Table 2-15 Survey Effort:

Species	Date Surveyed
Spotlighting/Call surveys	
Litoria aurea (Green and Golden Bell Frog)	Surveys for species of threatened frogs will occur at later date during the TBDC specified months.
Litoria brevipalmata (Green-thighed Frog)	
Uperoleia mahonyi (Mahony's Toadlet)	

Survey Effort:

- **Spotlighting –** The sites watercourses/bodies were monitored for the presence of threatened species.

Results – Surveys are to be conducted at later date in accordance with BAM survey guidelines.

- **Call Surveys –** Call playback surveys, species calls were played followed by quite listening to identify possible call-backs form targeted amphibian species.

Results – Surveys are to be conducted at later date in accordance with BAM survey guidelines.

Results: (update after surveys are complete)

Surveys are to be conducted at later date in accordance with BAM survey guidelines. As such frogs have been listed as assumed present within the BAM-Calculator, although surveys will occur at later dates to determine presence.

2.4.9 Targeted survey for Herpetofauna *Delmar impar* (Striped Legless Lizard), *Hoplocephalus stephensii* (Stephens' Banded Snake)

Areas of Potential Habitat in the Site:

The survey effort section details the areas of potential habitat on the site for *Delmar impar* (Striped Legless Lizard), *Hoplocephalus stephensii* (Stephens' Banded Snake).

Table 2-16: Potential Habitat on the Site for *Litoria aurea (Green and Golden Bell Frog), Litoria brevipalmata (Green-thighed Frog), Crinia tinnula (Wallum Froglet) & Uperoleia mahonyi (Mahoney Toadlet)*

PCT	Vegetation Zone (VZ)	Potential Habitat?

PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact	Yes
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Moderate	Yes

Survey Timing:

The TBCD specifies the appropriate times/months to survey for the amphibian species these months include;

Delmar impar (Striped Legless Lizard); September, October, November, December.
Hoplocephalus stephensii (Stephens' Banded Snake)**;** January, February, March, October, November, December.

As such targeted surveys were conducted during the specified months. See **Table 2-17 survey effort** for dates that these species were surveyed on**.**

Table 2-17 Survey Effort:

Species	Date Surveyed
Spotlighting/Call surveys	
Delmar impar (Striped Legless Lizard)	
Hoplocephalus stephensii (Stephens' Banded Snake)	

Survey Effort:

- **Transect Surveys –** Site was traversed looking under fallen timber and other debris for presence of threatened species.

Results – Surveys are to be conducted at later date in accordance with BAM survey guidelines

Results: (update after surveys are complete)

Surveys are to be conducted at later date in accordance with BAM survey guidelines.

Further Assessment of Candidate Species

N/A

Refer to Figure 6 Field survey locations

2.5 Weather conditions

Table 2-18: Environmental conditions during threatened species surveys

Survey Date	Conditions

	Rainfall (mm)	Temperature
14/04/2023	4.5mm	14.6 – 23.1°
25/05/2023	0mm	1.8 – 23.4°
28/05/2023	0mm	16.4 – 4°
29/05/2023	0mm	7.3 – 21.5°
30/05/2023	0mm	7.7 – 20.7°
21/06/2023	0mm	-1.2 – 16.6°
28/06/2023	0mm	4.5 – 9.4°

2.6 Limitations

Surveys for multiple species are to be undertaken at later dates in accordance with BAM survey guidelines.

Licensing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL100533;
- Animal Research Authority (Trim File No: TRIM 11/5655) issued by NSW Department of Primary Industries; and
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: TRIM 11/5655) issued by Department of Primary Industries.

3. Site context

3.1 Assessment area

The study area is the area of land within the site that has been assessed in this report, which is the area of vegetation within the site that is relevant to this BDAR i.e., the area of vegetation within or potentially impacted by the construction and operational footprint. Land within the site that is not considered to be impacted by the proposal (either directly or indirectly) is considered to be outside the study area. In this case however, the entire site as surveyed.

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 1 Site Map and Figure 2 Location Map, respectively. A discussion of relevant patch landscape features is provided below.

3.2.1 IBRA bioregions and IBRA subregions

Dominant landscape forms have been used to divide Australia into bioregions. The site is within the Sydney Basin IBRA bioregion and the Hunter IBRA subregion. The Upper Hunter IBRA subregion occurs close to the site, with the nearest adjacent subregion boundary being approximately ~5 km north of the site. See previous Figure 1-1 for the locations of IBRA regions/subregions within 1.5 km of the site

3.2.2 Rivers, streams, estuaries, and wetlands

There are five drainage canals which occur within the site. One 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix 3 of the BAM) enters the site from the south and diverts into three 1st order watercourses which extent into the northern portion of the site. One 1st order watercourse enters the south-east corner of the site and extends along the eastern boundary. (in accordance with the Strahler stream ordering system in Appendix 3 of the BAM). See previous Figure 1-1 for watercourses within 1.5 km of the site

3.2.3 Habitat connectivity

The site native vegetation extends onto larger highly fragmented patches of intact native vegetation, with the majority of the surrounding land being cleared for agricultural and residential purposes.

3.2.4 Karst, caves, crevices, cliffs, rocks, or other geological features of significance

No karst, caves, crevices, or cliffs were located on the site or within a 1,500 m buffer around the site.

3.2.5 Areas of outstanding biodiversity value

Under the BC Act, the Minister for the Environment may declare Areas of Outstanding Biodiversity Value (AOBV). These are special areas that contain irreplaceable biodiversity values that are considered important to NSW, Australia or globally. No listed AOBV occur within the site or within a 1,500 m buffer around the site.

3.2.6 NSW (Mitchell) landscape

Mitchell Landscapes are used to describe areas in NSW in a broad sense and group together areas with relatively homogenous geomorphology, soils and broad vegetation types and are mapped at a scale of 1:250000. The subject site is within the Newcastle Coastal Ramp landscape. This landscape region has an estimated cleared fraction of 0.54. See previous Figure 1-1 for the locations of Mitchell Landscapes within 1.5 km of the site.

3.2.7 Additional landscape features identified in SEARs

N/A

3.2.8 Soil hazard features

No soil hazards were identified on the site, however acid sulphate soil risk mapping from Esapde (NSW Soil and Land information) shows soil hazards within 600m of the site.

3.3 Native vegetation cover

All areas of native vegetation cover, within the site and within a 1,500 m buffer area surrounding the site, have been mapped; see Figure 3-1. It is estimated, from this mapping, that the native vegetation cover would be 50%.

Table 3-1: Native vegetation cover in the assessment area

Assessment area (ha)	~5.26ha
Total area of native vegetation cover (ha)	~19.85ha
100	100%
Class (0-10, >10-30, >30-70 or >70%)	>70%

4. Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

Refer to Figure 7 Native vegetation extent

4.1.2 Areas that are not native vegetation

Derived Grassland found on site consisted of native and exotic grasses was determined by a native grassland assessment conducted in accordance with Appendix A – Method for calculating native vegetation extent in grassland areas that contain a mix of native and exotic species in disturbed plant community types of the document Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

Therefore, the ha area of Derived Grassland found on site were able to be reduced due to only having a cover percentage of 35% across the site

Table 1-1: Native grassland assessment

Plot (1mx1m)	Native grassland (%)	Exotic grassland (%)
1	100	75
2	100	45
3	100	10
4	95	15
5	100	30
6	100	10
7	100	90
8	95	40
9	90	10
10	100	25
Average	98	35

Given, there is 35% native groundcover using the Native Vegetation Extent adjustment ruleset we can calculate the extent of native vegetation found within Derived Grassland within PCT 3433 and 3444. If there is between 15% and 75% native groundcover – the calculation of native vegetation extent is adjusted by multiplying the proportion (%) of native groundcover by the total area to be cleared Reviewing Biodiversity Values Map and Threshold Tool area clearing threshold results (DP&E, 2023).

Using this ruleset, the extent of native grass cover within the site was calculated by;

PCT 3433 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

PCT 3444 Derived Grassland: 5.6ha x 0.98 (total groundcover) = 5.4

5.4ha x 0.35 (native cover%) = 1.9ha

Using this calculation, we can assess that within the development area there is 7.4ha of exotic vegetation.

4.2 Plant community types

4.2.1 Identifying Plant Community Types

Review of Existing Information

Table 4-1 Review of Existing Information on the Site's PCTs

Vegetation Mapping Project	Response
Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855	Three PCT's have been mapped within the site: • PCT 3433 – Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest.
	• PCT 3444 – Lower Hunter Spotted Gum-Ironbark Forest
	• PCT 4036 – Hunter Coast Lake Flats Apple Forest

The PCT's identified within the site were found to be consistent with the PCT's mapped on the Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855. The distribution of the site's PCTs is indicated in figure 8. See Appendix I. for photos.

4.2.2.1 PCT overview

Table 4-2 Plant Community Types within the site that are impacted by the proposal

PCT 3433 – Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	
PCT ID	3433
PCT name	Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Vegetation formation	Dry Sclerophyll Forests (Shrub/ grass sub- formation)
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Per cent cleared value (%)	69%
Extent within subject land (ha)	20.1
PCT 3444 – Lower Hunter Spotted Gum-Ironbark Forest	
PCT ID	3444
PCT name	Lower Hunter Spotted Gum-Ironbark Forest
Vegetation formation	Dry Sclerophyll Forests (Shrub/ grass sub- formation)
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Per cent cleared value (%)	62%
Extent within subject land (ha)	7.84
PCT 4036 – Hunter Coast Lake Flats Apple Forest	

PCT ID	4036
PCT name	Hunter Coast Lake Flats Apple Forest
Vegetation formation	Forested Wetland
Vegetation class	Coastal Floodplain Wetland
Per cent cleared value (%)	85%
Extent within subject land (ha)	2.65

4.2.2.2 Condition states

The sites two PCT's 3433 and 4036 have been classed as intact-Under-scrubbed and intact respectively, this is due to intact canopy stratum with large mature trees consisting of hollow bearing trees, along with ground cover stratums consisting of high abundance of native species, it is noted that these PCT's currently have cattle grazing occurring within. PCT 3444 has been classed as disturbed due to having few trees and a high abundance of exotic ground cover species, this PCT is also used for cattle grazing purposes.

4.2.2.3 Justification of PCT selection

Surveys undertaken by Firebird ecoSultants have confirmed the presence of several typical species associated with PCT 3433, including; *Corymbia maculata* (Spotted Gum), *Eucalyptus siderophloia* (Grey ironbark), *Microlaena stipoides* (Weeping Grass), *Panicum simile* (two colour panic).

PCT 3444, including; *Eucalyptus siderophloia* (Grey ironbark), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Microlaena stipoides* (Weeping Grass), *Eragrostis brownie* (Brown Lovegrass)

PCT 4036, including; *Eucalyptus tereticornis* (Forest Red Gum), *Microlaena stipoides* (Weeping Grass), *Eragrostis brownie* (Brown Lovegrass), *Hydrocotyle sibthorpioides*.

4.2.2.5 Alignment with EPBC Act listed ECs

N/A

4.3 Threatened ecological communities

PCT 3433 is associated with the endangered ecological community: Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions.

PCT 3444 is associated with the endangered ecological community: Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions.

PCT 4036 has no associated TEC/EC.

4.4 Vegetation zones

For the purposes of the BAM, a vegetation zone is an area of native vegetation on the site that is the same PCT and has a similar broad condition state. The site's impacted PCTs have been divided into several vegetation zones (as detailed in Table 4-3) (see Appendix I

for photos). A patch size area has been assigned to each vegetation zone, as a class (as detailed in Table 4-3). See Appendix I for photos of each vegetation zone

Table 4-3 Vegetation zones and patch sizes

PCT	Vegetation Zone (VZ) Name	VZ total area (Ha)	Vegetation Zone Description	Patch Size Class
3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ 1: Intact Under-Scrubbed	10	PCT 3433 has been classed as intact-Under-scrubbed, this is due to intact canopy stratum with large mature trees consisting of multiple hollow bearing trees, along with a ground cover stratum consisting of a high abundance of native species, it is noted that this PCT currently has cattle grazing occurring within.	101
	VZ 2: Derived Grassland	10.1	This vegetation zone has been classified as derived grassland as it is lacking in a canopy and mid stratum, this veg zone predominantly consists of exotic and native grasses.	101
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1: Disturbed	1.59	PCT 3444 has been classed as disturbed due to having few trees and a high abundance of exotic ground cover species, this PCT is also used for cattle grazing purposes.	101
	VZ 2: Derived Grassland	6.25	This vegetation zone has been classified as derived grassland as it is lacking in a canopy and mid stratum, this veg zone predominantly consists of exotic and native grasses.	101
4036 - Hunter Coast Lake Flats Apple Forest	VZ1: Intact	2.65	PCT 4036 has been classed as intact respectively, this is due to intact canopy stratum with large mature trees consisting of hollow bearing trees, along with ground cover stratums consisting of high abundance of native species, it is noted that this PCT currently has cattle grazing occurring within.	101

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

Each vegetation zone identified on the site has been surveyed to obtain a quantitative measure for each zone, of the composition, structure and function attributes listed in Table 3 of the BAM. These attributes are listed below:

• Growth form groups used to assess composition and structure:

- Tree
- Shrub
- Grass and grass like
- Forb
- Fern
- Other

• Attributes used to assess function:

- Number of large trees
- Tree regeneration
- Tree stem size class
- Total length of fallen logs
- Litter cover
- High threat exotic vegetation cover
- Hollow-bearing trees

Plot-based surveys were conducted, in accordance with s.5.3.4 of the BAM, by one ecologist on 22nd February 2021 and April 1st 2021. Survey plots were established around a central 50m transect and included:

- One 400 m² (20 m x 20 m) plot to assess the composition and structure attributes listed above.
- One 1000 m² (20 m x 50 m) plot to assess the function attributes: number of large trees, stem size class, tree regeneration and length of logs.
- Five 1 m² sub-plots to assess average litter cover (and other optional groundcover components).

See previous Figure 6 for plot locations. Plot data is provided in Appendix E. Table 4-4 details the Vegetation Integrity Score.

4.5.2 Scores

Table 4-4 Vegetation Integrity Score

PCT	Vegetation Zone (VZ)	Composition Score	Structure Condition Score	Function Condition Score	Vegetation Integrity Score
3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ 1: Intact Under-Scrubbed	55.9	71.5	28.8	48.6
	VZ 2: Derived – Grassland	51.3	41.5	15	31.7
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1: Disturbed	33.4	57.3	19.8	33.6
	VZ 2: Derived – Grassland	29.1	40.7	1.3	11.5

4.5.3 Use of benchmark data

Table 4-5: Zone Composition Benchmark Data:

PCT or vegetation class	Vegetation Zone	Tree	Shrub	Grass & Grass like	Forb	Fern	Other
3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ 1: Intact Under-Scrubbed	5	12	11	11	2	5
	VZ 2: Derived – Grassland	5	12	11	11	2	5
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1: Disturbed	5	12	11	11	2	5
	VZ 2: Derived – Grassland	5	12	11	11	2	5

Table 4-6: Zone Structure Benchmark Data:

PCT or vegetation class	Vegetation Zone	Tree	Shrub	Grass & Grass like	Forb	Fern	Other
3433 - Hunter Coast	VZ 1: Intact Under-Scrubbed	55	34	66	8	1	4

Foothills Spotted Gum-Ironbark Grassy Forest	VZ 2: Derived – Grassland	55	34	66	8	1	4
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1: Disturbed	55	34	66	8	1	4
	VZ 2: Derived – Grassland	55	34	66	8	1	4

Table 4-7: Zone Function Benchmark Data:

PCT or vegetation class	Vegetation Zone	Number of Large Trees	Litter Cover	Length of Fallen Logs	Stem size class	Tree regeneration <5cm diameter	High Threat Weed Cover
3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ 1: Intact Under-Scrubbed	3	65	45	4	Present	0
	VZ 2: Derived – Grassland	3	65	45	4	Present	0
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1: Disturbed	3	65	45	4	Present	0
	VZ 2: Derived – Grassland	3	65	45	4	Present	0

Hollow bearing Trees occur onsite however the proposal has been designed to avoid the removal of any hollow bearing trees on site.

5. Habitat suitability for threatened species

5.1 Identifying Threatened Species for Assessment

Threatened species that require assessment are initially identified based upon the following criteria:

• the distribution of the species includes the IBRA subregion in which the subject land occurs

• the study area is within any geographic constraints of the distribution of the species within the IBRA subregion.

• the species is associated with any of the PCTs identified within the study area

• the native vegetation cover within an assessment area including a 1500m buffer around the study area is equal to or greater than the minimum required for the species.

• the patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species.

• the species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM Calculator. The PCTs identified within the study area, patch sizes and native vegetation cover, as outlined in Section 3, were entered into the BAM Calculator and a preliminary list of threatened species were identified.

5.2 Identification of threatened species for assessment

Table 5-1 Predicted ecosystem credit species

Ecosystem Credit Species	Habitat Constraints	Veg Zone - Confirmed Predicted Species	Justification when not confirmed for a Veg Zone	BC Act listing	EPBC Act listing
Anthochaera phrygia Regent Honeyeater (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	CE	CE
Artamus cyanopterus cyanopterus Dusky Woodswallow		PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes		V	-

Botaurus poiciloptilus Australasian Bittern	• Waterbodies = yes • Brackish or freshwater wetlands = no • East of Cessnock = yes	PCT 4036 VZ1 = Yes	N/A	E	E
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	E
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	• Presence of Allocasuarina and casuarina species = no	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	No Allocasuarina and casuarina species present in this PCT (Double Check this)	V	V
Chthonicola sagittata Speckled Warbler	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Circus assimilis Spotted Harrier	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Daphoenositta chrysoptera Varied Sittella	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Dasyurus maculatus Spotted-tailed Quoll	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	E
Ephippiorhynchus asiaticus Black-necked Stork	• Shallow, open freshwater or saline wetlands or	PCT 3433 VZ1 = No PCT 3444 VZ1 = No	The sites dam's only occur as small artificial dams – the dams would not be considered as an open freshwater wetland.	E	-

	shallow edges of deeper wetlands within 300m of these swamps. • Waterbodies, Shallow lakes, lake margins and estuaries within 300m of these waterbodies				
Falco subniger Black Falcon	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Falsistrellus tasmaniensis Eastern False Pipistrelle	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Glossopsitta pusilla Little Lorikeet	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Haliaeetus leucogaster White-bellied Sea Eagle (Foraging)	• Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	The site is not within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines. Although there are dams in the local area, these are small farm dams only.	V	-
Hieraaetus morphnoides Little Eagle (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Hirundapus caudacutus White-throated Needletail	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	-	V
Ixobrychus flavicollis	• Land within 40 m of freshwater and	PCT 3433 VZ1 = No	The site is not within freshwater and estuarine wetlands, in areas of	V	-

Black Bittern	estuarine wetlands, in areas of permanent water and dense vegetation	PCT 3444 VZ1 = No	permanent water and dense vegetation. The sites Dams do not contain dense vegetation suitable to this species.		
Lathamus discolor Swift Parrot (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	E	CE
Limicola falcinellus Broad-billed Sandpiper (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	The site is not within a mapped area for this species	V	-
Lophoictinia isura Square-tailed Kite (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Miniopterus australis Little Bentwing-bat (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Miniopterus *orianae* ***oceanensis*** Large Bentwing-bat (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Neophema pulchella Turquoise Parrot	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-

Ninox connivens Barking Owl (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Ninox strenua Powerful Owl (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Nyctophilus corbeni Corben's Long-eared Bat	-	PCT 3433 VZ1 = Yes	N/A	V	-
Pandion cristatus Eastern Osprey (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Petaurus australis Yellow-bellied Glider	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	V
Petroica boodang Scarlet Robin	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Petroica phoenicea Flame Robin	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Pomatostomus temporalis temporalis Grey-crowned Babbler (Eastern subspecies)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Pseudomys novaehollandiae New Holland Mouse	-				
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	V
Saccolaimus flaviventris	-	PCT 3433 VZ1 = Yes	N/A	V	-

Yellow-bellied Sheathtail-bat		PCT 3444 VZ1 = Yes			
Scoteanax rueppellii Greater Broad-nosed Bat	-	PCT 3433 VZ1 = Yes	N/A	V	-
Stagonopleura guttata Diamond Firetail	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-
Tyto longimembris Eastern Grass Owl	-	PCT 3433 VZ1 = Yes	N/A	V	-
Tyto novaehollandiae Masked Owl (Foraging)	-	PCT 3433 VZ1 = Yes PCT 3444 VZ1 = Yes	N/A	V	-

5.1.2 Species credit species

Species credit species (or candidate species) are those where the likelihood of occurrence of the species or elements of suitable habitat for the species, cannot be confidently predicted by vegetation surrogates and landscape features and can be reliably detected by survey. The TBDC has identified several candidate species as requiring assessment, for the proposal; these are listed in Table 5-2. Table 5-3 also provides an assessment of habitat suitability for candidate species, in accordance with s.6.4 of the BAM.

Table 5-2: Predicted Flora species credit species

Species Credit Species	Sensitivity to Gain	Habitat Constraints / Geographic Limitations	Confirmed Candidate Species for Further Assessment	Justification
Acacia bynoeana Bynoe's Wattle	High Sensitivity to Gain	Nil	Yes	N/A
Angophora inopina Charmhaven Apple	High Sensitivity to Gain	Nil	Yes	N/A

Callistemon linearifolius Netted Bottle Brush	Moderate Sensitivity to Gain	Nil	Yes	N/A
Corybas dowlingii Red Helmet Orchid	Moderate Sensitivity to Gain	• East of Morpeth	No	**Geographic limitation not present:** The Site is located to the West of Morpeth
Diuris tricolor Pine Donkey Orchid	Moderate Sensitivity to Gain	• Muswellbrook LGA	No	**Geographic limitation not present:** The site is located within the Maitland City Council LGA
Eucalyptus Glaucina Salty Red Gum	High Sensitivity to Gain	Nil	Yes	N/A
Eucalyptus parramattensis subsp. Decadens Eucalyptus parramattensis subsp. Decadens	High Sensitivity to Gain	Nil	Yes	N/A
Eucalyptus pumila Pokolbin Mallee	High Sensitivity to Gain	Nil	Yes	N/A
Grevillea parviflora subsp. Small-flower grevillea	High Sensitivity to Gain	Nil	Yes	N/A
Persoonia pauciflora North Rothbury Persoonia	High Sensitivity to Gain	• Within 10km of North Rothbury	No	**Habitat constraints not present:** The study area is not within 10km of North Rothbury
Pomaderris queenslandica Scant Pomaderris	High Sensitivity to Gain	Nil	Yes	N/A
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	Moderate Sensitivity to Gain	Nil	Yes	N/A
Prostanthera cineolifera Singleton Mint Bush	High Sensitivity to Gain	Nil	Yes	N/A
Pterostylis chaetophora Pterostylis chaeterophora	Moderate Sensitivity to Gain	Nil	Yes	N/A

Rutidosis heterogams Heath Wrinklewort	High Sensitivity to Gain	Nil	Yes	N/A
Spyridium burragorang - endangered population Spyridium burragorang in the Cessnock local government area	High Sensitivity to Gain	Nil	Yes	N/A
Syzygium paniculatum Magenta Lilly Pilly	High Sensitivity to Gain	Nil	Yes	N/A
Tetratheca juncea Black-eyed Susan	High Sensitivity to Gain	Nil	Yes	N/A

Table 5-3: Predicted Fauna species credit species

Species Credit Species	Sensitivity to Gain	Habitat Constraints / Geographic Limitations	Confirmed Candidate Species for Further Assessment	Justification
Anthochaera phrygia Regent Honeyeater (Breeding)	High Sensitivity to Gain	• As per Important Habitat map	No	**Habitat constraints not present:** The study area is not within or near a mapped area of important habitat for this species.
Burhinus grallarius Bush Stone-curlew	High Sensitivity to Gain	• Fallen/standing dead timber including logs	Yes	**Habitat constraints present:** This study area has Fallen/standing dead timber present.

Callocephalon fimbriatum Gang-gang Cockatoo (Breeding)	High Sensitivity to Gain	• Hollow bearing trees • Eucalypt tree species with hollows greater than 9 cm in diameter	Yes	**Habitat constraints present:** This study area has Hollow bearing trees and eucalypt tree species with hollows greater than 9 cm in diameter present.
Calyptorhynchus lathami Glossy Black-Cockatoo (Breeding)	High Sensitivity to Gain	• Hollow bearing trees • Living or dead tree with hollows greater than 15 cm diameter and greater than 5m above the ground	Yes	**Habitat constraints present:** This study area has hollow bearing trees and living or dead trees with hollows greater than 15 cm in diameter and greater than 5m above the ground present
Cercartetus nanus Eastern Pygmy-possum	High Sensitivity to Gain	Nil	Yes	
Chalinolobus dwyeri Large-eared Pied Bat	Very High Sensitivity to Gain	• Cliffs • Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	No	**Habitat constraints not present**: This study area is not within or near cliffs or within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.
Crinia tinnula Wallum Froglet	Moderate Sensitivity to Gain	Nil	No	**Habitat constraint not present:** although the site has water features, these on-site dams and gullies do not consist of the needed acidic ephemeral nature that this species utilises when breeding, therefore it is highly unlikely that this species would occur on site.

Delmar impar Striped Legless Lizard	Moderate Sensitivity to Gain	Nil	Yes	
Dromaius novaehollandiae - endangered population Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	Moderate Sensitivity to Gain	• Port Stephens LGA	No	**Habitat constraints not present:** The site is not located within the LGA of Port Stephens.
Haliaeetus leucogaster White-bellied Sea Eagle (Breeding)	High Sensitivity to Gain	• Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	No	**Habitat constraints present:** This study area contains Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines.
Hieraaetus morphnoides Little Eagle (Breeding)	Moderate Sensitivity to Gain	• Nest trees - live (occasionally dead) large old trees within vegetation)	No	**Habitat constraints present:** This study area does contain Nest trees - live (occasionally dead) large old trees within vegetation)
Hoplocephalus stephensii Stephens' Banded Snake	High Sensitivity to Gain	• Hollow bearing trees • Within 500m of arboreal vines, tangles, fallen/standing dead timber including logs	Yes	**Habitat constraints present:** The site contains hollow bearing trees as well as having fallen/standing dead timber including logs.
Lathamus discolor Swift Parrot (Breeding)	Moderate Sensitivity to Gain	• As per Important Habitat Map	No	**Habitat constraints not present:** The study area is not within or near a mapped area of important habitat for this species.

Limicola Falcinellus Broad-billed Sandpiper (Breeding)	High Sensitivity to Gain	• As per Important Habitat Map	No	**Habitat constraints not present:** The study area is not within or near a mapped area of important habitat for this species.
Litoria aurea Green and Golden Bell Frog	Moderate Sensitivity to Gain	• Semi-permanent/ephemeral wet areas • Within 1km of wet areas|Swamps • Within 1km of swamp Waterbodies • Within 1km of waterbody	Yes	**Habitat constraints present:** The study area is within 1km of a waterbody / wet area / swamp/semi-permanent/ephemeral wet areas.
Litoria brevipalmata Green-thighed Frog	Moderate Sensitivity to Gain	• Semi-permanent/ephemeral wet areas swamps/waterbodies	Yes	**Habitat constraints present:** The study area contains Semi-permanent/ephemeral wet areas swamps/waterbodies.
Lophoictinia isura Square-tailed Kite (Breeding)	Moderate Sensitivity to Gain	• Nest trees	No	**Habitat constraints present:** This study area contains nest trees.
Miniopterus australis Little Bentwing-bat (Breeding)	Very High Sensitivity to Gain	• Caves • Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' • observation type code 'E nest-roost' • with numbers of individuals >500 • or from the scientific literature	No	**Habitat constraints not present:** This study area does not contain cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'. No observation type code 'E nest-roost'.
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	Very High Sensitivity to Gain	• Caves • Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in	No	**Habitat constraints not present:** This study area does not contain cave, tunnel, mine, culvert or other structure

		BioNet with microhabitat code 'IC – in cave' • observation type code 'E nest-roost' • with numbers of individuals >500		known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'. No observation type code 'E nest-roost'.
Myotis macropus Southern Myotis	High Sensitivity to Gain	• Hollow bearing trees • Within 200 m of riparian zone • Bridges, caves or artificial structures within 200 m of riparian zone • This includes rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200m of the site	Yes	**Habitat constraints present:** The study area is within 200 m of a riparian zone and contains hollows, Bridges, caves or artificial structures within 200 m of riparian zone and This includes rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200m of the site.
Ninox connivens Barking Owl (Breeding)	High Sensitivity to Gain	• Hollow Bearing trees • 'Living or dead trees with hollows greater than 20cm diameter and greater than 4m above the ground.	Yes	**Habitat constraints present:** The site contains hollow bearing trees with hollows greater than 20cm diameter and that occur 4m above the ground.
Ninox strenua Powerful Owl (Breeding)	High Sensitivity to Gain	• Hollow bearing trees • Living or dead trees with hollow greater than 20cm diameter	Yes	**Habitat constraints present:** The site contains hollow bearing trees with hollows greater than 20cm diameter and that occur 4m above the ground.
Pandion cristatus Eastern Osprey (Breeding)	Moderate Sensitivity to Gain	• Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting)	No	**Habitat constraints not present:** The study area does not contain stick nests.

Petauroides volans Southern Greater Glider	High Sensitivity to Gain	Nil	Yes	
Petaurus norfolcensis Squirrel Glider	High Sensitivity to Gain	Nil	Yes	
Petrogale penicillata Brush-tailed Rock-wallaby	Very High Sensitivity to Gain	• Land within 1km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines.	No	**Habitat constraints not present:** The study site is not located within 1km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines.
Phascogale tapoatafa Brush-tailed Phascogale	High Sensitivity to Gain	Nil	Yes	
Phascolarctos cinereus Koala (Breeding)	High Sensitivity to Gain	• Presence of Koala use trees – refer to Survey Comments field in TBDC	Yes	
Planigale maculata Common Planigale	High Sensitivity to Gain	Nil	No	This species is considered vagrant and therefore will not require further survey effort.
Pteropus poliocephalus Grey-headed Flying-fox (Breeding)	High Sensitivity to Gain	• Breeding camps	No	**Habitat constraints not present:** The study area does not contain any breeding camps.
Tyto novaehollandiae Masked Owl (Breeding)	High Sensitivity to Gain	• Hollow bearing trees • Living or dead trees with hollows greater than 20cm diameter	Yes	**Habitat constraints present:** The study area does contain hollow bearing trees, living or dead trees with hollows greater than 20cm diameter.
Uperoleia mahonyi Mahony's Toadlet	High Sensitivity to Gain	Nil	Yes	

Vespadelus troughtoni Eastern Cave Bat	Very High Sensitivity to Gain	• Caves • Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds.	No	**Habitat constraints not present:** The site does not contain Caves or is located Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds.

5.3 Presence of candidate species credit species

Table 5-4 Determining the presence of candidate flora species credit species on the subject land

Species Presence	Confirmed presence
Acacia bynoeana Bynoe's Wattle	No – surveyed
Angophora inopina Charmhaven Apple	No – surveyed
Callistemon linearifolius Netted Bottle Brush	No – surveyed
Cynanchum elegans *White-Flowered Wax Plant*	No – surveyed
Eucalyptus Glaucina Slaty Red Gum	No – surveyed
Eucalyptus parramattensis subsp. Decadens Eucalyptus parramattensis subsp. Decadens	No – surveyed
Eucalyptus pumila Pokolbin Mallee	No – surveyed
Grevillea parviflora subsp. Small-flower grevillea	No – surveyed
Pomaderris queenslandica Scant Pomaderris	No – surveyed
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No – surveyed
Prostanthera cineolifera Singleton Mint Bush	No – surveyed
Pterostylis chaetophora Pterostylis chaeterophora	No – surveyed
Rutidosis heterogams Heath Wrinklewort	No – surveyed
Spyridium burragorang - endangered population	No – surveyed
Syzygium paniculatum Magenta Lilly Pilly	No – surveyed
Tetratheca juncea Black-eyed Susan	No – surveyed

Table 5-5 Determining the presence of candidate fauna species credit species on the subject land

Species Presence	Confirmed presence
Burhinus grallarius Bush Stone-curlew **(Listed as E under BC Act)**	No – surveyed
Callocephalon fimbriatum Gang-gang Cockatoo	To be Surveyed at a later date in accordance with TBDC specified months.

Calyptorhynchus lathami Glossy Black-Cockatoo	To be Surveyed at a later date in accordance with TBDC specified months.
Cercartetus nanus Eastern Pygmy-possum	No – surveyed
Delmar impar Striped Legless Lizard	To be Surveyed at a later date in accordance with TBDC specified months.
Haliaeetus leucogaster White-bellied Sea-Eagle	To be Surveyed at a later date in accordance with TBDC specified months.
Hieraaetus morphnoides Little Eagle	To be Surveyed at a later date in accordance with TBDC specified months.
Hoplocephalus stephensii Stephens' Banded Snake	To be Surveyed at a later date in accordance with TBDC specified months.
Litoria aurea Green and Golden Bell Frog	To be Surveyed at a later date in accordance with TBDC specified months.
Litoria brevipalmata Green-thighed Frog	To be Surveyed at a later date in accordance with TBDC specified months.
Lophoictinia isura Square-tailed Kite	To be Surveyed at a later date in accordance with TBDC specified months.
Myotis macropus Southern Myotis	To be Surveyed at a later date in accordance with TBDC specified months.
Ninox connivens Barking Owl	No – surveyed
Ninox strenua Powerful Owl	No – surveyed
Ninox connivens Barking Owl	No – surveyed
Petauroides volans Southern Greater Glider	No – surveyed
Petaurus norfolcensis Squirrel Glider	No – surveyed
Phascogale tapoatafa Brush-tailed Phascogale	No – surveyed
Phascolarctos cinereus Koala	No – surveyed
Tyto novaehollandiae Masked Owl	No – surveyed
Uperoleia mahonyi Mahony's Toadlet	To be Surveyed at a later date in accordance with TBDC specified months.

5.4 Threatened species surveys

Table 5-6 Threatened species surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)		
Bynoe's Wattle	***Acacia bynoeana***	Parallel field-transverse method	☒ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Charmhaven Apple	***Angophora inopina***	Parallel field-transverse method	☒ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Netted Bottle Brush	***Callistemon linearifolius***	Parallel field-transverse method	☒ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
White-Flowered Wax Plant	***Cynanchum elegans***	Parallel field-transverse method	☒ Yes 28/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Slaty Red Gum	***Eucalyptus Glaucina***	Parallel field-transverse method	☒ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Eucalyptus parramattensis subsp. Decadens	***Eucalyptus parramattensis subsp. Decadens***	Parallel field-transverse method	☒ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	Yes (Not Within clearing aera)	No
Pokolbin Mallee	***Eucalyptus pumila***	Parallel field-transverse method	☐ Yes 21/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Small-flower grevillea	***Grevillea parviflora subsp.***	Parallel field-transver	☒ Yes To Be surveyed	☐ No <Dates & times>	2 hours, 2 People	No	No

		se method					
Scant Pomaderris	***Pomaderris queenslandica***	Parallel field-transverse method	☒ Yes 28/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Prasophyllum sp. Wybong	***Prasophyllum sp. Wybong***	Parallel field-transverse method	☐ Yes To Be surveyed	☐ No <Dates & times>	2 hours, 2 People	No	No
Singleton Mint Bush	***Prostanthera cineolifera***	Parallel field-transverse method	☐ Yes To Be surveyed	☐ No <Dates & times>	2 hours, 2 People	No	No
Pterostylis chaeterophora	***Pterostylis chaetophora***	Parallel field-transverse method	☐ Yes To Be surveyed	☐ No <Dates & times>	2 hours, 2 People	No	No
Heath Wrinklewort	***Rutidosis heterogams***	Parallel field-transverse method	☒ Yes 28/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Spyridium burragorang - endangered population	***Spyridium burragorang - endangered population***	Parallel field-transverse method	☒ Yes 28/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Magenta Lilly Pilly	***Syzygium paniculatum***	Parallel field-transverse method	☒ Yes 28/06/2023	☐ No <Dates & times>	2 hours, 2 People	No	No
Black-eyed Susan	***Tetratheca juncea***	Parallel field-transverse method	☐ Yes To Be surveyed	☐ No <Dates & times>	2 hours, 2 People	No	No

Refer to Section 2.4.3 for detailed survey effort.

Table 5-7: Threatened species surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g., harp trap, Elliott trap, bioacoustics, etc.)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)		
Bush Stone-curlew	***Burhinus grallarius***	Transect surveys	☒ Yes 21/06/2023 28/06/2023	☐ No <Dates & times>		No	No
Gang-gang Cockatoo	***Callocephalon fimbriatum***	Bird Watching/ Watching hollows during dusk	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Glossy Black-Cockatoo	***Calyptorhynchus lathami***	Bird Watching/ Watching hollows during dusk	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Eastern Pygmy-possum	***Cercartetus nanus***	Elliot trapping	☐ Yes	☐ No <Dates & times>		No	No
Striped Legless Lizard	***Delma impar***	Transect surveys, targeting loose timber	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
White-bellied Sea-Eagle	***Haliaeetus leucogaster***	Bird watching/ listening for calls	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Little Eagle	***Hieraaetus morphnoides***	Bird watching/ listening for calls	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Stephens' Banded Snake	***Hoplocephalus stephensii***	Transect surveys, targeting loose timber, hollow surveys	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No

Green and Golden Bell Frog	***Litoria aurea***	Frog surveys/ call playback/ listening	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Green-thighed Frog	***Litoria brevipalmata***	Frog surveys/ call playback/ listening	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Square-tailed Kite	***Lophoictinia isura***	Bird watching/ listening for calls	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Southern Myotis	***Myotis macropus***	ANABAT Surveys	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No
Barking Owl	***Ninox connivens***	Call playback surveys/ nocturnal transect surveys	☒ Yes 25/05/2023 29/05/2023 30/05/2023 28/06/2023	☐ No <Dates & times>		No	No
Powerful Owl	***Ninox strenua***	Call playback surveys/ spotlighting	☐ Yes 25/05/2023 29/05/2023 30/05/2023 28/06/2023	☐ No <Dates & times>		No	No
Southern Greater Glider	***Petauroides volans***	Spotlighting/ Stag watching/ Camera traps	☐ Yes Spotlighting 25/05/2023 29/05/2023 30/05/2023 28/06/2023Camera 14/04/2023 - 28/05/2023	☐ No <Dates & times>		No	No
Squirrel Glider	***Petaurus norfolcensis***	Spotlighting/ Stag watching/ Camera traps	☐ Yes Spotlighting 25/05/2023 29/05/2023 30/05/2023 28/06/2023 Camera 14/04/2023 - 28/05/2023	☐ No <Dates & times>		No	No

Brush-tailed Phascogale	***Phascogale tapoatafa***	Spotlighting/ Stag watching/ Camera traps	☐ Yes Spotlighting 25/05/2023 29/05/2023 30/05/2023 28/06/2023 Camera 14/04/2023 - 28/05/2023	☐ No <Dates & times>		Yes	No
Masked Owl	***Tyto novaehollandiae***	Call playback surveys/ spotlighting	☐ Yes 25/05/2023 29/05/2023 30/05/2023 28/06/2023	☐ No <Dates & times>		No	No
Mahony's Toadlet	***Uperoleia mahonyi***	Frog surveys/ call playback/ listening	☐ Yes To Be surveyed	☐ No <Dates & times>		No	No

Refer to Section 2.4.3 for detailed survey effort.

5.5 Expert reports

N/A

5.6 More appropriate local data (where relevant)

N/A

Table 5-8 Use of more appropriate local data for habitat suitability

Species	Amendments to species data	Local data source/s
N/A		

5.6 Area or count, and location of suitable habitat for a species credit species (a species polygon)

N/A No threatened species were found on site that will require offset.

Table 5-9 Results for present species (recorded within the subject land)

Common name	**Scientific name**	**Biodiversity risk weighting** (BAM-C & TBDC*)	**SAII entity**** (BAM-C & TBDC)	**Habitat constraints / microhabitats present on the subject land / vegetation zone**	**Abundance – No. individual plants present on subject land** (Flora with unit of measure of count)	**Extent (ha) of suitable habitat present on site** (flora or fauna with unit of measure of area)	**TBDC species specific recommendations e.g. buffers, general comments** (Where relevant)	**Habitat condition** (vegetation integrity score for each vegetation zone in the polygon – area species only)

Table 5-10 Results for EPBC Act listed species present (recorded within the subject land)

Common name	**Scientific name**	**Abundance – No. individual plants present on subject land** (Flora with unit of measure as count)	**Extent (ha) of suitable habitat present on site** (flora or fauna with unit of measure as area)

6. Identifying prescribed impacts

Table 6-1: Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Example: Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐Yes / ☒No	No krast's, caves, crevices, cliffs, rocks are present within or near the site, as such the proposed development would not impact these features.	N/A
Example: Vehicle strikes	☐Yes / ☒No	N/A	N/A
Human-made structures	☒Yes / ☐No	Two existing dwellings occur on site currently, they will not be impacted by the development.	N/A
Non-native vegetation	☒Yes / ☐No	The site consists of a mixture of native and non-native grasses.	N/A
Habitat connectivity	☒Yes / ☐No	Site is connected to larger intact portions of native vegetation. However, the majority if the sites intact native vegetation will be retained. As such habitat connectivity will not be affected by the Proposed development.	N/A
Waterbodies, water quality and hydrological processes	☒Yes / ☐No	Five ephemeral gullies occur within the site as well as one 2nd order ephemeral gully.	Threatened frog species are likely to use these geographical features found within the site as breeding/foraging habitat, however no threatened frog species have been identified as using the features. Threatened micro bat species Myotis macropus (Southern Myotis) is likely to use waterbodies located on site as foraging habitat due to the close proximity of hollow bearing trees to these features.

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Wind turbine strikes (wind farm development only)	☐Yes / ☒No	N/A	N/A

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

7. Avoid and minimise impacts

7.1 Avoid and minimise direct and indirect impacts

7.1.1 Project location

The site is ~32 ha in size and is located in the eastern periphery of the residential portion of Farley. The majority of the site is zoned as RU2 Rural Landscape, with the north-eastern corner of the site zoned as R1 General Residential. The northern western half of the site is covered predominantly in native and exotic grasses with Spotted Gum and Ironbark tree species scattered throughout. Spotted Gum – Ironbark Forest vegetation occurs over the majority of the south eastern half of the site. Forest adjoins the site from the west, south and east. A residential subdivision is being developed in the adjoining property to the north-east. Medium and large rural lots occur to the north across Wollombi Road. There are five ephemeral gullies which occur within the site. One 2nd order gully (in accordance with the Strahler stream ordering system in Appendix 3 of the BAM)

7.1.2 Project design

The proposal includes a residential lifestyle community with moveable dwellings (2 lots into 207 manufactured homes as well as 47 multi-dwelling sites) of 303 & 283 Wollombi Road, Farley 2320 (Lot 2 & 4 DP 810894) to provide development space for the construction of 207 dwellings as well as associated infrastructure such as site access, services and asset protection zones (APZ).

The development footprint has largely been located in the northern portion of the site, which is predominately covered by a mixture of native and exotic grasses and weeds.

The proposed development footprint is indicated in Figure 1-2. It totals an area of 12.66 ha of land/vegetation and encompasses the following areas:

- The designated area for residential lots, building envelopes and site access (12.66 ha)
- The proposed operational footprint would include the same areas as the construction footprint indicated in Figure 1; that being the developed areas for the residential lots and site access and the APZs.

The study area is the area of land within the site that has been assessed in this report, which is the area of vegetation within the site that is relevant to this BDAR i.e., the area of vegetation within or potentially impacted by the construction and operational footprint. Land within the site that is not considered to be impacted by the proposal (either directly or indirectly) is considered to be outside the study area. In this case however, the entire site was surveyed.

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7.2 Avoid and minimise prescribed impacts

The following sections 7.4 to 8.4 describe efforts undertaken to avoid and minimise impacts on biodiversity values in accordance with Chapter 7 of the BAM.

7.3 Other measures considered

N/A

7.4 Summary of measures to avoid and minimise impacts

Table 7-1: Avoidance and minimisation measures for direct, indirect and prescribed impacts

Locating a Project to Avoid and Minimise Impacts on Native Vegetation and Habitat	
Objectives/Requirements	**Compliance**
Project location decisions should be informed by knowledge of biodiversity values. The biodiversity values set out in Stage 1 of the BAM may be used to provide early consideration in planning the route or location of a proposal.	Under the Maitland Local Environment Plan 2011 (the LEP), The proposed development has been designed to avoid the PCTs with the higher VIS and located the development in the lower VIS PCTs, which is mainly grassland with scattered Eucalyptus.
Final selection of project location may be an iterative process. Location decisions may need to be revisited when all field surveys have been completed. Direct impacts on clearing of native vegetation and habitat can be avoided and minimised by: (a) locating the development outside of biodiversity values (b) locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score) (c) locating the project in areas that avoid habitat for species that have a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or highly cleared PCT. (d) locating the project so its outside of the buffer area around breeding habitat features such as nest trees or caves	The site has been subject to previous disturbance by existing use as Rural Land. a) As reflected in the Biodiversity Values Map, the Subject Land does not contain any areas containing biodiversity values. b) The Subject DA Footprint has been located within the RU2 Rural Landscape zone. The majority of the development footprint is to occur within the grassland present on site, this grassland is currently used for grazing by cattle and has been selected as to avoid the removal of habitat features such as hollow bearing trees and to retain the higher VIS PCT's. c) The Subject DA Footprint will impact upon TEC Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions within PCT (3433 and 3444) The development footprint as stated has been designed to avoid the higher VIS PCT's and aims to avoided habitat features that will impact upon species that may use these

	features, such as hollow bearing trees, established nests, gully lines and associated buffers as well as high risk weighting species such as the 4 *Eucalyptus parramattensis* which will be avoided by clearing, d) All hollow bearing trees located within the site are to be retained as to not disturb possible breeding habitat of threatened species that may occur on site, however 2 water bodies located on site are planned to be removed as part of the development, in order to offset potential impacts to species using the feature currently the water bodies will be drained in the presence of an ecologist to preserve and relocate any potential species found during the process.
Justifications for the decisions in determining the final location must be based on consideration of (a) an analysis of alternative modes or technologies that would avoid or minimise impacts on biodiversity values (b) an analysis of alternative routes that would avoid or minimise impacts on biodiversity values (c) an analysis of alternative sites that within a property on which the project is proposed that would avoid or minimise impacts on biodiversity values	The removal of vegetation will occur within the RU2 Rural Landscape as well as the North-Eastern portion of the site zoned as R1 General Residential. a) b) The route that has been selected has aimed to minimise the impacts to the biodiversity of the site. c) An analysis of the site has shown that the location chosen for the proposed residential lifestyle community with moveable dwellings has been chosen to minimise and avoid impacts on biodiversity values.
The proposal may also list and map constraints, such as: (a) Bushfire protection requirements, including clearing for asset protection zones (b) Flood planning levels (c) Servicing constraints	Bushfire mitigation measures including Asset Protection Zones has been implemented within the proposed lots.
Design the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat	
Justifications for the decisions in determining the final location must be based on consideration of (a) reducing the clearing footprint of the project	a) The proposed development will avoid the majority of higher quality habitat within Zone 1, with only removal of 0.28ha. The proposed

(b) locating ancillary facilities in areas where there are no biodiversity values (c) locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score) (d) locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC or entity at risk of SAII) (e) Actions and activities that provide for rehabilitation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation, threatened species, threatened ecological communities and their habitat on the development site	development has a low impact on biodiversity values, native vegetation, connectivity routes and fauna movements whilst retaining the better-quality habitat within the site.
Avoid or Minimise Prescribed Impacts when planning the proposal	
Prescribed impacts may occur on habitat features that are not native vegetation e.g., caves, rocky outcrops, and flyways. Because these types of features cannot readily replace or offset, it is important that measures to avoid minimise impacts are undertaken and are clearly documented	A vegetation management plan will be implemented to revegetate and improve areas of native vegetation. The South Eastern corner of the site has limited function as a habitat corridor, in order to minimise impacts to the sites connectivity this portion of the site will be revegetated following processes and guidelines put in place through the use of a vegetation management plan.
Locating a Project to Avoid and Minimise Prescribed Biodiversity Impacts	
*P*rescribed biodiversity impacts can be avoided and minimised by: (a) locating surface works to avoid direct impacts on the habitat features identified in Chapter 6 (b) locating of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features identified in Chapter 6 e.g., locating longwall panels away from geological features of significance or water dependent plant communities and their supporting aquifers	Surface works will avoid habitat features such as hollow bearing trees, the proposals design will impact habitat features such as watercourses and water bodies, as two waterbodies on site are to be removed for the building of a proposed club house. a) The project is located to predominantly affect open grassland, with most of the sites mature canopy vegetation to be retained this in turn will aim to avoid severing or interfering with corridors.

(c) locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or local movement pathways (d) optimising project layout to minimise interactions with threatened species and ecological communities, e.g. designing turbine layout to allow buffers around features that attract and support aerial species, such as forest edges, riparian corridors and wetlands, ridgetops and gullies (e) locating the project to avoid direct impacts on water bodies or hydrological processes	b) Project layout is designed to minimise impacts to threatened species areas containing habitat features such as hollows which may be utilised by threatened species are to be retained, the project has been designed to avoid impacts/ interactions with *Eucalyptus parramattensis* found on site. c) 2 farm dams are located on site are planned to be removed as part of the development, in order to offset potential impacts to species using the feature currently the water bodies will be drained in the presence of an ecologist to relocate any potential species found during the process.
When locating a proposal, the following need to be analysed and justification should be provided for each alternative selected: (a) alternative modes or technologies that would avoid or minimise prescribed impacts (b) alternative routes that would avoid or minimise prescribed impacts (c) alternative locations that would avoid or minimise prescribed impacts (d) alternative sites within a property on which the project is proposed that would avoid or minimise prescribed impacts	The location of the proposal has been designed to avoid the better-quality habitat within the site i.e., hollow bearing trees and the PCT with the higher VIS. The location of the development occurs already in a disturbed are of the site that is comprised of grassland and scattered trees.
Justifications for project location decisions should identify any other site constraints that the proponent has considered in determining the location and design of the project, e.g., bushfire protection requirements including clearing for asset protection zones, flood planning levels, servicing constraints.	Bushfire mitigation measures including Asset Protection Zones has been implemented within the proposed lot layout to occur within the site.
Design the proposal to avoid or minimise prescribed impacts	
Design measures that can avoid or minimise prescribed impacts include: (a) engineering solutions, such as proven techniques to: i. minimise fracturing of bedrock underlying features of geological significance, or groundwater-dependent communities and their supporting aquifers ii. restore connectivity and movement corridors	Water Sensitive Urban Design (WSUD) will be implemented to ensure that water quality and runoff are appropriately like existing conditions on site and minimise prescribed impacts on biodiversity values.

(b) design elements that minimise interactions with threatened entities, such as: i. designing turbines to dissuade perching and minimise the diameter of the rotor swept area ii. designing fencing to prevent animal entry to transport corridors iii. providing vegetated buffers rehabilitated with native species (c) maintaining environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation (d) maintaining hydrological processes that sustain threatened entities (e) controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities.	

8. Impact Assessment

8.1 Direct Impacts

The following describes direct impacts on native vegetation, including impacts on TECs and threatened species through the removal of potential habitat. Direct impacts of the development are detailed in the following Tables 8-1 to 8-3.

Table 8-1: Summary of residual direct impacts

PCT	BC Act Name / Listing Status	EPBC Act Name / Listing Status	Vegetation Zone (VZ) Name	Direct Impact
PCT 3433- Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Endangered Ecological Community	Not Listed	56.3	
PCT 3444 - Lower Hunter Spotted Gum-Ironbark Forest	Endangered Ecological Community	Not Listed	30.1	
PCT 4036 - Hunter Coast Lake Flats Apple Forest	Not listed	Not listed	60.6	

Table 8-2: Impacts to Vegetation Integrity (VI) Scores

PCT	Vegetation Zone (VZ)	Management Zone / Area Impacted	Current VI Score	Future VI Score	Change in VI Score	Total Change in VI Score
3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ1	0.28	48.6	0	-48.6	-48.6
	VZ2	1.9	31.7	0	- 31.7	- 31.7
3444 - Lower Hunter Spotted Gum-Ironbark Forest	VZ1	1.18	30.1	0	-30.1	-30.1
	VZ2	1.9	11.5	0	- 11.5	- 11.5

8.1.1 Residual direct impacts

Table 8-3: Summary of residual direct impacts.

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	**BC Act status**	**EPBC Act status**	**SAII entity**	**Project phase/timing of impact** (e.g. construction, operation, rehabilitation)	**Extent** (ha, number of individuals)
Removal of 0.11ha of native vegetation **3433** - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest (Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions)	Endangered Ecological Community	Not Listed	No	Pre-construction	0.11ha
Removal of 1.2ha of native vegetation **3444** - Lower Hunter Spotted Gum-Ironbark Forest (Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions)	Endangered Ecological Community	Not Listed	No	Pre-construction	1.2ha
Remoival of 0.11ha of native vegetation **4036** - Hunter Coast Lake Flats Apple Forest	Not listed (Not a TEC)	Not Listed	No	Pre-construction	0.11ha

8.1.2 Assessment of Direct Impacts on Confirmed Ecosystem Credit Species

As indicated in previous Table 2-7, several predicted ecosystem credit species have been confirmed for the site. The following provides an assessment of direct impacts on the confirmed ecosystem credit species, which have been grouped into guilds.

Open Forest / Woodland Birds – *Anthochaera phrygia* (Regent Honeyeater (Foraging)), *Artamus cyanopterus* (Dusky Woodswallow), *Chthonicola sagittata* (Speckled Warbler), *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies)), *Daphoenositta chrysoptera* (Varied Sittella), and *Glossopsitta pusilla* (Little Lorikeet).

These are highly mobile species that are able to footage over large ranges. There is potential for any of these species to occur in the site (although some more than others). The area of habitat within the site that these species would most likely prefer is PCT 3433 - vegetation zone 1, which has largely been avoided by the proposal.

Overall, it is considered that the avoided habitat described in previous section 3.2.1, as well as the recommended mitigation measures described in previous section 3.1.2 would minimise the impacts on these wide-ranging species.

Birds of Prey – *Lophoictinia isura* (Square-tailed Kite (Foraging)), *Circus assimilis* (Spotted Harrier), *H. morphnoides* (Little Eagle) (Foraging) and *Pandion cristatus* (Eastern Osprey) (Foraging) *Falco subniger* (Black Falcon).

P. cristatus (Eastern Osprey) generally hunt over large areas of open water. The study area and nearby surrounding areas do not provide open water for foraging, as such it is considered unlikely that this species would occur within the site. However, the study area may serve as a brief resting area for. *P. cristatus* (Eastern Osprey).

H. morphnoides (Little Eagle), *Lophoictinia isura* (Square-tailed Kite) and *Circus assimilis* (Spotted Harrier) are highly mobile species that are able to hunt/travel over large ranges. There is potential for any of these species to occur in the site (although some more than others). The area of habitat within the site that these species would most likely prefer is PCT 3433 - vegetation zone 1, which has largely been avoided by the proposal.

Overall, it is considered that the avoided habitat described in previous section 3.2.1, as well as the recommended mitigation measures described in previous section 3.1.2 would minimise the impacts on these wide-ranging species.

Forest Owls – Ninox connivens (Barking Owl (Foraging)), Ninox strenua (Powerful Owl (Foraging)) & Tyto novaehollandiae (Masked Owl (Foraging))

These species were not recorded on the site during the targeted surveys undertaken. The site contains potential hunting habitat for these owls; although arboreal mammal activity was observed to be low for the site, with low sightings of prey species during spotlighting surveys. Nevertheless, it must be assumed that prey species may nest and forage within the site.

These are highly mobile species that can travel over large ranges. There is potential for any of these species to occur in the site (although some more than others). The area of habitat within the site that these species would most likely prefer is PCT 3433 - vegetation zone 1, which has largely been avoided by the proposal

All the hollow-bearing trees and most of the ground hollows within vegetation zone 1 (PCT 3433) have been avoided. As such, the proposal has avoided impacts to nesting habitat for hollow-dependant prey species.

Overall, it is considered that the avoided habitat described in previous section 3.2.1, as well as the recommended mitigation measures described in previous section 3.1.2 would minimise the impacts on these wide-ranging species.

Microbats – Microbats – *Falsistrellus tasmaniensis* (Eastern-False pipistrelle), *Micronomus norfolkensis* (Eastern Coastal Freetail-bat), *Miniopterus australis* (Little Bentwing-bat) (Foraging), *Miniopterus orianae oceanensis* (Large Bentwing-bat) (Foraging), *Myotis Macropus* (Southern Myotis), *Nyctophilus corbeni* (Corben's Long-Eared Bat), S*accolaimus flaviventris* (Yellow Bellied Shea tail-bat), *Scoteanax rueppellii* (Greater Broad-Nosed Bat)

These species are highly mobile and are known to travel large distances to forage. They generally forage in structurally open and associated edge habitat and roost in trees containing hollows, or (in the case of *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus orianae oceanensis* (Large Bentwing-bat), caves or similar structures)..

All the hollow-bearing trees have been avoided. As such, the proposal has avoided significant impacts to nesting habitat for these hollow-dependant species.

***Dasyurus maculatus* (Spotted-tailed Quoll)**
D. maculatus (Spotted-tailed Quoll) is known to favour extensive tracts of undisturbed bushland away from human development, the chances of it occurring within the site is very small. Nevertheless, its presence must be assumed.

Overall, it is considered that the recommended mitigation measures would minimise the direct impacts and allow the directly impacted areas of the site to retain some of its habitat values for these species.

Phascolarctos cinereus (Koala) (Foraging)

A development proposal must be assessed under the development assessment process under the SEPP in LGAs where no approved Koala Plan of Management is in place. The includes all land:

with an area of at least 1 hectare, including adjoining land (meaning land the next cadastre over) within the same ownership, and

that is within an LGA to which the SEPP applies

The site is greater than 1 hectare and Farley occurs within the Maitland LGA which lies within the Central Coast Koala Management Area. There is no Koala Plan of Management for the Maitland LGA and so this development proposal must be assessed under the development assessment process under the Koala Habitat Protection SEPP 2021.

The definition of core koala habitat under the Koala SEPP 2021 includes a reference to highly suitable habitat. Highly suitable habitat is where 15% or greater of the total number of trees within any Plant Community Type (PCT) are the regionally relevant species of those listed in Schedule 2 of the SEPP.

An area of land is defined as – including both the development footprint and the surrounding area that may have indirect impacts from the development (that is

contained within the subject lot and adjoining land within the same ownership). The Koala SEPP 2021 applies to both direct and indirect impacts to habitat on the site area, therefore all habitat on the landholding should be considered even if no vegetation is to be cleared, however this does not mean all habitat must be surveyed – see below.

• For development applications, to determine the size of the surrounding area that needs to be surveyed, the suitably qualified person needs to consider the extent of potential indirect impacts from the development, such as vehicle strikes, drowning in pools, increased risk of fire, disturbance, and impediments to movement. It is not always necessary to survey the entire landholding

• Historical koala occupation of the site area is determined by considering koala records within the last 18 years, within the following maximum distances from the external boundary of the site area: o 2.5 kilometres of the site (for North Coast, Central Coast, Central Southern Tablelands, South Coast KMAs).

The field survey undertaken found no evidence of P. cinereus (Koala) occurring in the site. A review of the OEH Atlas of NSW Wildlife indicated no historical records of Koala within the last 18 years.

The isolated nature of the site, lack of scats and no recordings of Koala's suggest that the site would not constitute 'Core Koala Habitat' as defined by SEPP. No further provisions of the Koala Habitat Protection SEPP apply.

Megabats - *Pteropus poliocephalus* (Grey-headed Flying-fox) (Foraging)
These species were not recorded within the site during any of the spotlighting surveys undertaken in May 2023.

This species is highly mobile and are known to travel large distances to forage. The development footprint potential foraging habitat, however the majority of native vegetation within the site will be retained. Large areas of suitable habitat for these species also occurs within the wider Maitland locality, ensuring that any local scale impacts from vegetation removal would be unlikely to impact on populations of these wide-ranging species.

Overall, it is considered that the recommended mitigation measures would minimise the direct impacts and allow the directly impacted areas of the site to retain some of its habitat values for these species.

8.2 Indirect impacts

Table 8-4: Summary of residual indirect impacts

Indirect impact (Describe impact, e.g., transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g., construction, operation, rehabilitation)	**Likelihood and consequences**
Inadvertent impacts on adjacent habitat or vegetation		Adjacent vegetation	Daily during construction	Potentially long-term	During construction	Medium
Sedimentation and contaminated and/or nutrient rich run-off		Into downstream areas	During heavy rainfall or storm events	Potentially long-term	During rainfall events	Medium
Noise, dust or light spill		Adjacent vegetation	Daily during construction and sporadically during operation	Short-term impacts during construction phase, long-term impacts	Daily during construction and sporadically during operation	Medium
Transport of weeds and pathogens from the site to adjacent vegetation		Potential to spread into nearby habitat	During construction and operation	Potentially long-term impacts	Ongoing for the life of the development	Medium
Rubbish Dumping		Potential for rubbish to spread into areas outside the development footprint.	Anytime during construction and operation	Ongoing for the life of the development	Ongoing for the life of the development	Low

Wood collection		Potential habitat to be removed from areas outside of the development footprint	Anytime during construction and operation.	Ongoing for the life of the development	Ongoing for the life of the development	Low
Bush rock removal and disturbance		Potential habitat to be removed from areas outside of the development footprint	Anytime during construction and operation	Ongoing for the life of the development	Ongoing for the life of the development	Low
Vehicle strike		Within access roads and within development footprint	Daily, during construction and operational phases	Potential long-term impacts.	Potential long-term impacts	Low
Increased risk of fire		Adjacent vegetation	Anytime during construction and operation	Anytime during construction and operation	Anytime during construction and operation	Low

8.3 Prescribed impacts

With the sites current state, the South-eastern portion of the site would not function as a suitable corridor, in order to offset any impacts that may occur through the implementation of the proposal a vegetation management plan will be implemented to increase the function of this corridor through re-vegetation works.

8.3.1 Minimisation of impacts

Mitigation measures are proposed to minimise potential impacts to the site's biodiversity values: these are summarised in Table 8-4. These include measures to be implemented in the pre-construction, construction and post-construction phases. It is considered that these measures would serve to minimise any potential direct or indirect impacts.

8.4 Mitigating residual impacts – management measures and implementation

Table 8-5 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Action	Responsibility	Timing
Pre-construction Phase Measures		
The area of endangered ecological community PCT 3433 and 3444 (Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions) that occurs within the site but outside of the construction and operational development footprint is to be fenced off.	Landowner	Covenant to be established prior to commencement of any excavation or clearing works.
The proposed APZs are to be managed to the standards of an APZ as defined in *Planning for Bushfire Protection 2019*. No exotic trees or shrubs are to be planted within the proposed APZs. It is recommended that this should be protected in perpetuity through a positive / restrictive covenant, registered on title, under Section 88B or 88E of the Conveyancing Act 1919.	Landowner	Covenant to be established prior to commencement of any excavation or clearing works.
The boundaries of the development footprint will be delineated in the field using bunting / flagging tape to ensure inadvertent clearing / disturbance of the adjacent vegetation does not occur.	Project manager.	Prior to commencement of any excavation or clearing works.
Any site workers / contractors are to be inducted on the ecological sensitivities of the site, including, but not limited to, the importance of avoiding disturbance to the vegetation / habitat external to the development footprint.	Project manager in consultation with the project ecologist.	Prior to commencement of any excavation or clearing works.
Erosion and sediment control measures (e.g. silt fences, straw bales wrapped in geotextile etc) must be established before excavation or vegetation clearance begins and are to remain in place until all surfaces have been fully restored and stabilised.	Project manager.	Prior to commencement of any excavation or clearing works.
A pre-clearing survey will be conducted by a qualified ecologist and will include the following;	Project Ecologist	Prior to commencement of any excavation or clearing works.

➢ Any habitat trees (hollow-bearing trees or nest trees) within the clearing footprint shall be clearly marked (with flagging tape or fluoro spray-paint). Any salvageable habitat features (such as ground timber), identified during the pre-clearing survey, shall be redistributed in the site's retained area of vegetation.		
Construction Phase Management Actions		
During the clearing of native vegetation, and only if habitat trees occur within the development footprint, a suitably qualified and experienced ecologist must: a) Ensure no vegetation clearing occurs outside of the approved clearing footprint. b) Ensure soft felling techniques are utilised for felling of any habitat/hollow-bearing trees. c) Supervise all habitat/hollow-bearing tree removal to capture and/or relocate any dispersed fauna. d) Transport any injured wildlife to appropriate veterinary care or transfer the animal to a local volunteer wildlife carer group. e) Provide post-clearing reporting back to Council should any threatened species be captured or encountered by clearing operations.	Project ecologist	During clearing.
Appropriate weed control measures must be implemented, including for instance: • All weeds removed from the site must be transported in a sealed container or bag and disposed at a waste management facility licenced to accept green waste. • Vehicles, machinery and equipment must be free from weed material (including seeds) before entering the construction corridor.	Project manager.	During excavation, clearing and construction works.

Any spoil storage areas or stockpiles will have appropriate erosion control devices installed to control runoff and prevent sedimentation.	Project manager.	During excavation, clearing and construction works.
Materials, plant and equipment are not to be stored within the drip-lines of any retained trees at the site or near the site.	Project manager.	During excavation, clearing and construction works.
Topsoil is to be removed from newly cleared areas and then stockpiled for later use in the rehabilitation and/or landscaping works.	Project manager.	During excavation, clearing and construction works.
Cleared vegetation will be mulched and stockpiled for later use in any vegetation restoration/landscaping activities (provided that it doesn't contain weed material). Where possible, any felled trees may be cut into manageable sections and redistributed in the site.	Project manager.	During excavation, clearing and construction works.
Sediment and erosion control devices will be inspected regularly, maintained to ensure effectiveness over the entire duration of the project, and cleaned out before 30% capacity is reached.	Project manager.	During excavation, clearing and construction works.
Post-construction Phase Management Actions		
All temporary erosion and sediment control devices such as silt-stop fencing will be removed from the site at the completion of the works, but not until the site is fully revegetated/stabilised.	Project manager.	After construction, but not until the site is fully revegetated/stabilised.

8.5 Adaptive management strategy for uncertain impacts (where relevant)

Address the following considerations to outline an adaptive management plan for uncertain impacts (indirect or prescribed), or remaining impacts where mitigation measures have not been proposed:

- identify impacts where no mitigation measures are proposed
- describe the impacts (PCT/ threatened entity/ indirect/ prescribed)
- indicate the likelihood of impact and details of the extent, both spatially and temporally
- document the baseline data required and monitoring methods to measure uncertain impacts including frequency, timing and reporting; include published data sources where relevant
- assign performance indicators that trigger management intervention and determine when the action is completed
- evaluate the risk of failure
- management actions proposed to reduce or eliminate the impact, which may include additional biodiversity credits to offset (above the credit requirement generated by the BAM-C for direct impacts), other conservation measures and/or mitigation measures. Document the decision pathway and justification for the proposed actions
- where an adaptive management strategy is not required for the proposal or some impacts of the proposal, justify why adaptive management strategies have not been prepared. Include details on the size and nature of the impacts and reasons why the severity and consequence of direct and indirect impacts are easily predicted and well understood>

Adaptive management strategy is not required for the proposal due to the size and nature of the impacts have been avoided, minimised, and offset.

9. Serious and irreversible impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

No entities will be at risk of an SAII due to the proposal.

10. Impact summary

10.1 Determine an offset requirement for impacts o

10.1.1 Impacts on native vegetation and TECs or ECs (ecosystem credits)

Table 10-1: Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
					Choose an item.	

Table 10-2: Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ 1	3433_Intact-under-scrubed	3433_Intact-under-scrubed	0.28	48.6	0	-48.6	2	7
VZ 2	3433_Derived-Grassland	3433_Intact-under-scrubed	1.9	31.7	0	-31.7	2	30
VZ 1	3444_Moderate	3433_Intact-under-scrubed	1.18	33.6	0	-33.6	2	20
VZ 2	3444_Derived-Grassland	3433_Intact-under-scrubed	1.9	11.5	0	-11.5	2	0

10.1.2 Impacts on threatened species and their habitat (species credits)

Table 10-3: Impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
To be updated upon completion of remaining species surveys, Species to be surveyed at a later date have been listed as Assumed present.						
					Total credits	

10 .1.3 Indirect and prescribed impacts

Table 10-4: Summary of proposed offsets for residual indirect and prescribed impacts

Residual indirect or prescribed impact (identified in Table 8-5 after mitigation)	**Proposed offset** (Additional biodiversity credit requirement and/or other conservation measures)
N/A	

10.2 Impacts that do not need further assessment

Table 10-5: Impacts that do not need further assessment for ecosystem credits

Impact	**Location within subject land**	**Justification why no further assessment is required**

11. Biodiversity credit report

Refer to Appendix G Credit reports

11.1 Ecosystem credits

Table 11-1 Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits						
	PCT name	**PCT vegetation class**	**PCT vegetation formation**	**Associated TEC or EC**	**Offset trading group** (BAM Section 10.2, Tables 4 & 5)	**Hollow bearing trees present?**	**IBRA subregion** (in which proposal is located)
37	Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Yes EC	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	No	Hunter
20	Lower Hunter Spotted Gum-Ironbark Forest	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Yes EC	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	No	Hunter

11.2 Species credits

Table 11-2 Species credit class and matching credit profile

Species credit	Attributes shared with matching credits				
	Name of threatened species	**Kingdom**	**BC Act status**	**EPBC Act status**	**IBRA region**


firebird

12. References

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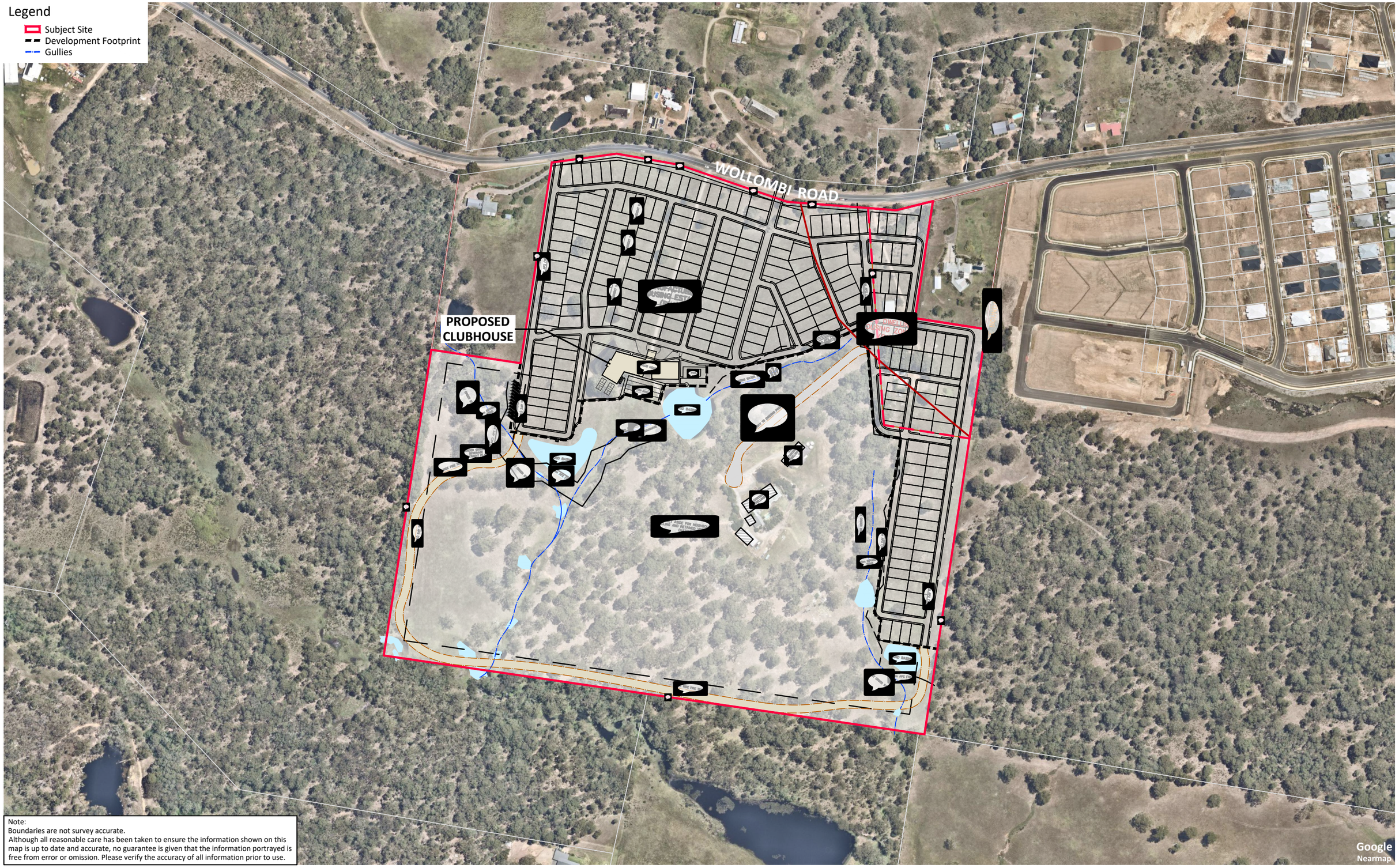
13. Figures



Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 1-2: SITE MAP

Ref No 3215 E

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

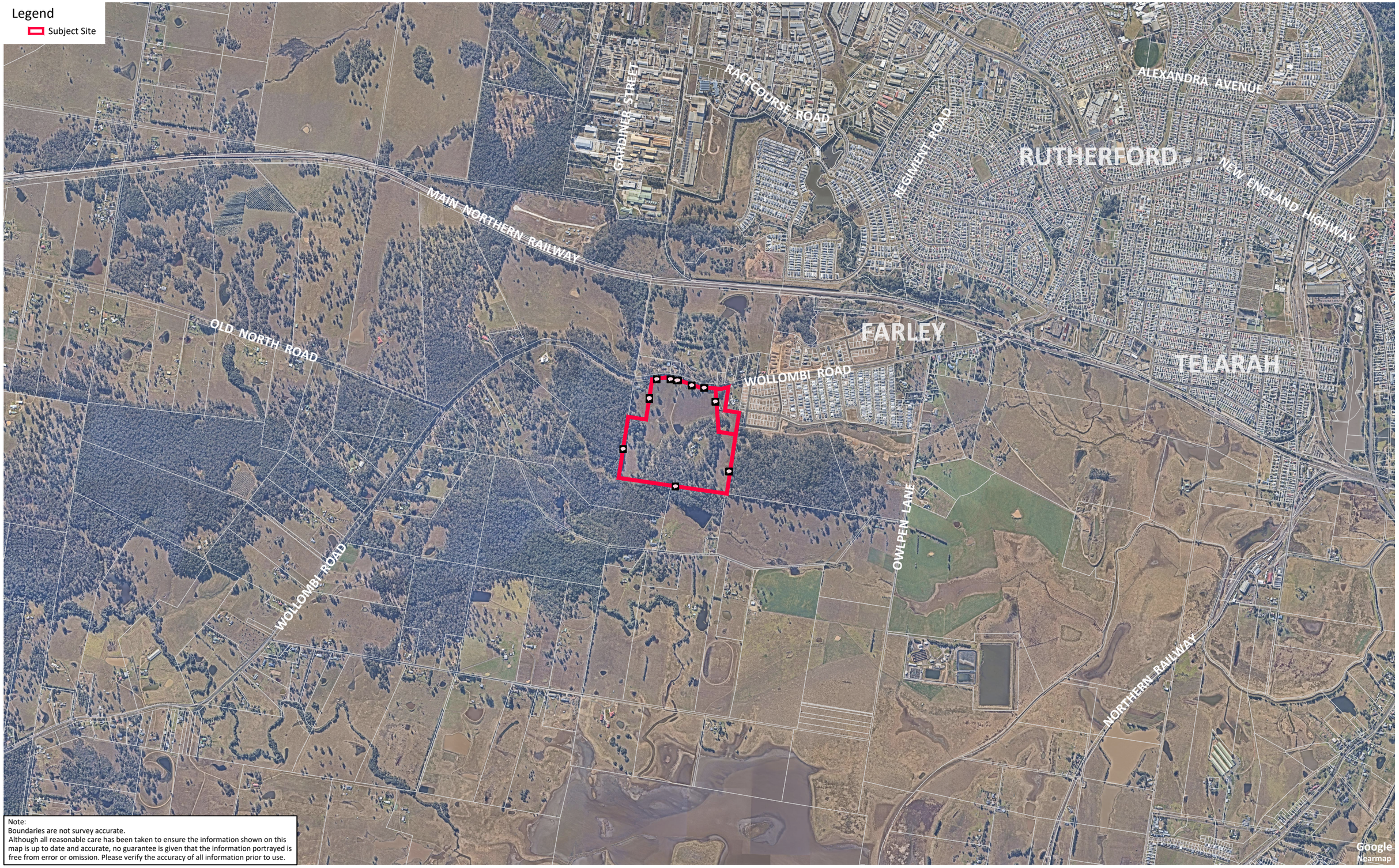
0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird



Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 2-1: SITE LOCALITY

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

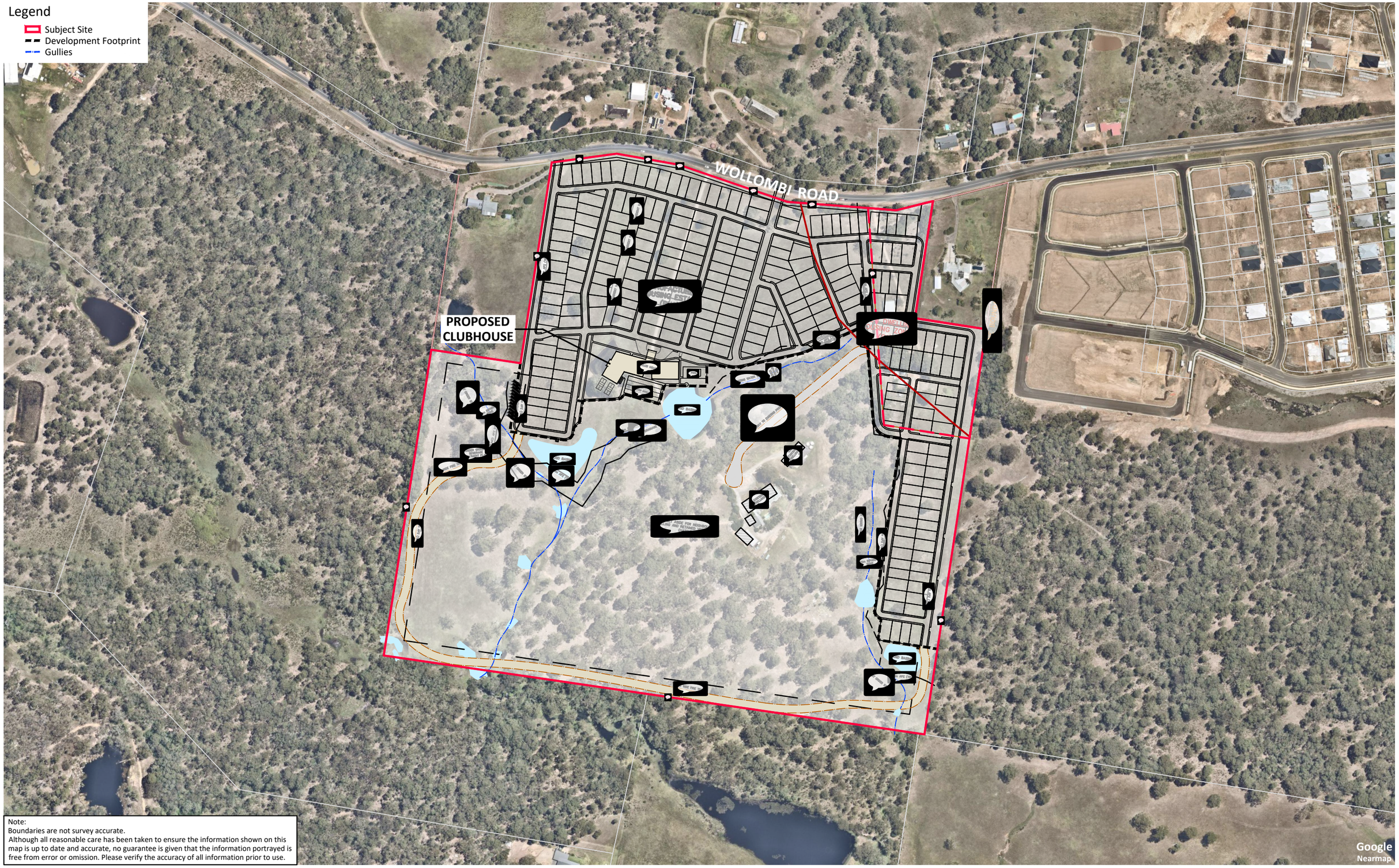
0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird



Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

F I G U R E 3 - 1 : DEVELOPMENT FOOTPRINT

Ref No 3215 E

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

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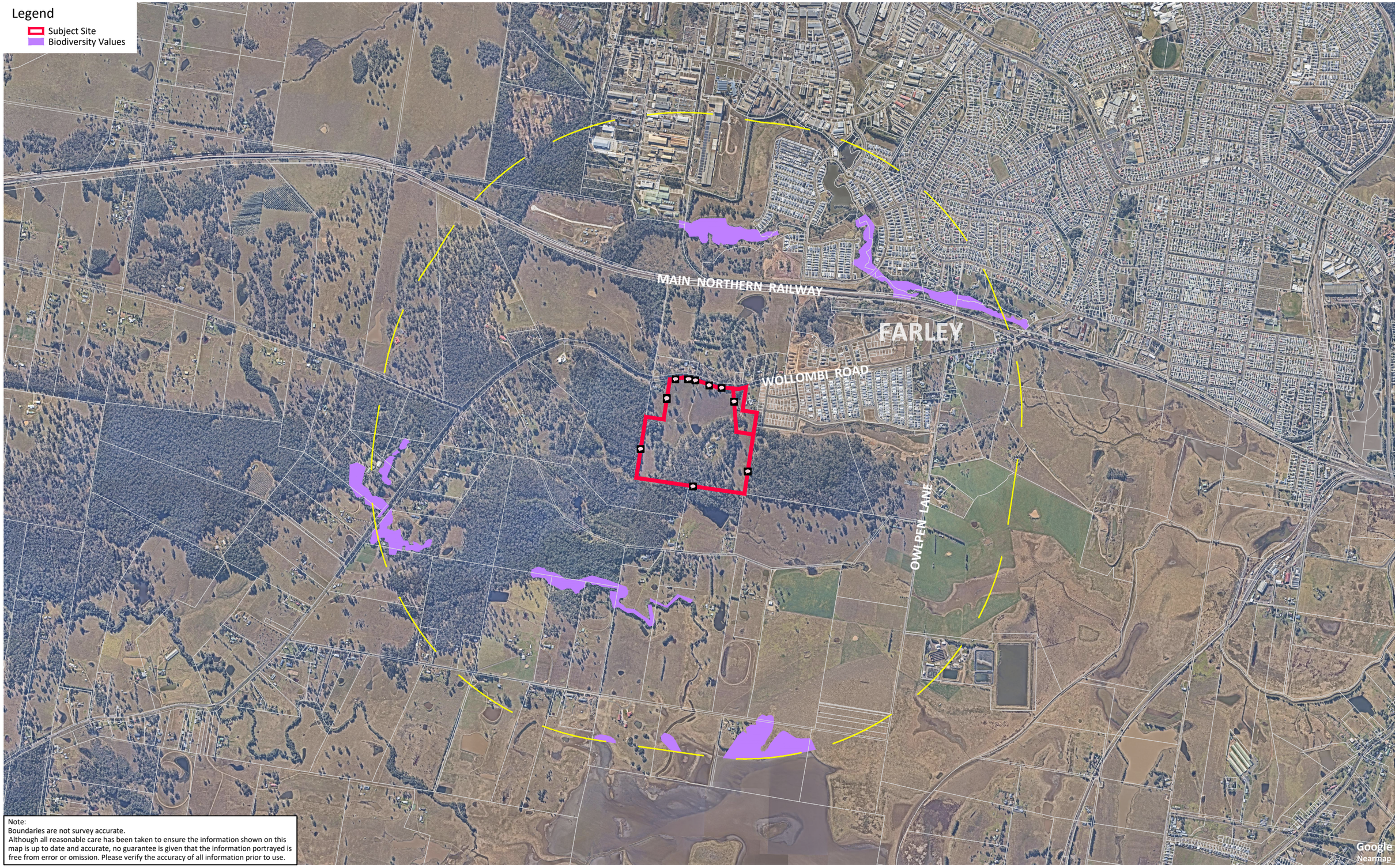
P O Box 354 Newcastle NSW 2300

firebird



Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 4-1: BIODIVERSITY VALUES

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

0 250 500 1000

SCALE 20 000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

Legend
Subject Site
Key Fish Habitats

WOLLOMBI ROAD

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Google
Nearmap

FIGURE 4-2: KEY FISH HABITATS

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	16 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

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Figure 5 Excluded impacts

N/A

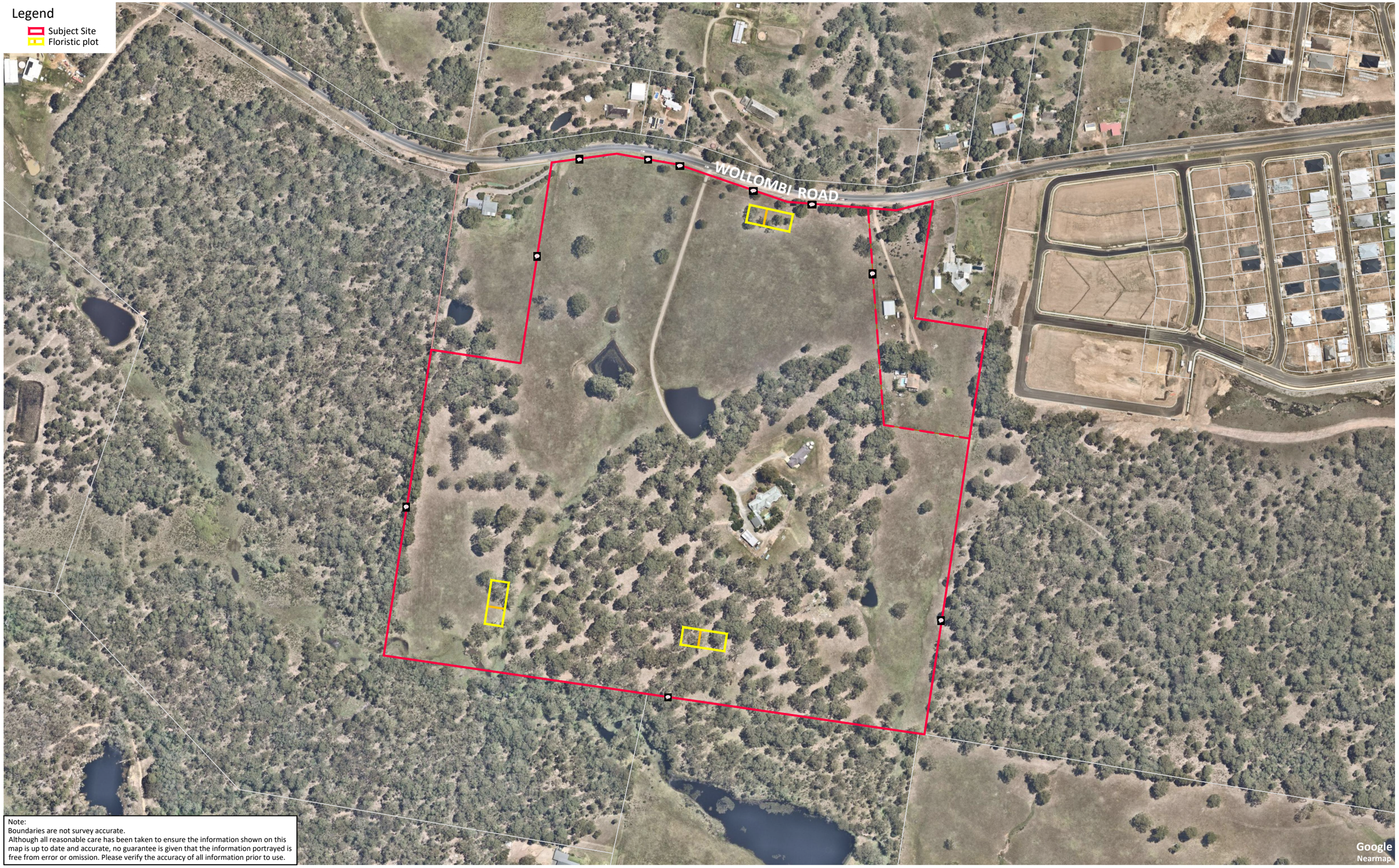

FIGURE 6-1: FLORISTIC SURVEY PLOT

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

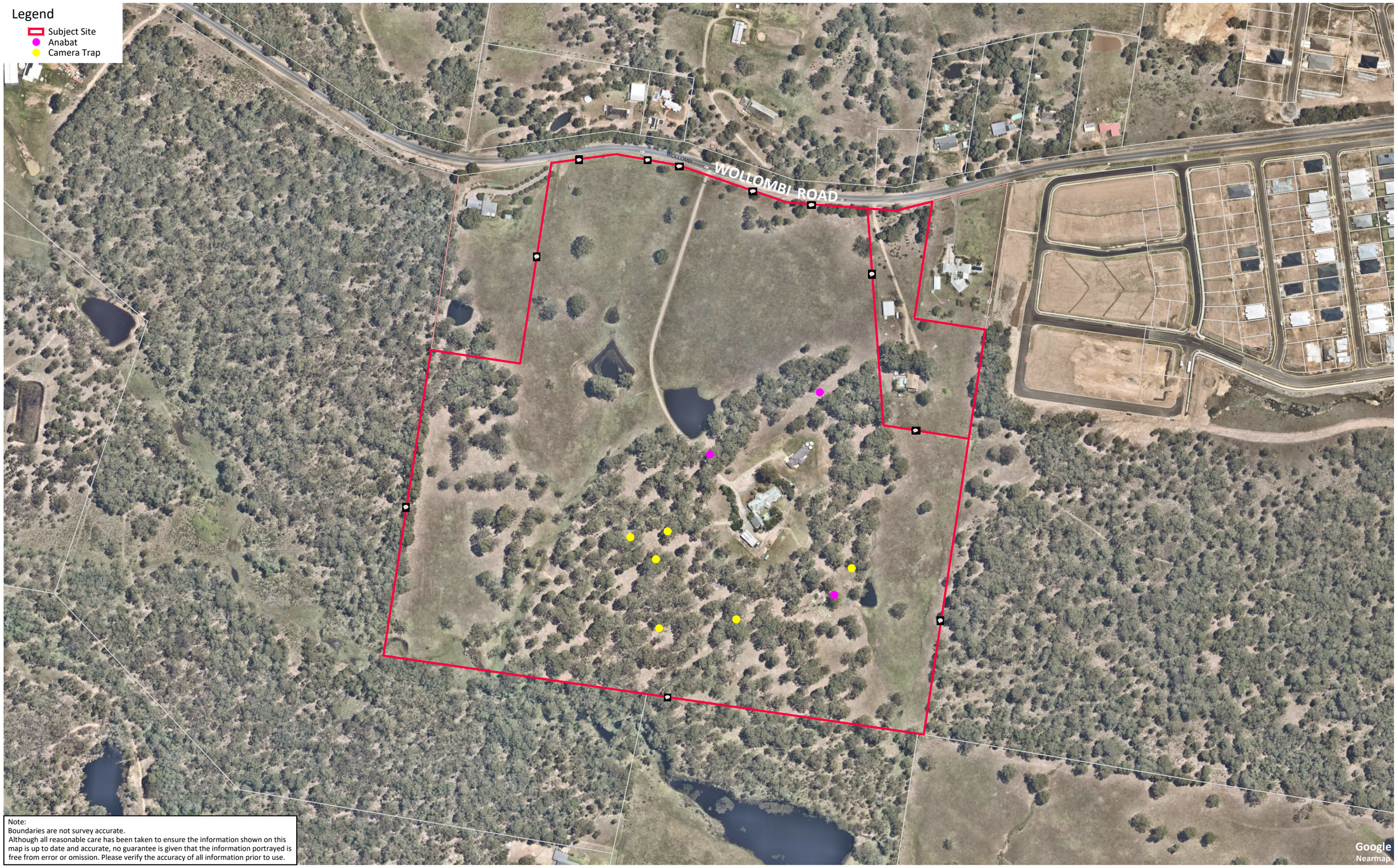

FIGURE 6-2: CAMERA TRAPS & ANABAT SURVEY

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	16 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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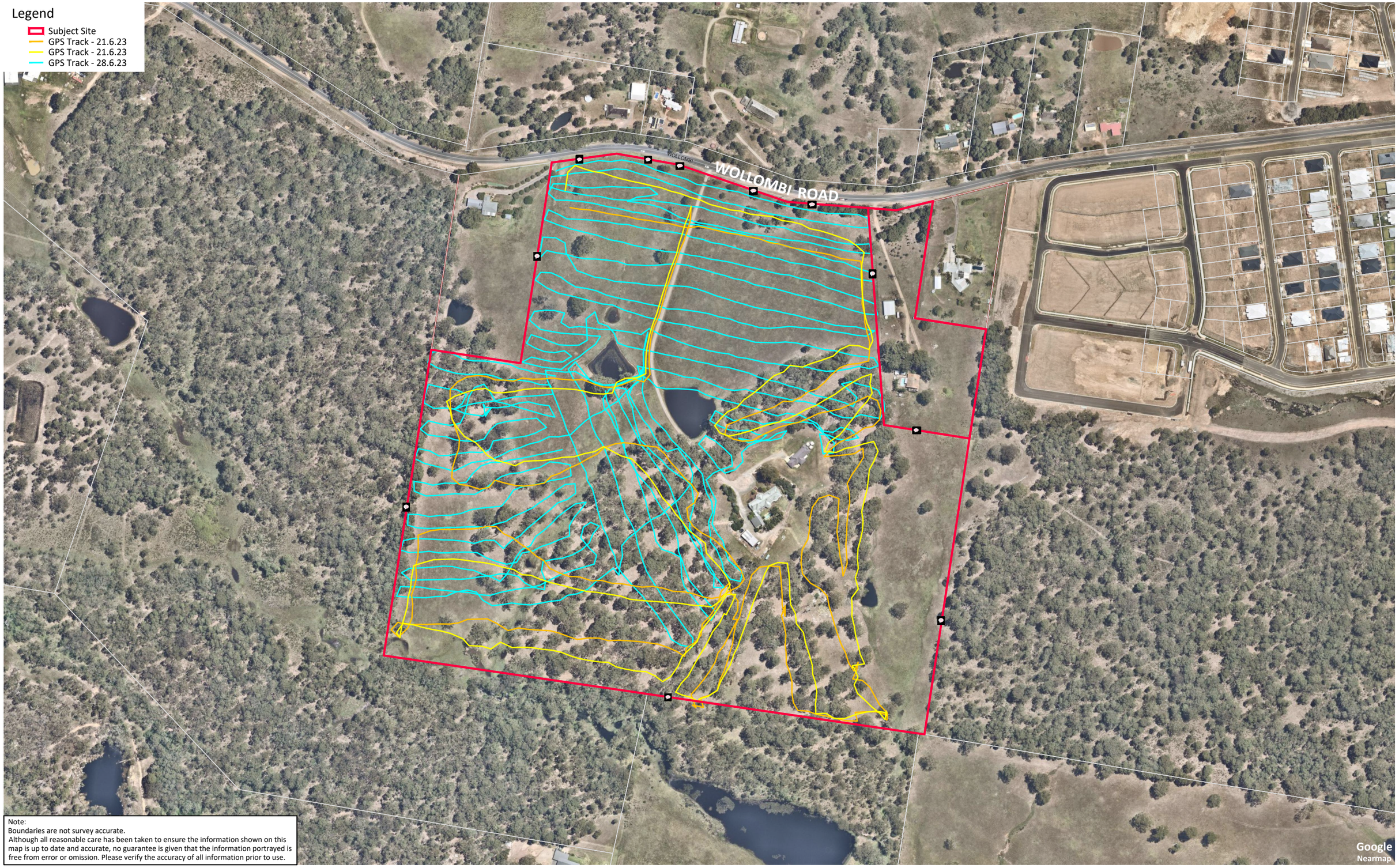

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 6-3: FLORA SURVEY

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	16 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

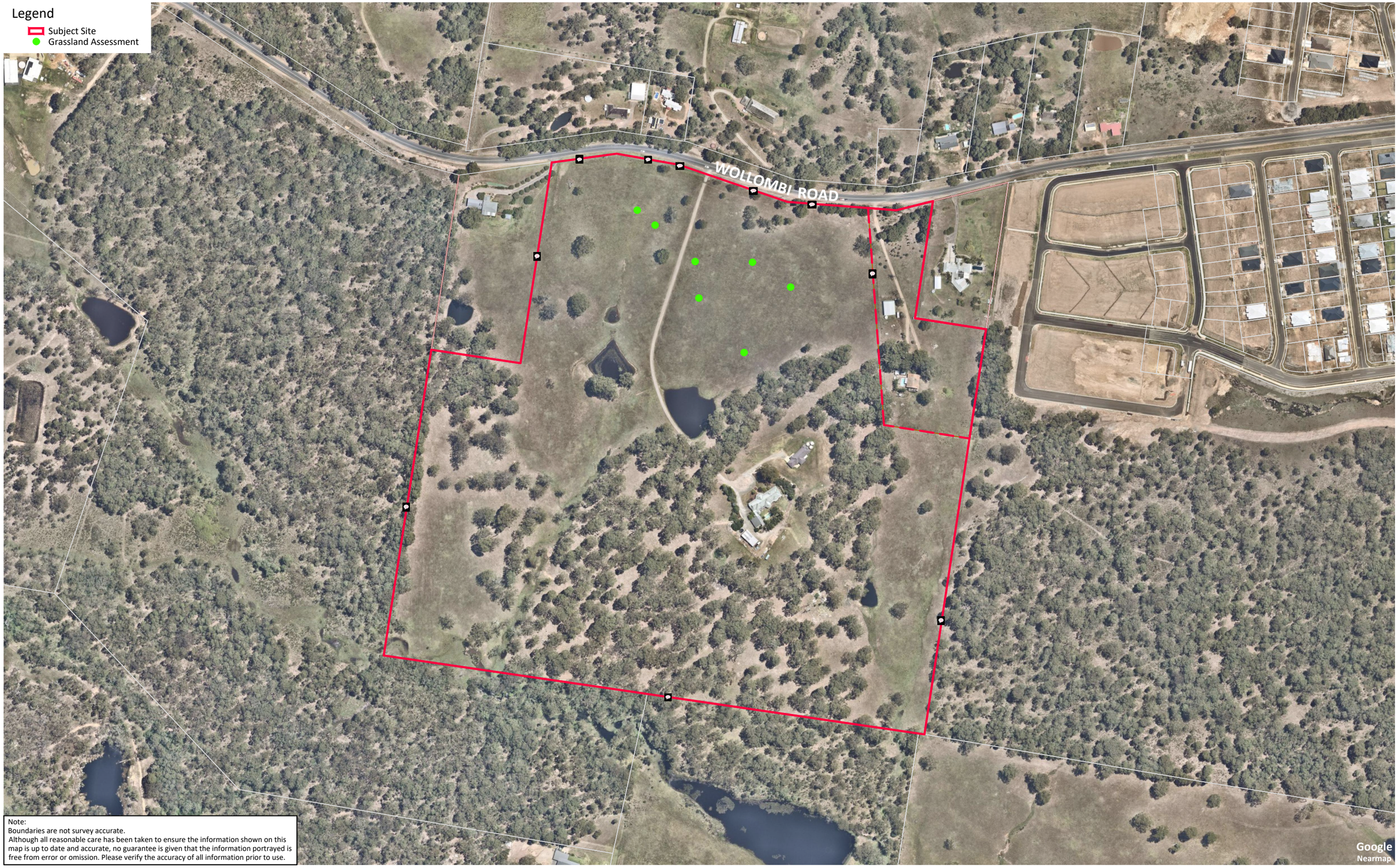

FIGURE 6-4: FLORISTIC SURVEY PLOT

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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firebird

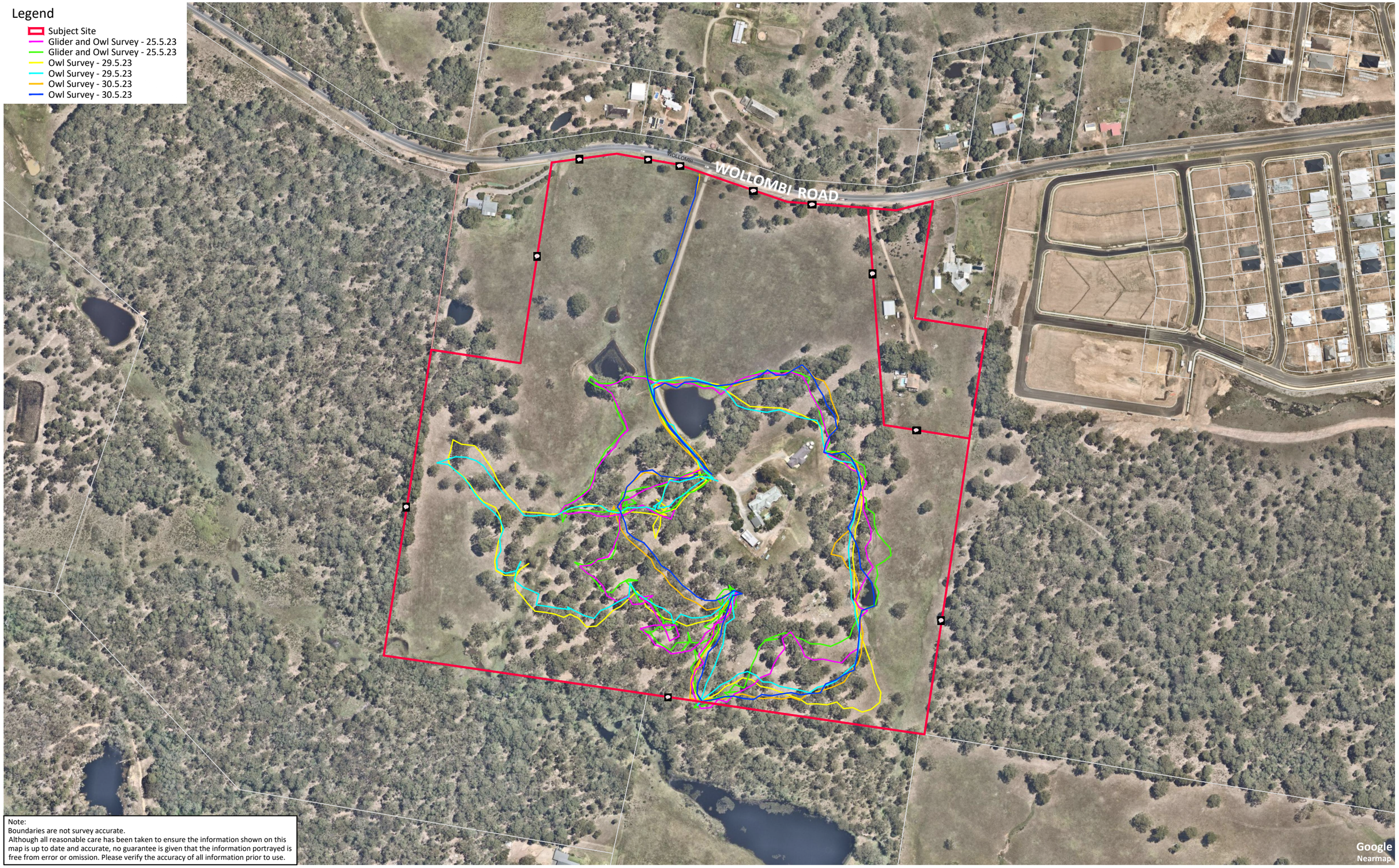

FIGURE 6-5: SQUIRREL GLIDER

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	16 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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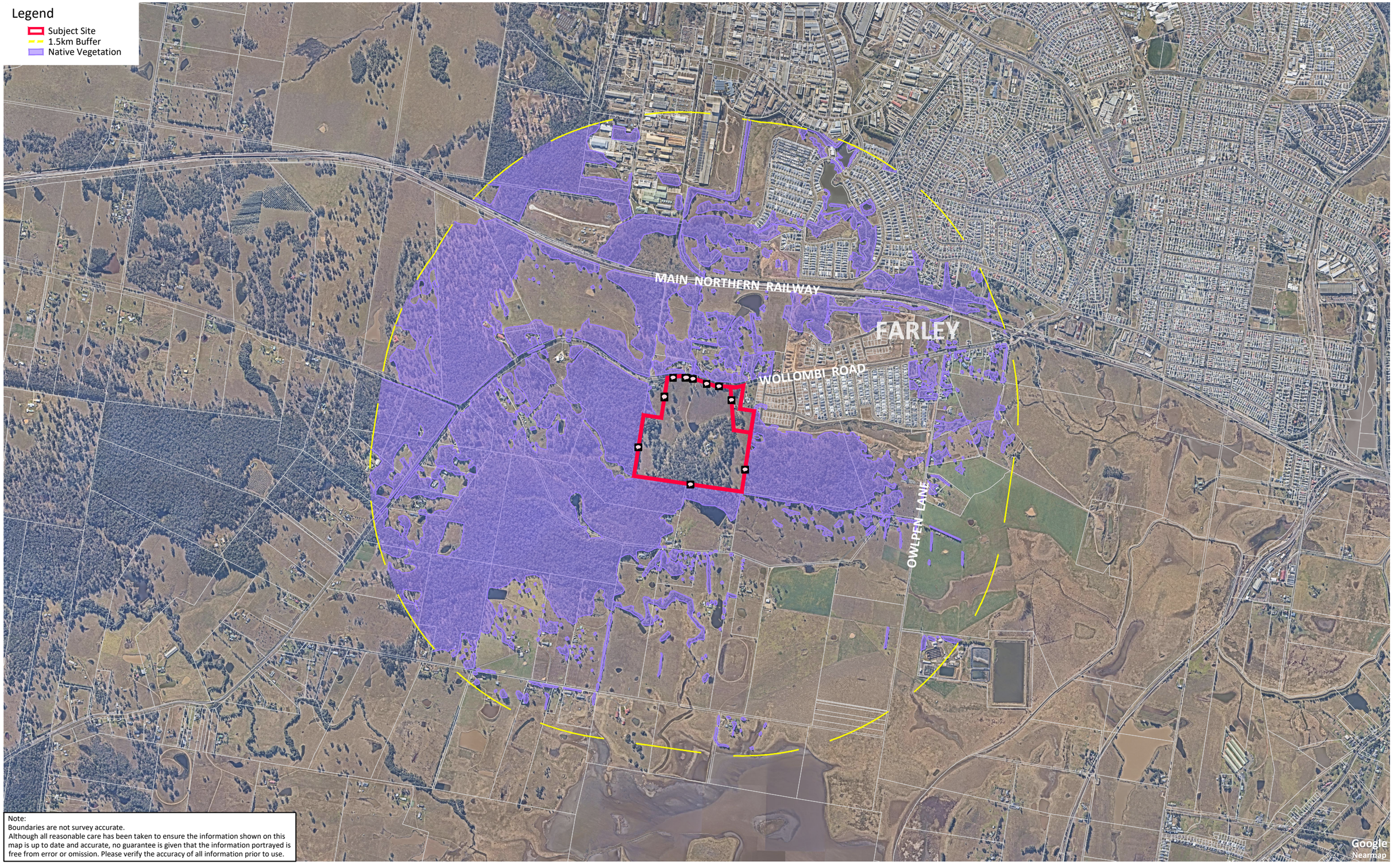
P O Box 354 Newcastle NSW 2300

firebird



Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 7-1: NATIVE VEGETATION EXTENT

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	7 September 2023

NORTH

0 250 500 1000

SCALE 20 000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
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Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

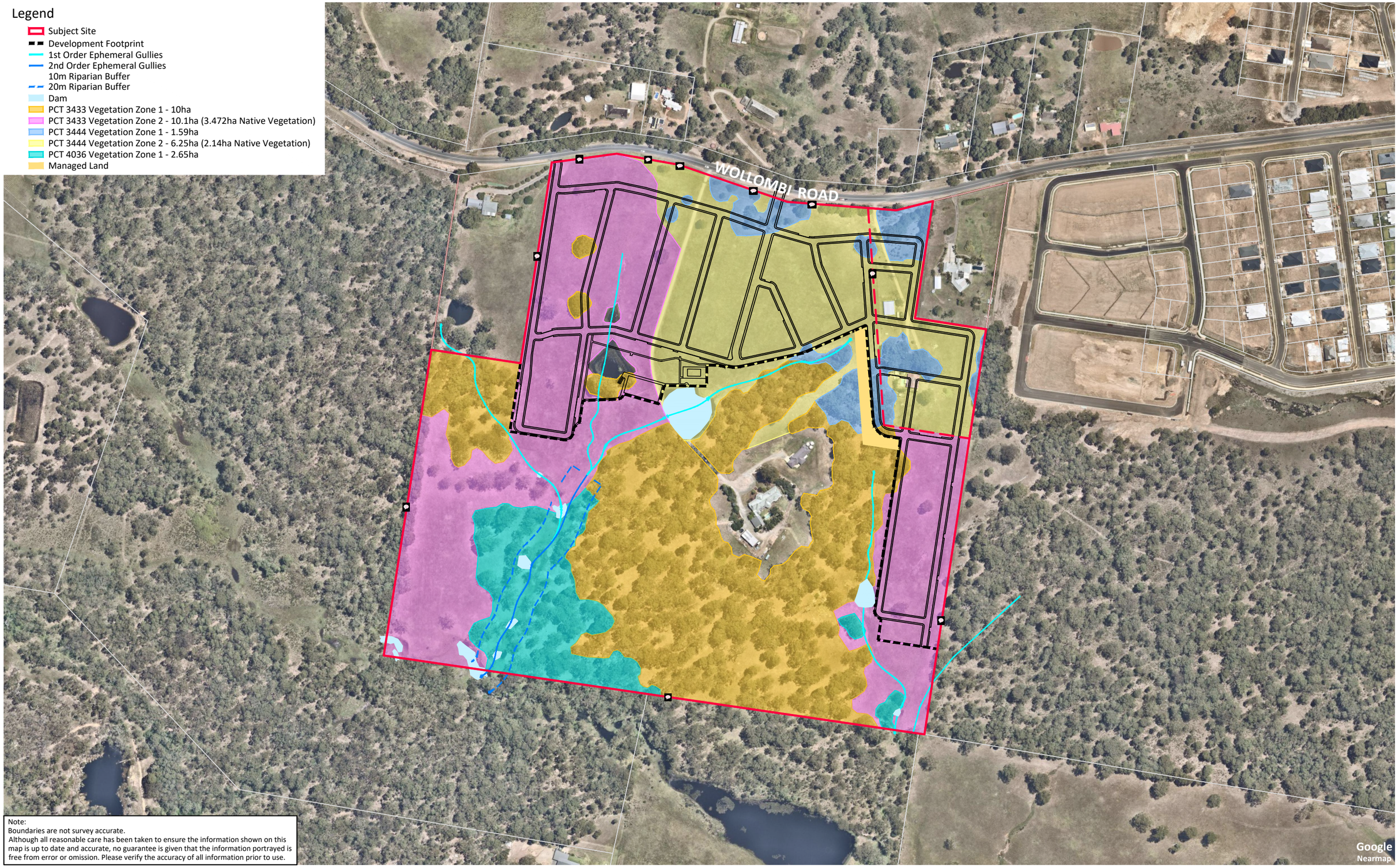


FIGURE 8-1: VEGETATION ZONES

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	23 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

Figure 9 Threatened ecological communities and ecological communities

N/A

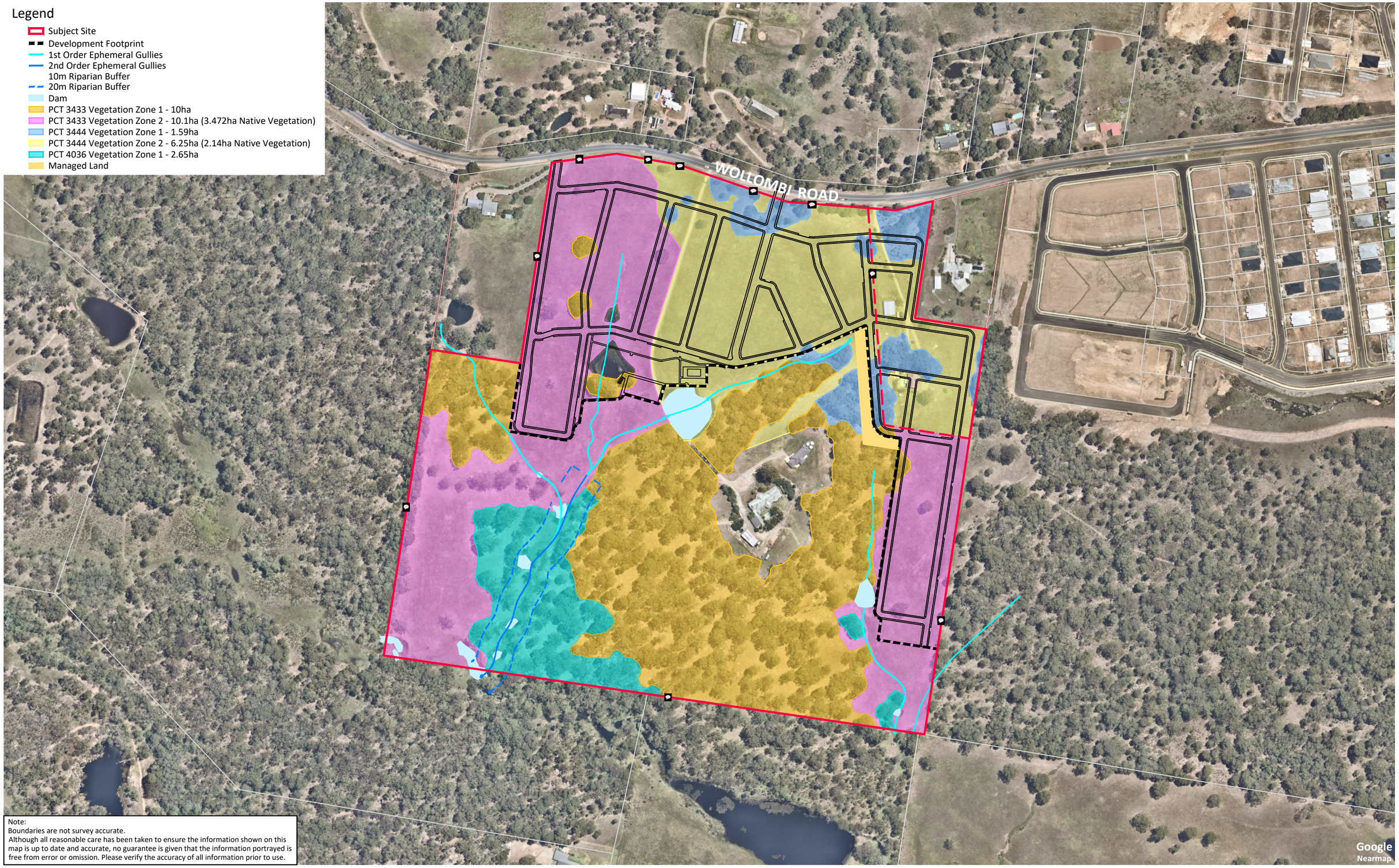


FIGURE 10-1: VEGETATION ZONES

Ref No 3215 F

CLIENT	Client
SITE DETAILS	Farley Lifestyle Village Wollombi Road Farley
DATE	23 August 2023

NORTH

0 50 100 200

SCALE 4000 @ A3

PIXELDRAFTING

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

firebird

Figure 11 **Candidate species credit species records and species polygons**

Figure 12 Wind turbine disturbance zone

N/A

Figure 13 Serious and irreversible impacts

N/A

Figure 14 Thresholds for assessing and offsetting impacts

Appendix A: BDAR requirements compliance

Table 41 Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Introduction	Chapters 2 and 3	Information	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	10
		☒ identification of subject land boundary, including:	10
		☒ operational footprint	
		☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	
		☒ general description of the subject land	10
		☒ sources of information used in the assessment, including reports and spatial data	12
		☒ identification and justification for entering the BOS	11
		Maps and tables	
		☐ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	**<Error! Reference source not found.>**
Landscape	Sections 3.1 and 3.2, Appendix E	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	35
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	36
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	35
		☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	35
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	35
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	35
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	35
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	35
		☒ any additional landscape features identified in any SEARs for the proposal	36
		☒ NSW (Mitchell) landscape on which the subject land occurs	36
		☐ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	N/A
		Maps and tables	
		☐ Site Map ☐ Property boundary ☐ Boundary of subject land	**<Error! Reference source not found.>**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☐ Landscape features identified in BAM Subsection 3.1.3	
		☐ Location Map ☐ Digital aerial photography at 1:1,000 scale or finer ☐ Boundary of subject land ☐ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☐ Landscape features identified in BAM Subsection 3.1.3 ☐ Additional detail (e.g. local government area boundaries) relevant at this scale	**<Error! Reference source not found.>**
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☐ IBRA bioregions and subregions ☐ rivers, streams and estuaries ☐ wetlands and important wetlands ☐ connectivity of different areas of habitat ☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☐ areas of outstanding biodiversity value occurring on the subject land and assessment area ☐ any additional landscape features identified in any SEARs for the proposal ☐ NSW (Mitchell) landscape on which the subject land occurs	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		Data	
		☐ All report maps as separate jpeg files	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Individual digital shape files of:	–
		☐ subject land boundary	–
		☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	–
		☐ cadastral boundary of subject land	–
		☐ areas of native vegetation cover	–
		☐ landscape features	–
Native vegetation	Chapter 4, Appendix A and Appendix H	Information	
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	36
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	37
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	37
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	13,14,15, 41
		☒ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	37,38
		☒ vegetation class	37,38
		☐ extent (ha) within subject land	37,38
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	38
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	38
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	39
		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	37,38
		Describe the vegetation integrity assessment of the subject land, including:	–
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	40
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	40
		☒ area (ha) of each vegetation zone	39
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	40
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	41
		☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	42,43

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☒ identify the PCT or vegetation class for which local benchmark data will be applied ☒ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☒ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	N/A
		☒ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	N/A
		☒ provide written confirmation from the decision-maker that they support the use of local benchmark data	N/A
		Maps and tables	
		☐ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	**<Error! Reference source not found.>**
		☐ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	**<Error! Reference source not found.>**
		☐ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	**<Error! Reference source not found.>**
		☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	**<Error! Reference**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
			source not found.>
		☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	<**Error! Reference source not found.** & **Error! Reference source not found.**>
		☐ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	<**Error! Reference source not found.** & **Error! Reference source not found.**>
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		☒ composition condition score	42
		☒ structure condition score	
		☒ function condition score	
		☒ presence of hollow bearing trees	
		Data	
		☐ All report maps as separate jpeg files	–
		☐ Plot field data (MS Excel format)	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Plot field datasheets	<Appendix F>
		Digital shape files of:	–
		☐ PCT boundaries within subject land	–
		☐ TEC boundaries within subject land	–
		☐ vegetation zone boundaries within subject land	–
		☐ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	Information	
		Identify ecosystem credit species likely to occur on the subject land, including:	
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	44,45,46,47,48,49,50
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	44,45,46,47,48,49,50
		☒ justification for addition of any ecosystem credit species to the list	N/A
		Identify species credit species likely to occur on the subject land, including:	–
		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	50,51,52,53,54,55,56,57
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	50,51,52,53,54,55,56,57

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	50,51,52,53,54,55,56,57
		☒ justification for addition of any species credit species to the list	N/A
		From the list of candidate species credit species, identify:	–
		☒ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☒ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☒ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	58,59,60,61
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	62,63,64
		☒ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	64
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	62,63,64
		☒ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	60,61
		☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	60,61,62,63,64

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ survey personnel and relevant experience	60,61,62,63,64
		☒ describe any limitations to surveys and how these were addressed/overcome	60,61,62,63,64
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–
		☒ justification of the use of an expert report ☒ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☒ all requirements of Box 3 have been addressed in the expert report	N/A
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☒ identify relevant species ☒ identify data to be amended ☒ identify source of information for local data, e.g. published literature, additional survey data, etc. ☒ justify use of local data in preference to VIS Classification or TBDC data	N/A
		☒ provide written confirmation from the decision-maker that they support the use of local data	N/A
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	–
		☐ the unit of measure for each species is documented	
		for species assessed by area:	
		☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	N/A
		for species assessed by counts of individuals:	N/A
		☒ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	N/A
		☒ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	N/A
		☒ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	N/A
		☒ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	N/A
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	44,45,46,47,48,49,50
		☒ the ecosystem credit species removed from the list	52,53,54,55,56,57
		☒ the sensitivity to gain class of each species	52,53,54,55,56
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	58, 59
		☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	58, 59
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	58, 59

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	60,61,62,63,64
		☐ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	
		Data	
		☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species	–
		☐ Survey locations including GPS coordinates of any plots, transects, grids	
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals	–
		☐ Species polygon map in jpeg format	–
		☐ Expert reports and any supporting data used to support conclusions of the expert report	
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	
Prescribed impacts	Chapter 6	Information	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3)	67,68

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	
		☒ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	67,68
		☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	67,68
		☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	67,68
		☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	67,68
		Where the proposed development is for a wind farm:	
		☒ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	N/A
		☒ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	N/A
		☒ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	N/A
		Where the proposal may result in vehicle strike:	–
		☒ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	N/A
		Maps and tables	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		☐ Map showing location of potential vehicle strike locations	**<Error! Reference source not found.>**
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		Data	
		☐ Digital shape files of prescribed impact feature locations	–
		☐ Prescribed impact features map in jpeg format	–
Avoid and minimise impacts	Chapter 7	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	69,70,71,72,73,74
		☒ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	73
		☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	73
		☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	73
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	72,73
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	72,73
		☒ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	N/A
		Maps and tables	
		☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	81,82,83
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	**<Error! Reference source not found.>**
		☐ Maps demonstrating indirect impact zones where applicable	**<Error! Reference**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
			source not found.>
		Data	
		Digital shape files of:	–
		☐ alternative and final proposal footprint	–
		☐ direct and indirect impact zones	–
		☐ Maps in jpeg format	–
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	Information	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	75
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	79,80
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	76,77,78
		☒ reporting any limitations or assumptions, etc. made during the assessment	76,77,78
		☒ identification of the threatened entities and their habitat likely to be affected	76,77,78
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–
		☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	N/A
		☒ human-made structures	N/A -80
		☒ non-native vegetation	N/A -80
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	N/A-80
		☒ movement of threatened species that maintains their life cycle	N/A-80
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	N/A-80
		☒ assessment of the impacts of wind turbine strikes on protected animals	N/A-80
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	N/A-80
		☒ evaluate the consequences of prescribed impacts	N/A-80
		☒ describe impacts that are uncertain	N/A-80
		☒ document limitations to data, assumptions and predictions	N/A-80
		Maps and tables	
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	75
		Data	
		N/A	–
Mitigation and manage	Chapter 8, Sectio	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
ment of impacts	ns 8.4 and 8.5		
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–
		☒ techniques, timing, frequency and responsibility	81,82,83
		☒ identify measures for which there is risk of failure	
		☒ evaluate the risk and consequence of any residual impacts	
		☒ document any adaptive management strategy proposed	81,82,83
		Identification of measures for mitigating impacts related to:	
		☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))	81,82,83
		☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.))	
		☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	
		☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	84
		Maps and tables	
		☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	81,82,83
		Data	
		N/A	–
Impact summary	Chapter 9	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		☐ for each TEC, report the extent of the TEC in NSW	**<Error! Reference source not found.>**
		☐ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		☐ for each threatened species, report the population size in NSW	**<Error! Reference source not found.>**
		☐ documenting assumptions made and/or limitations to information ☐ documenting all sources of data, information, references used or consulted ☐ clearly justifying why any criteria could not be addressed	**<Error! Reference source not found.**– **Error!**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
			Reference source not found.>
		☐ Identification of impacts requiring offset in accordance with BAM Section 9.2	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		☐ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	**<Error! Reference source not found.>**
		☐ Identification of areas not requiring assessment in accordance with BAM Section 9.3	**<Error! Reference source not found.>**
		Maps and tables	
		☐ Map showing the extent of TECs at risk of an SAII within the subject land	**<Error! Reference source not found.>**
		☐ Map showing location of threatened species at risk of an SAII within the subject land	**<Error! Reference source not found.>**
		Map showing location of:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ impacts requiring offset	**<Error! Reference source not found.>**
		☐ impacts not requiring offset	**<Error! Reference source not found.>**
		☐ areas not requiring assessment	**<Error! Reference source not found.>**
		Data	
		Digital shape files of:	–
		☐ extent of TECs at risk of an SAII within the subject land	–
		☐ location of threatened species at risk of an SAII within the subject land	–
		☐ boundary of impacts requiring offset	–
		☐ boundary of impacts not requiring offset	–
		☐ boundary of areas not requiring assessment	–
		☐ Maps in jpeg format	–
Impact summary	Chapter 10	Information	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☐ change in vegetation integrity score (BAM Subsection 8.1.1) ☐ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	**<Error! Reference source not found.>**
		☐ biodiversity risk weighting for each	**<Error! Reference source not found.** & **Error! Reference source not found.>**
		☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	**<Error! Reference source not found.>**
		Maps and tables	
		☐ Table of PCTs requiring offset and the number of ecosystem credits required	**<Error! Reference source not found.>**
		☐ Table of threatened species requiring offset and the number of species credits required	**<Error! Reference source not found.>**
		Data	
		☐ Submitted proposal in the BAM Calculator	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Biodiversity credit report	Chapter 10	Information	
		☐ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	<**Error! Reference source not found.** & **Error! Reference source not found.**>
		☐ BAM credit report in pdf format	<Appendix H>
		Maps and tables	
		☐ Table of credit class and matching credit profile	<**Error! Reference source not found.**>
		Data	
		☐ BAM credit report in pdf format	<Appendix H>

Appendix B: Biodiversity Values Map and Threshold tool report

Department of Planning and Environment

Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to a consent authority to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether or not a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

Biodiversity Values Map and Threshold Report

Date of Report Generation		08/09/2023 2:00 PM
Biodiversity Values (BV) Map Threshold - Results Summary		
1	**Does the development Footprint intersect with BV mapping?**	no
2	**Was ALL of the BV Mapping within the development footprinted added in the last 90 days?** (dark purple mapping only, no light purple mapping present)	no
3	**Date of expiry of dark purple 90 day mapping***	N/A
4	**Is the Biodiversity Values Map threshold exceeded?**	no
Area Clearing Threshold - Results Summary		
5	**Size of the development or clearing footprint**	23,996.3 sqm
6	**Native Vegetation Area Clearing Estimate (NVACE)**	19,523.7 sqm
7	**Method for determining Minimum Lot Size**	LEP
8	**Minimum Lot Size** (10,000sqm = 1ha)	400,000 sqm
9	**Area Clearing Threshold** (10,000sqm = 1ha)	10,000 sqm
10	**Is the Area Clearing Threshold exceeded?**	yes

Is the proposed development assessed above the Biodiversity Offsets Schema (BOS) threshold? Exceeding the BOS threshold will require completion of a Biodiversity Development Assessment Report (BDAR). More details provided on page 2.	**yes**

What do I do with this report?

• If the result above indicates a BDAR is required, a Biodiversity Development Assessment Report may be required with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of accredited assessors. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR.

• If the result above indicates a BDAR is not required, you have not exceeded the BOS threshold. This report can be provided to Council to support your development application. You may still require a permit from your local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species" as determined under the test in Section 7.3 of the Biodiversity Conservation Act 2016. You may also be required to review the area where no vegetation mapping is available.

• If all Biodiversity Values mapping within your development footprint are less than 90 days old, i.e. mapping is displayed as dark purple on the map, a BDAR may not be required if your Development Application is submitted within that 90 day period. *Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 3 above.

For more detailed advice about actions required, refer to the Interpreting the evaluation report section of the Biodiversity Values Map Threshold Tool User Guide.

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you disagree with the NVACE result for Line Item 6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared) you can undertake a self-assessment. For more information about this refer to the Guide for reviewing BMAT Tool area clearing threshold results.

Acknowledgement

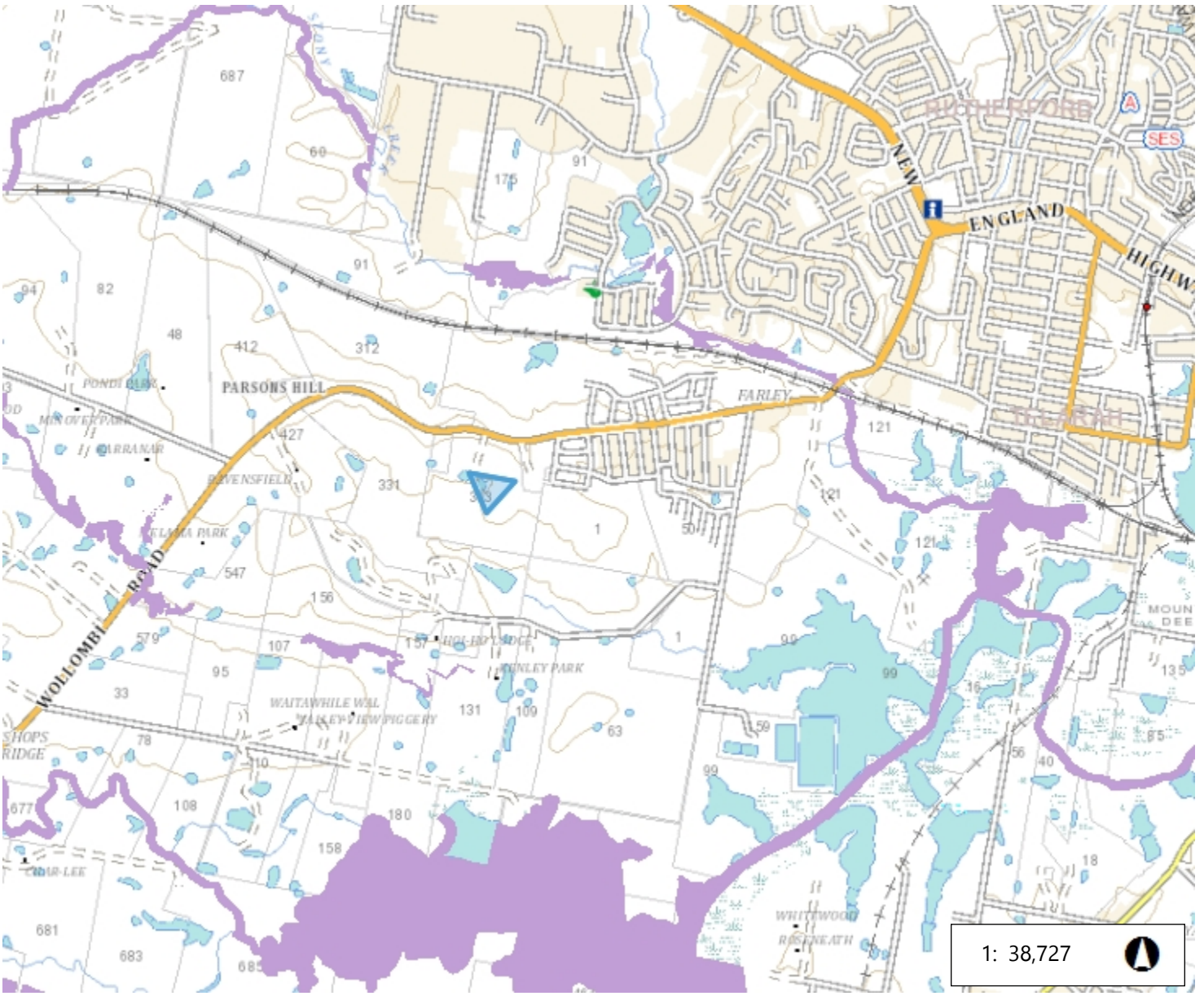
I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: _____ Date:_____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

08/09/2023 02:00 PM

Biodiversity Values Map



1,967.3 0 983.65 1,967.3 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

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

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

08/09/2023 02:00 PM

The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

Appendix C: Determination of excluded impacts

N/A

Appendix D: Matters of national environmental significance

N/A

Appendix E: Vegetation survey data

Abreviation	Kingdom	Class	Family	Scientific Name	Common Name	BC Act	EPBC	GrowthForm	N or E	HTE	Cover	Abundance
				eucalyptus crebra	Narrow-leaved Ironbark	Not Listed	Not Listed	Tree (TG)	Alive in NSW, Native		0.1	1
euca side				Eucalyptus siderophloia	Grey Ironbark	Not Listed	Not Listed	Tree (TG)	Alive in NSW, Native		25	2
aris vaga				Aristida vagans	Threeawn Speargrass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.1	10
halo hete				Haloragis heterophylla	Variable Raspwort	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	10
murd gram				Murdannia graminea		Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	1
cyno dact				Cynodon dactylon	Common Couch	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		3	100
them aust				Themeda australis	Kangaroo Grass	Not Listed	Not Listed	0	Alive in NSW, Native		8	500
echi caes				Echinopogon caespitosus	Bushy Hedgehog-grass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		1	200
erag brow				Eragrostis brownii	Brown's Lovegrass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		15	1000
aris ramo				Aristida ramosa	Purple Wiregrass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		1	200
pasp dist				Paspalidium distans		Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		2	400
micr stip				Microlaena stipoides	Weeping Grass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		10	1000
spor creb				Sporobolus creber	Slender Rat's Tail Grass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		4	400
fimb dich				Fimbristylis dichotoma	Common Fringe-sedge	Not Listed	Not Listed	FALSE	Alive in NSW, Native		0.1	20
glyc taba				Glycine tabacina	Variable Glycine	Not Listed	Not Listed	Other (OG)	Alive in NSW, Native		2	400
dich repe				Dichondra repens							0.2	100
prat purp				Pratia purpurascens							0.2	100
				Glycine microphylla							3	500
axon comp		Flora	Malvaceae	Axonopus compressus	Broad-leaved Carpet Grass	Not Listed	Not Listed	0	Introduced		1	200
modi caro		Flora	Poaceae	Modiola caroliniana	Red-flowered Mallow	Not Listed	Not Listed	0	Introduced		0.1	1
pasp dila		Flora	Poaceae	Paspalum dilatatum	Paspalum	Not Listed	Not Listed	0	Introduced		0.5	100
dige dida		Flora	Malvaceae	Digitaria didactyla	Queensland Blue Couch	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		55	2000
sida rhom		Flora	Asteraceae	Sida rhombifolia	Paddy's Lucerne	Not Listed	Not Listed		Introduced		0.2	20
sene mada		Flora	Juncaceae	Senecio madagascariensis	Fireweed	Not Listed	Not Listed	0	Introduced		0.3	30
junc cogn		Flora	Fabaceae (Faboide	Juncus cognatus		Not Listed	Not Listed	0	Introduced		0.1	20
trif repe		Flora	Caryophyllaceae	Trifolium repens	White Clover	Not Listed	Not Listed	0	Introduced		0.2	50
stel medi		Flora	Plantaginaceae	Stellaria media	Common Chickweed	Not Listed	Not Listed	0	Introduced		0.1	5
plan lanc	Plantae	Flora	Asteraceae	Plantago lanceolata	Lamb's Tongues	Not Listed	Not Listed	0	Introduced		0.2	100
hypo radi	Plantae	Flora	Caryophyllaceae	Hypochoeris radicata	Catsear	Not Listed	Not Listed	0	Introduced		0.1	10
paro bras	Plantae	Flora	Cyperaceae	Paronychia brasiliana	Chilean Whitlow Wort, Brazilian Whi	Not Listed	Not Listed	0	Introduced		0.3	200
cype brev				Cyperus brevifolius		Not Listed	Not Listed	0	Introduced		0.2	100
desm vari				Desmodium varians							0.1	5
cype poly	Plantae	Flora	Anthericaceae	Cyperus polystachyos							0.1	10
laxm grac	Plantae	Flora	Poaceae	Laxmannia gracilis	Slender Wire Lily	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	1
	Plantae	Flora	Poaceae	Poa sieberiana	Snowgrass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.1	3
echi ovat	Plantae	Flora	Poaceae	Echinopogon ovatus	Forest Hedgehog Grass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.1	2
cenc clan				Cenchrus clandestinus	Kikuyu Grass	Not Listed	Not Listed	0	Introduced		0.1	1

Tree Count	Absent=0,Present =1
80cm +	0
50-79 cm	1
30-49 cm	1
20-29 cm	1
10-19 cm	0
5-9 cm	0
<5 cm	0

Logs	<sum of longs on ground >10cm
0	

Hollows	<Number of hollow bearing trees
0	

1 x 1 m Plots	Subplot	Average
	Leaf Litter	
5	15	
15	10	
25	30	13.0
35	5	
45	5	
	Bare Ground	
5	0	
15	0	
25	0	0.0
35	0	
45	0	
	Cryptogram	
5	0	
15	0	
25	0	0.0
35	0	
45	0	
	Rock Cover	
5	0	
15	0	
25	0	0.0
35	0	
45	0	

Abreviation	Kingdom	Class	Family	Scientific Name	Common Name	BC Act	EPBC	GrowthForm	N or E	HTE	Cover	Abundance
			Myrtaceae	Eucalyptus globoidea	White Stringybark	Not Listed	Not Listed	Tree (TG)	Alive in NSW, Native		0.1	1
euca tere			Myrtaceae	Eucalyptus tereticornis	Forest Red Gum	Not Listed	Not Listed	Tree (TG)	Alive in NSW, Native		15	51
glyc micr			Fabaceae (Faboide	Glycine microphylla	Small-leaf Glycine	Not Listed	Not Listed	Other (OG)	Alive in NSW, Native		0.3	150
digi dida			Poaceae	Digitaria didactyla	Queensland Blue Couch	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		70	200
micr stip			Poaceae	Microlaena stipoides	Weeping Grass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		8	600
erag brow			Poaceae	Eragrostis brownii	Brown's Lovegrass	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		10	700
cype poly			Cyperaceae	Cyperus polystachyos		Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.1	10
halo hete			Haloragaceae	Haloragis heterophylla	Variable Raspwort	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.5	200
oxal perr			Oxalidaceae	Oxalis perennans		Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	10
junc remo			Juncaceae	Juncus remotiflorus		Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.4	10
glyc taba			Fabaceae (Faboide	Glycine tabacina complex		Not Listed	Not Listed	0	Alive in NSW, Native		0.2	100
desm vari			Fabaceae (Faboide	Desmodium varians	Slender Tick-trefoil	Not Listed	Not Listed	Other (OG)	Alive in NSW, Native		0.1	10
leuc juni			Ericaceae	Leucopogon juniperinus	Prickly Beard-heath	Not Listed	Not Listed	Shrub (SG)	Alive in NSW, Native		0.2	1
hydr silo			Apiaceae	Hydrocotyle sibthorpioides		Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	200
			Dilleniaceae	Hibbertia obtusifolia	Hoary Guinea Flower	Not Listed	Not Listed	Shrub (SG)	Alive in NSW, Native		0.1	3
fimb dict			Cyperaceae	Fimbristylis dichotoma	Common Fringe-sedge	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.1	10
good pani				Goodenia paniculata							0.5	200
			Apiaceae	Centella asiatica	Indian Pennywort	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.5	100
			Caryophyllaceae	scleranthus spp.		Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	20
prat purp			Campanulaceae	Pratia purpurascens	Whiteroot	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	10
glyc clan			Fabaceae (Faboide	Glycine clandestina	Twining glycine	Not Listed	Not Listed	Other (OG)	Alive in NSW, Native		0.1	2
tric elat			Anthericaceae	Tricoryne elatior	Yellow Autumn-lily	Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	1
them aust			Poaceae	Themeda australis	Kangaroo Grass	Not Listed	Not Listed	0	Alive in NSW, Native		0.2	10
romu rose			Iridaceae	Romulea rosea		Not Listed	Not Listed	0	Introduced		0.1	10
junc coga			Juncaceae	Juncus cognatus		Not Listed	Not Listed	0	Introduced		0.2	50
trif repe				Trifolium repens	White Clover	Not Listed	Not Listed	0	Introduced		0.1	10
sene mada			Asteraceae	Senecio madagascariensis	Fireweed	Not Listed	Not Listed	0	Introduced		0.2	5
hypo radi			Asteraceae	Hypochoeris radicata	Catsear	Not Listed	Not Listed	0	Introduced		0.2	100
cype brev	Plantae	Flora	Cyperaceae	Cyperus brevifolius		Not Listed	Not Listed	0	Introduced		0.2	80
axon comp	Plantae	Flora	Poaceae	Axonopus compressus	Broad-leaved Carpet Grass	Not Listed	Not Listed	0	Introduced		6	800
rich bras	Plantae	Flora	Rubiaceae	Richardia brasiliensis	Mexican Clover	Not Listed	Not Listed	0	Introduced		0.2	20
cyno dact	Plantae	Flora	Poaceae	Cynodon dactylon	Common Couch	Not Listed	Not Listed	Grass & grasslike (GG)	Alive in NSW, Native		0.2	10
dros pelt	Plantae	Flora	Droseraceae	Drosera peltata		Not Listed	Not Listed	Forb (FG)	Alive in NSW, Native		0.1	1

Seedling
1 mature + 50 Juv

Tree Count	Absent=0,Present =1
80cm +	
50-79 cm	2
30-49 cm	1
20-29 cm	1
10-19 cm	
5-9 cm	
<5 cm	

Logs	<sum of longs on ground > 10cm
1	

Hollows	<Number of hollow bearing trees
	Ground hollow

1 x 1 m Plots	Subplot	Average
	Leaf Litter	
5	2	
15	5	
25	5	6.4
35	15	
45	5	
	Bare Ground	
5	0	
15	0	
25	2	0.4
35	0	
45	0	
	Cryptogram	
5	0	
15	0	
25	0	0.0
35	0	
45	0	
	Rock Cover	
5	0	
15	0	
25	0	0.0
35	0	
45	0	

Appendix F: Decision-maker authorisation to use more appropriate local data

N/A

Appendix G: Credit reports

Species listed as Assumed Present are to be surveyed at later date in accordance with TBDC survey guidelines

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00040626/BAAS18020/23/00040627	303 Wollombi Rd Farley Big BDAR	22/06/2023
Assessor Name	**Report Created**	**BAM Data version ***
Sarah Elizabeth Jones	08/09/2023	61
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18020	Part 4 Developments (General)	Finalised
Assessment Revision	**Date Finalised**	**BOS entry trigger**
0	08/09/2023	BOS Threshold: Biodiversity Values Map and area clearing threshold

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

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	3433_Intact-under-scrubed	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Intact-under-scrubed	0.28	1	
2	3444_Moderate	3444-Lower Hunter Spotted Gum-Ironbark Forest	Moderate	1.18	1	
3	3433_VZ2-Derived-Grass	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	VZ2-Derived-Grass	1.9	1	
4	3444_VZ2-Derived-Grass	3444-Lower Hunter Spotted Gum-Ironbark Forest	VZ2-Derived-Grass	1.9	1	

BAM Credit Summary Report

Proposal Details

Assessment Id 00040626/BAAS18020/23/00040627	Proposal Name 303 Wollombi Rd Farley Big BDAR	BAM data last updated * 22/06/2023
Assessor Name Sarah Elizabeth Jones	Report Created 08/09/2023	BAM Data version * 61
Assessor Number BAAS18020	BAM Case Status Open	Date Finalised To be finalised
Assessment Revision 1	Assessment Type Part 4 Developments (General)	BOS entry trigger BOS Threshold: Biodiversity Values Map and area clearing threshold

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

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

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

Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest												
1	3433_Intact-under-scrubed	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	48.6	48.6	0.28	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		7
3	3433_VZ2-Derived-Grass	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	31.7	31.7	1.9	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		30
											Subtotal	**37**
Lower Hunter Spotted Gum-Ironbark Forest												
2	3444_Moderate	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	33.6	33.6	1.2	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		20

4	3444_VZ2-Derived-Grass	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	11.5	11.5	1.9	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
											Subtotal	**20**
											Total	**57**

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
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	20
3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	7
								Subtotal	**27**

Hoplocephalus stephensii / Stephens' Banded Snake (Fauna)									
3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	20
								Subtotal	**27**
Litoria aurea / Green and Golden Bell Frog (Fauna)									
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	20
3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	7
								Subtotal	**27**
Litoria brevipalmata / Green-thighed Frog (Fauna)									
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	15

3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	5
								Subtotal	**20**
Myotis macropus / Southern Myotis (Fauna)									
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	20
3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
								Subtotal	**27**
Uperoleia mahonyi / Mahony's Toadlet (Fauna)									
3433_Intact-under-scrubed	48.6	48.6	0.28	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Not Listed	False	7
3444_Moderate	33.6	33.6	1.2	Biodiversity Conservation Act listing status	Ecology or response to management is poorly known	Endangered	Not Listed	False	20

								Subtotal	**27**

BAM Candidate Species Report

Proposal Details

Assessment Id 00040626/BAAS18020/23/00040627	Proposal Name 303 Wollombi Rd Farley Big BDAR	BAM data last updated * 22/06/2023
Assessor Name Sarah Elizabeth Jones	Report Created 08/09/2023	BAM Data version * 61
Assessor Number BAAS18020	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 0	Date Finalised 08/09/2023	BOS entry trigger BOS Threshold: Biodiversity Values Map and area clearing threshold

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

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Angophora inopina Charmhaven Apple	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?
Callistemon linearifolius Netted Bottle Brush	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?
Callocephalon fimbriatum Gang-gang Cockatoo	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?
Calyptorhynchus lathami Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Delma impar Striped Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Eucalyptus glaucina Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus parramattensis subsp. decadens Eucalyptus parramattensis subsp. decadens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus pumila Pokolbin Mallee	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	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?
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?
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 stephensii Stephens' Banded Snake	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria brevipalmata Green-thighed Frog	Yes (assumed present)	☐ 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?
Myotis macropus Southern Myotis	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	No (surveyed)	☐ 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 Southern Greater Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pomaderris queenslandica Scant Pomaderris	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Prasophyllum sp. Wybong Prasophyllum sp. Wybong	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?
Pterostylis chaetophora Pterostylis chaetophora	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rutidosis heterogama Heath Wrinklewort	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Spyridium burragorang - endangered population Spyridium burragorang in the Cessnock local government area	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Syzygium paniculatum Magenta Lilly Pilly	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Tetratheca juncea Black-eyed Susan	No (surveyed)	☐ 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?
Uperoleia mahonyi Mahony's Toadlet	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Broad-billed Sandpiper	Limicola falcinellus	Habitat constraints
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Common Planigale	Planigale maculata	Species is vagrant
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Eastern Osprey	Pandion cristatus	Habitat constraints
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	Dromaius novaehollandiae - endangered population	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	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
North Rothbury Persoonia	Persoonia pauciflora	Refer to BAR
Pine Donkey Orchid population in the Muswellbrook local government area	Diuris tricolor - endangered population	Refer to BAR
Red Helmet Orchid	Corybas dowlingii	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints
Wallum Froglet	Crinia tinnula	Refer to BAR

Appendix H: Bat Call Analysis

Appendix I: Photos