BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT (SMALL AREA)

FOR A

PROPOSED RESIDENTIAL SUBDIVISION

AT

21-33 OWLPEN LANE, FARLEY NSW 2320,

Prepared by:

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Site Details:	21-33 Owlpen Lane, Farley NSW 2320 (Lot 1 DP 983691, Lot 10 DP 1229964, Lot 11 DP 1229964, Lot B DP 348463, Lot C DP 348463)				
Prepared by:	***Sarah Jones*** ***B.Env.Sc., G.DIP.DBPA (Design for Bushfire Prone Areas)*** ***BAAS18020 Accredited Assessor*** ***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				
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	1	Version 1	20/06/2022	Lucy Boswell	Sarah Jones
	2	Version 2	06/09/2022	Ollie Broun	Sarah Jones

Executive Summary

Introduction

Firebird ecoSultants Pty Ltd has been engaged by The Bathla Group, to provide a Biodiversity Development Assessment Report (BDAR) for a proposed residential subdivision ('the proposal') at 21-33 Owlpen Lane, Farley NSW 2320 (Lot 1 DP 983691, Lot 10 DP 1229964, Lot 11 DP 1229964, Lot B DP 348463, Lot C DP 348463) ('the site' or 'the subject site').

The proposal includes a Torrens title subdivision (5 lots into 131 residential lots) of 21-33 Owlpen Lane, Farley NSW 2320 to provide development space for the construction of 131 dwellings as well as associated infrastructure such as site access, services and asset protection zones (APZ).

The site is ~11.5 ha in size and is located in the eastern periphery of the residential portion of Farley. The site is zoned predominantly as R1 General Residential, with a band of RU2 Rural Landscape zoning within the eastern portion of the site. The site is predominantly managed and contains five existing dwellings, associated sheds, site access, some exotic pasture and lawn grass and some remnant native vegetation. Remnant patches of native vegetation occur within the southern portion of the site and scattered through the northern portion. A drainage line occcirs within the site. This stream would be classified as a 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix E of the BAM). The site is surrounded by large residential lots to the North, rural lots to the East and South, and smaller residential lots as part of a new subdivision to the west. The site does not contain important mapped areas for threatened species or any mapped biodiversity values.

Landscape features

Details	Response
IBRA Region and Subregion	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. There are no other IBRA bioregions or subregions near the site. See previous Figure 1-1 for the locations of IBRA regions/subregions within 1.5 km of the site.
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 Hunter – 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.
Percent 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 2-1. It is estimated, from this mapping, that the native vegetation cover would be 5%.
Wetlands, Rivers, Streams and Estuaries	A riparian zone spans from the south-west to the east of the site, and this is inclusive of a defined watercourse. This stream would be classified as a 2nd order watercourse (in accordance with the Strahler stream ordering system in

	Appendix E of the BAM). See previous Figure 1-1 for watercourses within 1.5 km of the site.
Connectivity Features	The highly degraded and largely managed state of vegetation within and on surrounding sites indicates that the small patch of remnant vegetation in the south of the site is highly isolated. It is likely that this patch once formed part of the patch of forest vegetation to the south-west of the site. Tenuous connectivity is provided through the site in an East/West direction towards the patch of vegetation to the south-west of the site. The site's connectivity would likely only be suitable for species that are comfortable crossing relatively open areas due to the lack of canopy and shrub layer throughout the site.
Areas of Geological Significance and Soil Hazard Features	No karst, caves, crevices or cliffs were located on the site or within a 1,500 m buffer around the site. No soil hazards were identified on the site or within a 1,500 m buffer around the site.
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.

Patch Size

The site's native vegetation is connected to a large area of intact bushland that is greater than 100 ha in area, therefore the patch size has been assessed as >100 ha.

Plant Community Types

Attribute	Details
PCT 1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	
Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation Class	Hunter Macleay Dry Sclerophyll Forest
TEC status	Not associated with a TEC
PCT Percent Cleared	49%
Justification for PCT Selection	Surveys undertaken by Firebird ecoSultants have confirmed the presence of several typical species associated with PCT 1593, including; *Corymbia maculata* (Spotted Gum), *Melaleuca nodosa,*
Other PCTs considered	**PCT 1598 –** Forest Red Gum grassy open forest on floodplains of the lower Hunter.

Impacted by the proposal?	Yes – Both directly and indirectly impacted by the proposal

Vegetation Integrity

PCT	Vegetation Zone (VZ)	Composition Score	Structure Condition Score	Function Condition Score	Vegetation Integrity Score
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	VZ 1: Moderate	64.4	64.4	25.4	47.2
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	VZ 2: Poor	7	25.7	17.9	14.8

Habitat Assessment

The following describes the habitat attributes of the study area;

- A riparian zone spans from the south-west to the east of the site, and this is inclusive of a defined watercourse. This stream would be classified as a 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix E of the BAM). This is to be retained as part of the proposed development.
- The study area contains tree species that are listed as Koala Feed Trees.
- The study area provides open grassland habitat within the site's pasture grassland area which may provide habitat for species adapted to open areas.
- The site contains one hollow-bearing trees, being;
    - Multiple medium and large sized hollows, suitable for microbats, mammals, birds, mammals or herpetofauna.
- The study area contains limited fallen logs and timber which would provide limited 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.

Avoidance of Impacts to the site's biodiversity values

The sites PCT 1593 is not considered to be threatened. The proposal largely avoids impacts to this community by positioning the construction and operational development footprint within a large area of the site that has already been predominantly cleared of native vegetation and within the less intact area of this PCT.

PCT 1593 covers an area of 1.44ha within the site and contains two vegetation zone section:

- Vegetation zone 1 – Moderate: This vegetation zone occurs in a moderate condition, with an intact canopy stratum with a few large mature trees. Four (4) hollow-bearing trees or stags were observed in this area. There is a moderate shrub layer present within this zone and the density of native ground cover is a mix of native and exotics species.
- Vegetation zone 2 – Poor: There is little to no upper or regrowth canopy stratum, limited to no shrub layer and a mix of native and exotic groundcover. There are two (2) hollow-bearing trees within this zone.

PCT 1593 will be directly impacted by the proposal by vegetation clearing (0.92ha) and may be indirectly impacted by changes in edge effects, noise, light pollution and dust from construction phase activities and post-development activities. All of the direct impacts to this PCT occur within zone 1 and 2; impacts to PCT have been reduced by the retention of the riparian zone and implementation of a VMP plan.

The riparian zone on site (PCT 1568) has been completely avoided during the planning of development on site.

Direct Impacts

PCT	BC Act Name / Listing Status	EPBC Act Name / Listing Status	Vegetation Zone (VZ) Name	Direct Impact
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	Not listed	Not listed	VZ 1: Moderate	0.16 ha
			VZ 1: Poor	0.58 ha

Avoidance of Impacts

The proposal largely avoids impacts by positioning the construction and operational development footprint within a large area of the site that has already been predominantly cleared of native vegetation and now consists of mostly exotic pasture grasses and weeds, and will retain and replant within the drainage line. A Vegetation Management Plan will be implemented to enhance the biodiversity values within the drainage line.

Abbreviations

Abbreviation	Meaning
AOBV	Areas of Outstanding Biodiversity Value
BAM	Biodiversity Assessment Methodology 2020
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DEE	Department of Environment and Energy
DoE	Department of Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Ha	Hectare
LEP	Local Environmental Plan
LGA	Local Government Area
MU	Map Unit
NPWS	NSW National Parks and Wildlife Service
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PFC	Projected Foliage Cover
SAII	Serious and Irreversible Impacts
TBCD	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan

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TABLES

FIGURES

1 INTRODUCTION

Firebird ecoSultants Pty Ltd has been engaged by The Bathla Group, to provide a Biodiversity Development Assessment Report (BDAR) for a proposed residential subdivision ('the proposal') at 21-33 Owlpen Lane, Farley NSW 2320 ('the site' or 'the subject site'). See Figure 1-1 for the Location Map and Figure 1-2 for the Site Map. 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 Description of the Proposal

The proposal is for a Torrens title subdivision (5 lots into 131 residential lots) of 21-33 Owlpen Lane, Farley NSW 2320 (Lot 1 DP 983691, Lot 10 DP 1229964, Lot 11 DP 1229964, Lot B DP 348463, Lot C DP 348463) to provide development space for the construction of 131 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 exotic pasture grasses and weeds, with some small areas of disturbed remnant native vegetation.

The proposed development footprint is indicated in Figure 1-2. It totals an area of 11.5ha of land/vegetation and encompasses the following areas:

- The designated area for residential lots, building envelopes, APZs and site access is 9.1ha. The majority of this land is grassland, with
- Retention of 7000m^2 of vegetation within riparian zone.

- 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, detention basin and site access and the APZs.

Refer to Appendix A for Site Plans.

1.2 General Site Description

The site is 11.5 ha in size and is located in the northern periphery of the growing residential portion of Farley. The site is zoned as R1 General Residential. The site is predominantly managed and contains five (5) existing dwellings, sheds, site access, some exotic pasture and lawn grass and some remnant native vegetation. The vegetated areas of the site are not currently grazed by livestock (cattle and goats) however, there is strong evidence of past grazing in the area. One drainage canal occurs within the site that drains through the site from west to east toward Stoney Creek which eventually drains into Swamp Creek. The drainage canal within the site would be classed as a 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix 3 of the BAM). The site is surrounded by similar large residential lots to the east, large

residential lots to the south and Rutherford to the north. The site does not contain important mapped areas for threatened species or any mapped biodiversity values.

See Figure 1-1 for the site location.

1.3 The Study 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 study area encompasses the entire site.

1.4 Information sources

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.

1.4.2 Regional Vegetation Mapping

Regional scale vegetation mapping, previously undertaken in the area, was reviewed. This included a review of *Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855* and Greater Hunter Vegetation Community & Plant Community Types Map.

1.4.3 Literature Review

Information sources reviewed included, but were not limited to:

- Aerial Photograph Interpretation (API)
- Relevant guidelines, including:
    - OEH *Biodiversity Assessment Method*, 2020
    - *NSW Guide to Surveying Threatened Plants* (OEH, 2016)
    - *'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:
    - *Lake Macquarie LEP 2014*;
    - *Lake Macquarie (DCP) 2014*;
- Any environmental / ecological reports relevant to the site or area, including vegetation mapping.
- Online tools and resources, including:
    - 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).

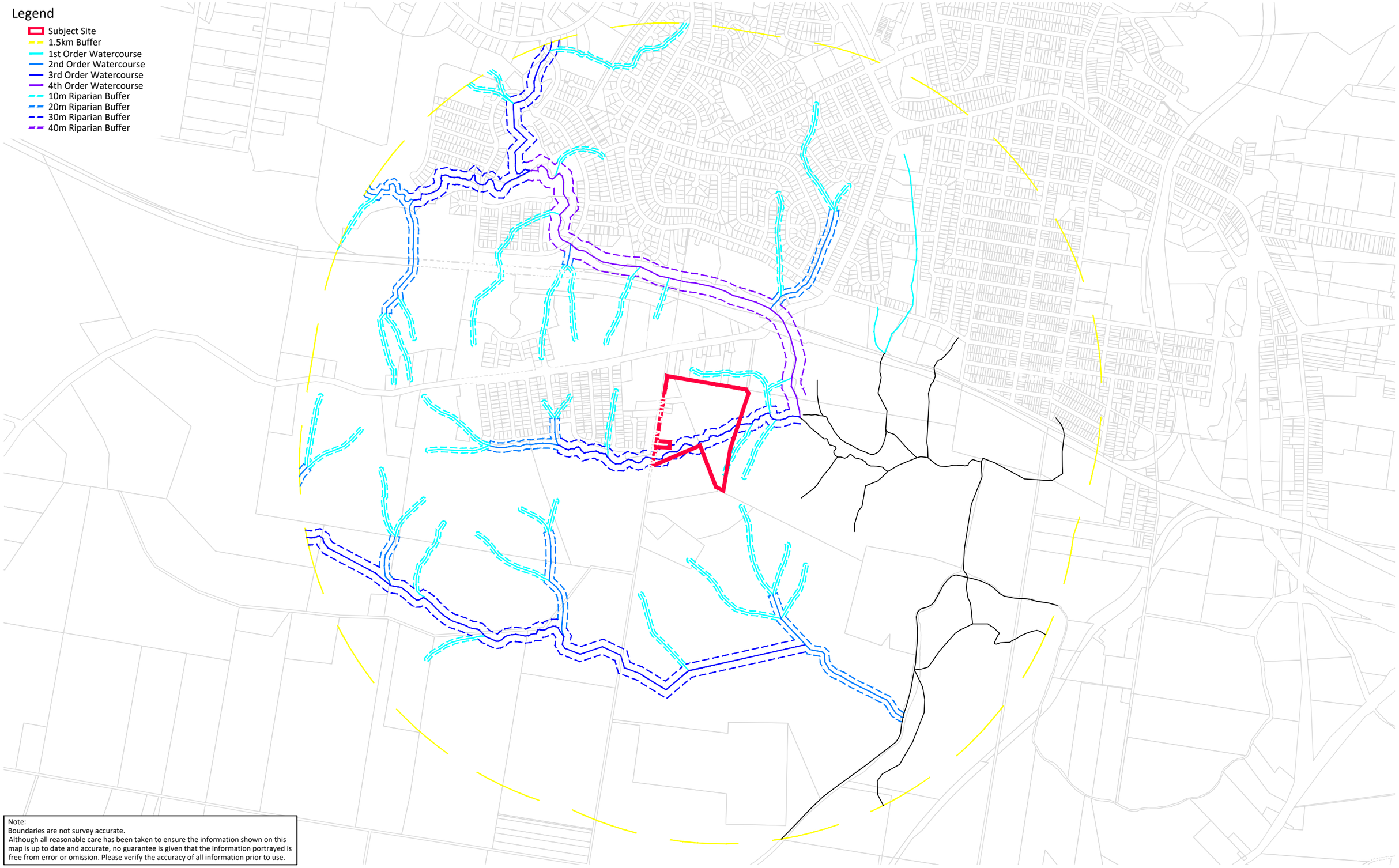

FIGURE 1-1: SITE LOCALITY MAP

Ref No 3133 BDAR

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 22 July 2022

NORTH

0 250 500 750

SCALE 15 000 @ A3

PIXELDRAFTING

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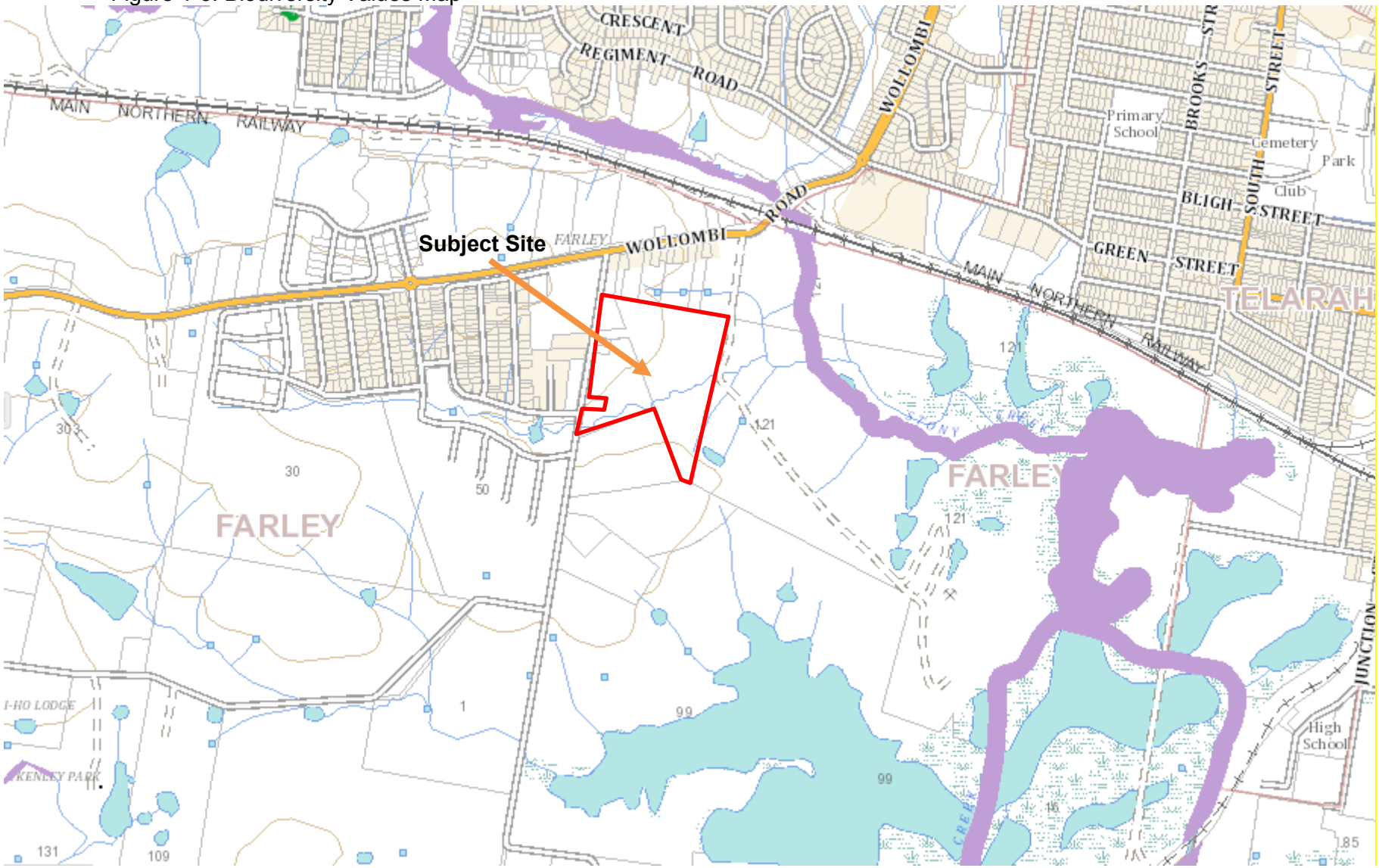
firebird

Figure 1-2: Site Map

Figure 1-3: Biodiversity Values Map



2 STAGE 1 – BIODIVERSITY ASSESSMENT

2.1 Landscape features

This section details the landscape features occurring on the Subject Land or within the assessment area (i.e. a 1.5 km buffer) surrounding the Subject Land; see Table 2-1.

Table 2-1: Landscape Features

Details	Response
IBRA Region and Subregion	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. There are no other IBRA bioregions or subregions near the site. See previous Figure 1-1 for the locations of IBRA regions/subregions within 1.5 km of the site.
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 Hunter – 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.
Percent 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 2-1. It is estimated, from this mapping, that the native vegetation cover would be 5%.
Wetlands, Rivers, Streams and Estuaries	A riparian zone spans from the south-west to the east of the site, and this is inclusive of a defined watercourse. This stream would be classified as a 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix E of the BAM). See previous Figure 1-1 for watercourses within 1.5 km of the site.
Connectivity Features	The highly degraded and largely managed state of vegetation within and on surrounding sites indicates that the small patch of remnant vegetation in the south of the site is highly isolated. It is likely that this patch once formed part of the patch of forest vegetation to the south-west of the site. Tenuous connectivity is provided through the site in an East/West direction towards the patch of vegetation to the south-west of the site. The site's connectivity would likely only be suitable for species that are comfortable crossing relatively open areas due to the lack of canopy and shrub layer throughout the site.
Areas of Geological Significance and Soil Hazard Features	No karst, caves, crevices or cliffs were located on the site or within a 1,500 m buffer around the site. No soil hazards were identified on the site or within a 1,500 m buffer around the site.
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.

2.2 Native vegetation

2.2.1 Native Vegetation Cover Within the Site

The site contains 1.44 ha 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 0.66 ha; see Figure 2-2 for the native vegetation extent within the site.

2.2.2 Patch Size

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.

The patch size has been assessed as < 2ha.

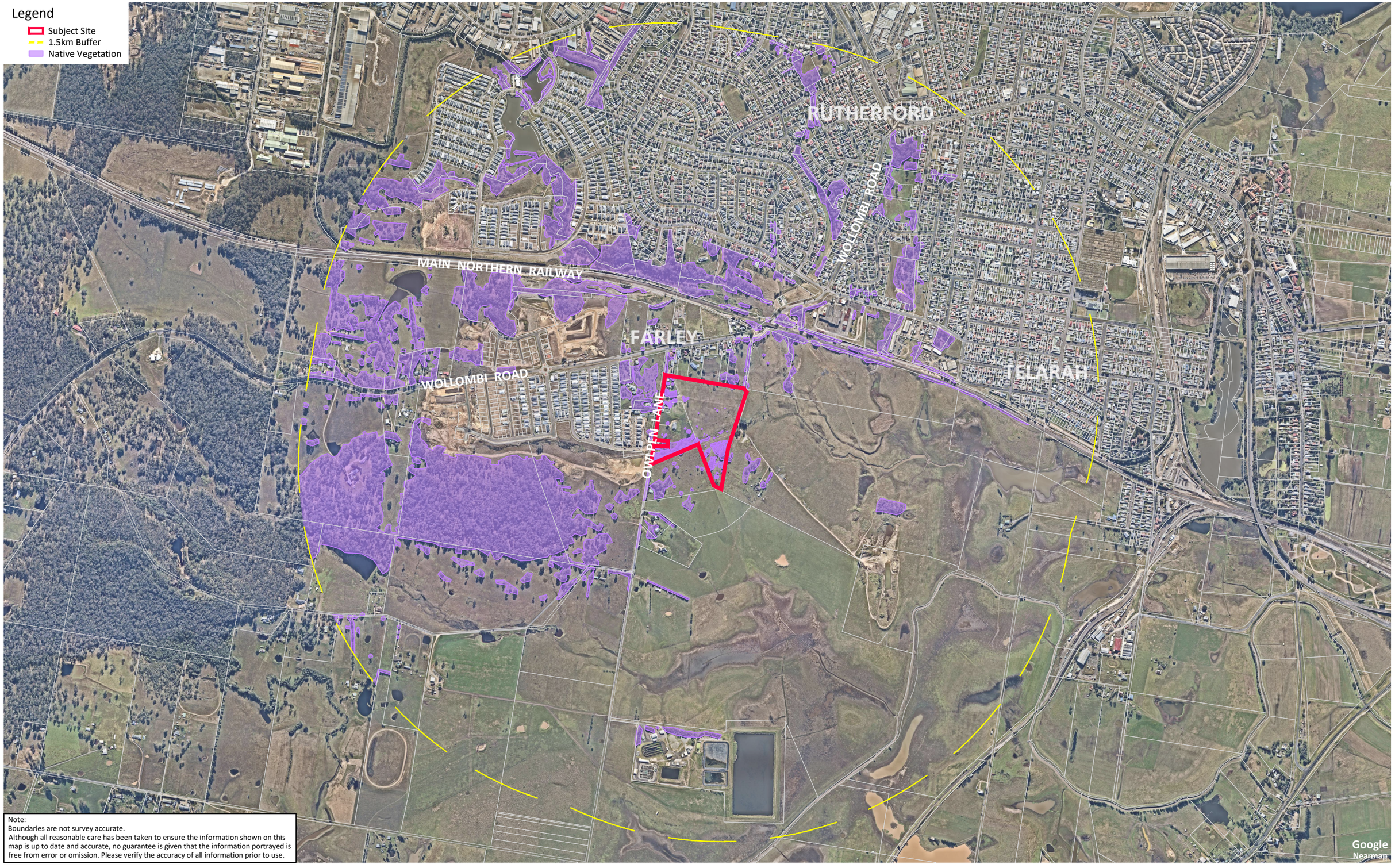


FIGURE 2-1: Native Vegetation Extent within a 1.5 km Radius of the Site

Ref No 3133 BDAR

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 22 July 2022

NORTH

0 250 500 750

SCALE 15 000 @ A3

PIXELDRAFTING

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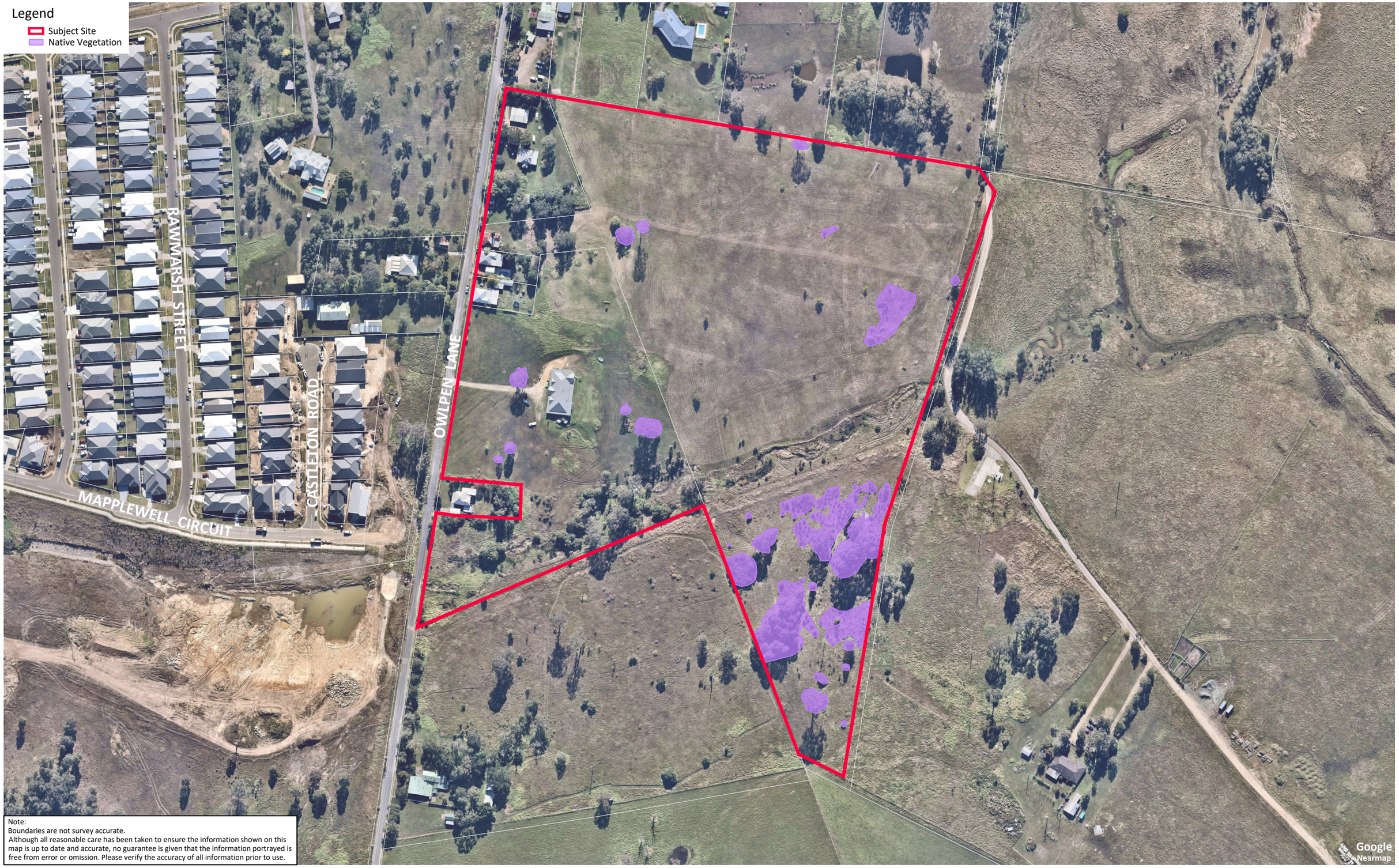

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 2-2: NATIVE VEGETATION WITHIN THE SITE

Ref No 3133 BDAR

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 15 July 2022

NORTH

0 50 100 150

SCALE 2500 @ A3

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2.2.3 Identifying Plant Community Types

Review of Existing Information

Table 2-3 details the review on existing information on the site's PCTs/vegetation communities.

Table 2-2: Review of Existing Information on the Site's PCTs

Vegetation Mapping Project	Response
Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855	There were no PCT's mapped within the site

2.2.3.1 Plot-based Floristic Surveys

Plot-based floristic vegetation surveys were undertaken within the study area in accordance with s.5.2.1.9 of the BAM, by two ecologists on 22th March 2022. The 20 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. Two native PCTs have been identified within the site; these PCTs are described below. The distribution of the PCTs in the development footprint is indicated in Figure 2-4. Plot data is provided in Appendix B. A full recorded species list is provided in Appendix C.

2.2.3.2 Plant Community Types

The PCT identified within the site was not found to be consistent with the PCT mapped on *Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855* and Lake Macquarie City Council Vegetation Community & Plant Community Types Map. The distribution of the site's PCT is indicated in Figure 2-4. See Appendix I for photos.

Table 2-3: Plant Community Types within the site that are impacted by the proposal

Attribute	Details
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	
Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation Class	Hunter-Macleay Dry Sclerophyll Forests
TEC status	Not associated with a TEC
PCT Percent Cleared	49%
Justification for PCT Selection	Surveys undertaken by Firebird ecoSultants have confirmed the presence of several typical species associated with PCT 1593, including; *Corymbia maculata* (Spotted Gum), *Melaleuca nodosa* (prickly-leaved paperbark), *Microlaena stipoides* (Weeping Grass), *Cymbopogon refractus* (Barbed Wire Grass) and *Cheilanthes sieberi* (Rock Fern).
Other PCTs considered	**PCT 1598 –** Forest Red Gum grassy open forest on floodplains of the lower Hunter.
Impacted by the proposal?	Yes – Both directly and indirectly impacted by the proposal

FIGURE 2-3: FLORISTIC SURVEY PLOTS

Ref No 3133 BDAR

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 15 July 2022

NORTH

0 50 100 150

SCALE 2500 @ A3

PIXELDRAFTING

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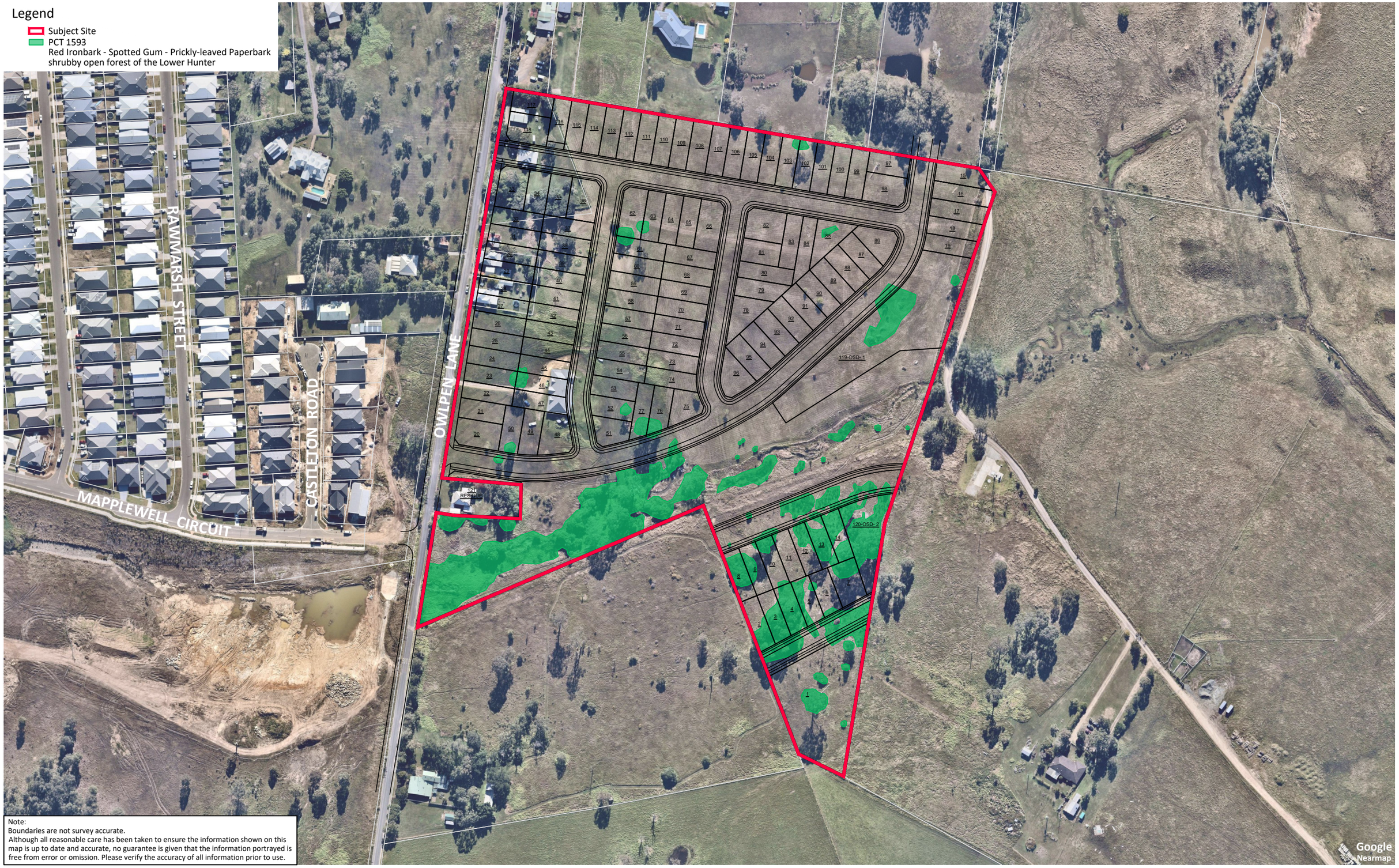

Note:
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FIGURE 2-4: PLANT COMMUNITY TYPES

Ref No 3133 BDAR B

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 19 August 2022

NORTH

0 50 100 150

SCALE 2500 @ A3

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2.2.4 Vegetation Integrity Assessment

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 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 2-4). See Appendix I for photos of each vegetation zone.

Table 2-4: Vegetation Zones and Patch Size Classes

PCT	Vegetation Zone (VZ) Name	Vegetation Zone Description	Patch Size Class
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	VZ 1: Moderate	This vegetation zone occurs in a moderate condition, with an intact canopy stratum with a few large mature trees. No hollow-bearing trees or stags were observed in this area. There is a moderate shrub layer present within this zone and the density of native ground cover is a mix of native and exotics species.	1 ha
	VZ 2: Poor	There is little to no upper or regrowth canopy stratum, limited to no shrub layer and a mix of native and exotic groundcover. There is one hollow-bearing trees within this zone containing three (3) hollows.	1 ha

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, by one ecologist on February 2021. Survey plots were established around a central 50 m 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 2-3 for plot locations. Plot data is provided in Appendix B. Table 2-5 details the vegetation integrity score.

Table 2-5: Vegetation Integrity Scores

PCT	Vegetation Zone (VZ)	Composition Score	Structure Condition Score	Function Condition Score	Vegetation Integrity Score
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	VZ 1: Moderate	64.4	64.4	25.4	47.2
	VZ 2: Poor	7	25.7	17.9	14.8

2.3 Threatened Species

The following has been undertaken in accordance with section 6 of the BAM.

Under the BAM, threatened species are separated into two classes, 'ecosystem' and 'species' credit species. Those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which a targeted survey has a low probability of detection, are identified as 'ecosystem' credit species. Targeted surveys are not required for ecosystem species and potential impacts to these species are assessed in conjunction with impacts to PCTs.

Threatened species where the likelihood of occurrence of a 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 are identified as 'species' credit species. A targeted survey or an expert report is required to confirm the presence or absence of these species on the subject land.

For some threatened species, they are identified as both ecosystem and species credit species, with different aspects of the habitat and life cycle representing different credit types. Commonly, threatened fauna species may have foraging habitat as an ecosystem credit, while their breeding habitat represents a species credit.

The following sections outline the process for determining the habitat suitability for threatened species within the subject lands, and the results of targeted surveys for candidate threatened species.

2.3.1 Identify 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.

2.3.2 Ecosystem Credit Species

Ecosystem credit species are those where the likelihood of occurrence of the species or elements of the species' habitat, can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. The Threatened Biodiversity Data Collection (TBCD) has identified several ecosystem credit species as requiring assessment, for the proposal; these are listed in Table 2-6.

Table 2-6: Ecosystem Credit Species Predicted to occur within the Study Area

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 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	CE	CE
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	• Presence of Allocasuarina and casuarina species = Yes	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	Presence of Allocasuarina and casuarina species present in this PCT 1568 VZ1 and VZ3	V	-
Chthonicola sagittata Speckled Warbler	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Dasyurus maculatus Spotted-tailed Quoll	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	E
Glossopsitta pusilla Little Lorikeet	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Haliaeetus leucogaster White-bellied Sea Eagle (Foraging)	• Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines = Yes	PCT 1593 VZ1 = Yes PCT 1593 VZ2 = No	N/A	V	-
Hirundapus caudacutus White-throated Needletail	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	-	V

Lathamus discolor Swift Parrot (Foraging)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	E	CE
Melanodryas cucullata cucullata Hooded Robin (south-eastern form)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Miniopterus australis Little Bentwing-bat (Foraging)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Miniopterus *orianae* ***oceanensis*** Large Bentwing-bat (Foraging)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Petroica boodang Scarlet Robin	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	V
Stagonopleura guttata Diamond Firetail	-	PCT 1593 VZ1 = No PCT 1593 VZ2 = No	N/A	V	-

2.3.3 Species Credit Species (Candidate 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 2-7. Table 2-7 also provides an assessment of habitat suitability for the candidate species, in accordance with s.6.4 of the BAM.

Table 2-7: Candidate Species Assessment

Species Credit Species	Habitat Constraints / Geographic Limitations	Confirmed Candidate Species for Further Assessment	Justification of Habitat Constraints / Geographic Limitations
Anthochaera phrygia Regent Honeyeater (Breeding)	• As per mapped areas	No	**Habitat constraints not present:** The study area is not within or near a mapped area of important habitat for this species.
Lathamus discolor Swift Parrot (Breeding)	• As per mapped area	No	**Habitat constraints not present:** The study area is not within or near a mapped area of important habitat for this species.
Miniopterus australis Little Bentwing-bat (Breeding)	• 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:** The study area does not contain caves, tunnels, mines, culverts or other structures 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'. **Refer to section 2.3.4 for the habitat assessment.**
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	• Caves • Cave, tunnel, mine, culvert or other structure known or suspected to be used	No	**Habitat constraints not present:** The study area does not contain caves, tunnels, mines, culverts or other structures 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'. **Refer to section 2.3.4 for the habitat assessment.**

	for breeding including species records in BioNet with microhabitat code 'IC – in cave' • observation type code 'E nest-roost' • with numbers of individuals >500		
Persoonia pauciflora North Rothbury Persoonia	• Within 10 km of North Rothbury	No	**Habitat constraints present:** The study area is not within 10km of North Rothbury.

2.3.4 Habitat Assessment

The following describes the habitat attributes of the study area;

- A riparian zone spans from the south-west to the east of the site, and this is inclusive of a defined watercourse. This stream would be classified as a 2nd order watercourse (in accordance with the Strahler stream ordering system in Appendix E of the BAM).
- The study area contains tree species that are listed as Koala Feed Trees. This being *E. tereticornis*.
- The study area provides open grassland habitat within the site's cleared exotic grassland area which may provide habitat for species adapted to open areas.
- Only two Allocasuarinas 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 one hollow-bearing trees, being; Multiple medium and large sized hollows, suitable for microbats, mammals, birds, mammals or herpetofauna.
- The study area contains limited fallen logs and timber which would provide limited 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.

See Appendix I for site vegetation photos and hollow-bearing tree.

2.3.4.1 Koala Habitat Protection SEPP 2021

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. This includes all land;

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

b. that is within an LGA to which the SEPP applies.

The site is greater than 1 hectare and Farley occurs within the Maitland city council 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.

Because the proposal is likely to impact on koala habitat (i.e. koala feed trees) a suitably experienced and qualified person must undertake a survey for core koala habitat and prepare a Koala Assessment Report which must accompany the development application.

Firebird ecoSultants conducted the survey for core koala habitat and prepared a Koala Assessment Report. It was found that the site does not contain core koala habitat, no further provisions of the Koala Habitat Protection SEPP 2021 apply.

2.3.5 Targeted Threatened Flora & Fauna 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 2-8 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); species highlighted in yellow are confirmed to be present. The following sections 2.4.4.1 to 2.4.4.6 outline the survey effort and results for each species. Table 2-9 shows the weather conditions for each day during the survey effort.

Table 2-8: Presence or Absence of Candidate Species

Species Presence	Confirmed presence
Acacia bynoeana Bynoe's Wattle	No – Surveyed
Aprasia parapulchella Pink-tailed Legless Lizard	No – Surveyed
Cynanchum elegans White-flowered Wax Plant	No – Surveyed
Delma impar Striped Legless Lizard	No – Surveyed
Eucalyptus glaucina Slaty Red Gum	No – Surveyed
Eucalyptus parramattensis Parramatta Red Gum	No – Surveyed
Grevillea parviflora Small-flower Grevillea	No – Surveyed
Haliaeetus leucogaster White-bellied Sea-Eagle	No – Surveyed
Phascolarctos cinereus	No – Surveyed

Koala	
Pomaderris queenslandica Scant Pomaderris	No – Surveyed
Prostanthera cineolifera Singleton Mint Bush	No – Surveyed
Pterostylis chaetophora	No – Surveyed
Rutidosis heterogama Heath Wrinklewort	No – Surveyed
Tetratheca juncea Black-eyed Susan	No – Surveyed

Table 2-9: Survey Period Weather Conditions

Survey Date	Conditions
22nd March 2022	No Rain, 11-5 – 25.8 Degrees
18th of July and 1st of September 2022	Light wind, 19-22 degrees.

2.3.5.1 Targeted Flora Survey

Areas of Potential Habitat in the Site:

Table 2-10 details the areas of potential habitat on the site for the threatened flora species confirmed as candidate species.

Table 2-10: Potential Habitat on the Site for Threatened Flora Species

Species	Survey Period			Surveyed
	VZ1	VZ2		
Acacia bynoeana Bynoe's Wattle	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – March 2022
Aprasia parapulchella Pink-tailed Legless Lizard	Y	Y	September;October;November	YES – September 2022
Cynanchum elegans White-flowered Wax Plant	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – September 2022

Delma impar Striped Legless Lizard	Y	Y	September;October;November;December	YES – September 2022
Eucalyptus glaucina Slaty Red Gum	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – March 2022
Eucalyptus parramattensis Parramatta Red Gum	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – March 2022
Grevillea parviflora Small-flower Grevillea	Y	Y	August;September;October;November	YES – March and September 2022
Haliaeetus leucogaster White-bellied Sea-Eagle	Y	Y	July;August;September;October;November;December	YES – September 2022
Phascolarctos cinereus Koala	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – July 2022
Pomaderris queenslandica Scant Pomaderris	Y	Y	August;September;October;November	YES – September 2022
Prostanthera cineolifera Singleton Mint Bush	Y	Y	September;October	YES – September 2022
Pterostylis chaetophora	Y	Y	September;October;November	YES – September 2022

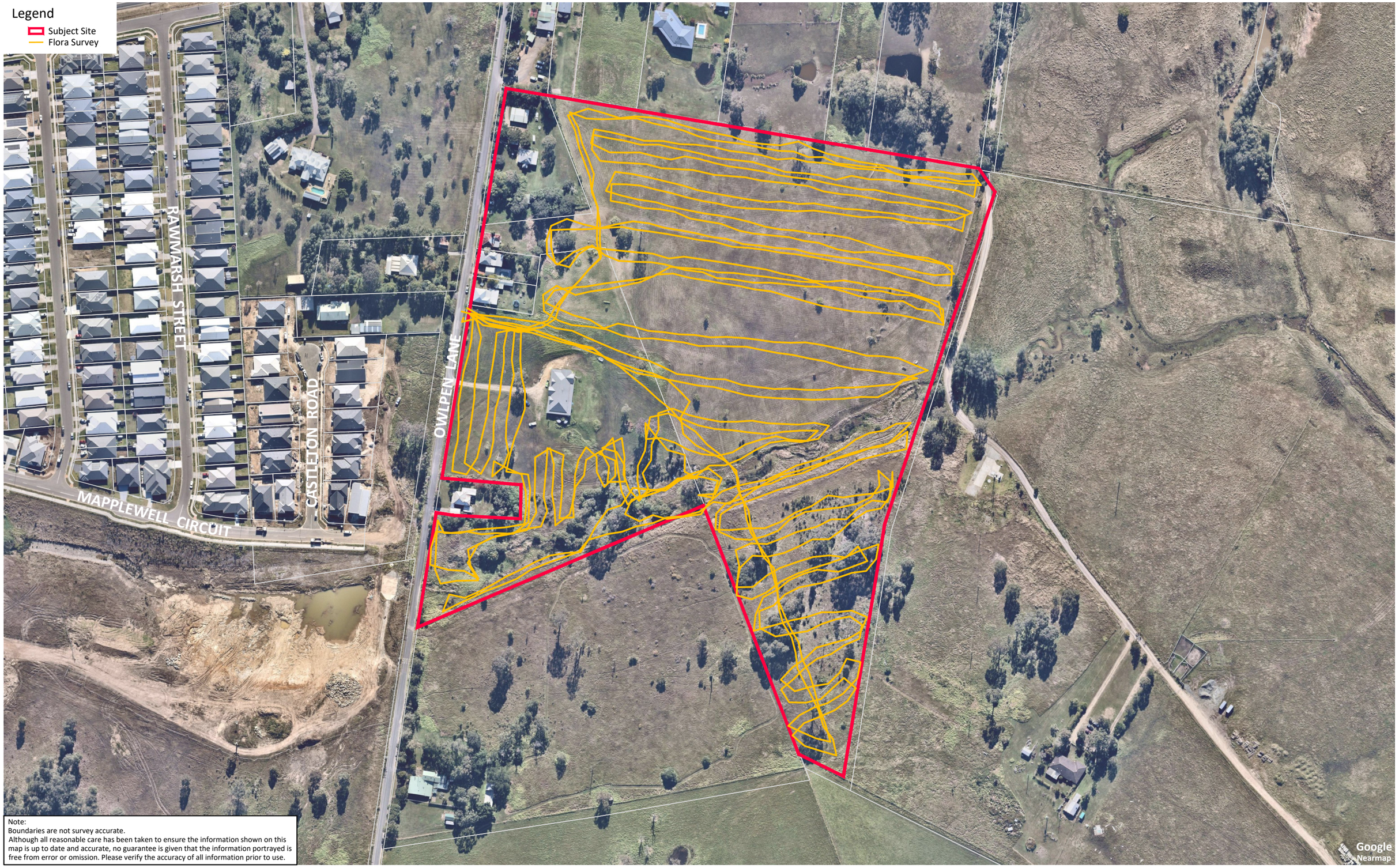
Rutidosis heterogama Heath Wrinklewort	Y	Y	January;February;March;April;May;June;July;August;September;October;November;December	YES – March 2022
Tetratheca juncea Black-eyed Susan	Y	Y	September;October	YES – September 2022

Survey Method and Effort:

The parallel field-transverse method was used in accordance with *NSW Guide to Surveying Threatened Plants* (OEH 2016); this requires walking a series of parallel transects that are close enough to allow observation of the species being targeted, in this case 2.5 m spacing was used to detect small cryptic species. Detectability of threatened plants is considered to be high using the parallel field-traverse method, because it systematically covers the entire area of potential habitat within a site and can be applied to a diverse range of species, habitats and sites. GPS tracking was undertaken (See Figure 2-6) showing the path walked. Additionally, the site was traversed on foot and surveyed with the random meander technique across all other days of survey on the site.

Results

No targeted species were recorded on site during any of the surveys despite an adequate survey effort.



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 X-X:FLORA SURVEY

Ref No 3133 BDAR

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 15 July 2022

NORTH

0 50 100 150

SCALE 2500 @ A3

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

2.3.5.2 Targeted surveys for *Phascolarctos cinereus* (Koala) - Breeding

Phascolarctos cinereus is considered as a potential credit species. At the time of the survey effort no survey guidelines have been produced for these species for the BAM.

Areas of Potential Habitat in the Site:

The habitat present on site was deemed suitable for *Phascolarctos cinereus* (Koala) due to the presence of Eucalyptus trees that may be suitable for feeding and resting.

Table 2-14 details the areas of potential habitat on the site for *Phascolarctos cinereus* (Koala).

Table 2-11 Potential Habitat on the Site for *Phascolarctos cinereus* (Koala).

Species	PCT 1593			Survey Period	Surveyed
	VZ1	VZ2			
***Phascolarctos cinereus* (Koala)**	Y	Y		All year	YES

Survey Effort:

Scat surveys and observations in Canopy trees were undertaken across the site.

Conclusion

Phascolarctos cinereus (Koala) were not recorded on site during any of the surveys despite an adequate survey effort.

This species is not considered to occur within the development site.

3 STAGE 2 – IMPACT ASSESSMENT

3.1 Avoiding and Minimising Impacts

The following sections 3.1.1 to 3.1.2 describe efforts undertaken to avoid and minimise impacts on biodiversity values in accordance with Chapter 7 of the BAM.

3.1.1 Avoidance of Impacts to the site's biodiversity values

PCT 1593 within the site is not considered to be threatened. The proposal largely avoids impacts to the greater value of this PCT by positioning the construction and operational development footprint within a large area of the site that has already been predominantly cleared of native vegetation. The riparian zone that contains most of the native vegetation on site has been completely avoided by the development footprint and will undergo post approval works with a Vegetation Management Plan (VMP) to be implemented.

PCT 1593 covers an area of 0.92 ha within the site and it has been separated into two vegetation zones;

- Vegetation zone 1 – Moderate: This vegetation zone occurs in a moderate condition, with an intact canopy stratum with a few large mature trees. Four (4) hollow-bearing trees or stags were observed in this area. There is a moderate shrub layer present within this zone and the density of native ground cover is a mix of native and exotics species.
- Vegetation zone 2 – Poor: There is little to no upper or regrowth canopy stratum, limited to no shrub layer and a mix of native and exotic groundcover. There are two (2) hollow-bearing trees within this zone.

The PCT 1593 will be directly impacted by the proposal by vegetation clearing (0.92 ha) and may 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 this PCT occur within vegetation zones 1 however, the overall effects on the PCT across site have been reduced by positioning of the development footprint to avoid and retain the riparian zone and implement the VMP.

There will be six (6) out of eight (8) of the hollow-bearing trees within vegetation zone 1 and vegetation zone 2 (PCT 1593) that will have to be removed. Two (2) of the hollow bearing trees within the riparian zone will be retained and the implementation of the VMP within this area will enhance the biodiversity values.

Refer to Figure 3-1 for an overview of direct and indirect impact areas, as well as the area of native vegetation that the proposal has avoided. Refer to Table 3-1 for Impact avoidance and minimisation.

Table 3-1 - Impact avoidance and minimisation

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 Site is zoned Residential. The site is highly fragmented by existing residential development and existing infrastructure. The vegetation within the site has not been identified as being of high conservation value on the Biodiversity Values Map. The development avoids the drainage line and will enhance the biodiversity values in this Riparian corridor by the implementation of a VMP.
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 is zoned Residential, therefore identifying this land as suitable for development. 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 over areas containing both native remnant vegetation and areas of cleared land. Areas of remnant vegetation exist in highly degraded condition across the site. c) Threatened species with the potential to occur on site do not attract species credits and are highly mobile. The Subject DA Footprint will impact upon TEC Lower Hunter Spotted Gum – Ironbark Forest and River-flat Eucalypt Forest. As discussed previously, the vegetation within the site has not been identified as of high conservation value during current detailed surveys and is zoned under the Maitland LEP for Residential development. The direct impacts upon the vegetation that are associated with the proposal are considered unavoidable to allow for the site to be developed d) The proposal will remove some hollow bearing trees that will be mitigated by installation of nest boxes within the Riparian / drainage reserve
Justifications for the decisions in determining the final location must be based on consideration of	The removal of vegetation will occur across the site in accordance with the LEP

(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 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	The servicing constraint is the access and the location is the only feasible option to enable the land use to be achieved.
Design the proposal to avid 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 (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	The proposed development will avoid the majority of higher quality habitat within the site, this habitat occurs within the drainage line. The retained area of the vegetation within will be revegetated and undertake weed removal as part of a VMP.
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 replaces or offset, it is important that measures to avoid minimise impacts are undertaken and are clearly documented	No prescribed impacts will occur as a result of the proposal.
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 (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	Threatened species identified as utilising the site are considered highly mobile species, it is therefore considered unlikely that movement throughout the landscape will be hindered by the proposed development. The proposed landscape plantings and enhancement of the riparian corridor may aid in creating movement pathways for these species. No structures will be developed that would interfere with migratory birds (wind turbines)
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	Clearing of this area allows for the site to be developed to meet Maitland LEP and avoids other areas that have a higher biodiversity value.
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	The proposed development has been located in areas of the site that have been previously been cleared and are highly disturbed, with the retention and enhancement of the riparian corridor.

clearing for asset protection zones, flood planning levels, servicing constraints.	
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 (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.	Water Sensitive Urban Design (WSUD) will be implemented to ensure that water quality and runoff are appropriately similar to existing conditions on site and minimise prescribed impacts on biodiversity values.

3.1.2 Minimisation of Impacts

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.

Table 3-2: Proposed Mitigation Measures

Action	Responsibility	Timing
Pre-construction Phase Measures		
The area of vegetation to be retained within the site that occurs outside of the construction and operational development footprint should be protected in perpetuity through a positive / restrictive covenant, registered on title, under Section 88B or 88E of the *Conveyancing Act 1919*. It is recommended that this should be part of the conditions of consent for the proposal.	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; ➢ 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	Project Ecologist	Prior to commencement of any excavation or clearing works.

during the pre-clearing survey, shall be redistributed in the site's retained area of vegetation. ➢ Installation of nest boxes at a ratio of 1:1 for any removed within the site		
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.
A vegetation management plan will be implemented across the retained riparian zone that run west to east across site. This plan will revegetate and provide habitat to a variety of species occurring in the area.	Project manager.	After construction, but not until the site is fully revegetated/stabilised.

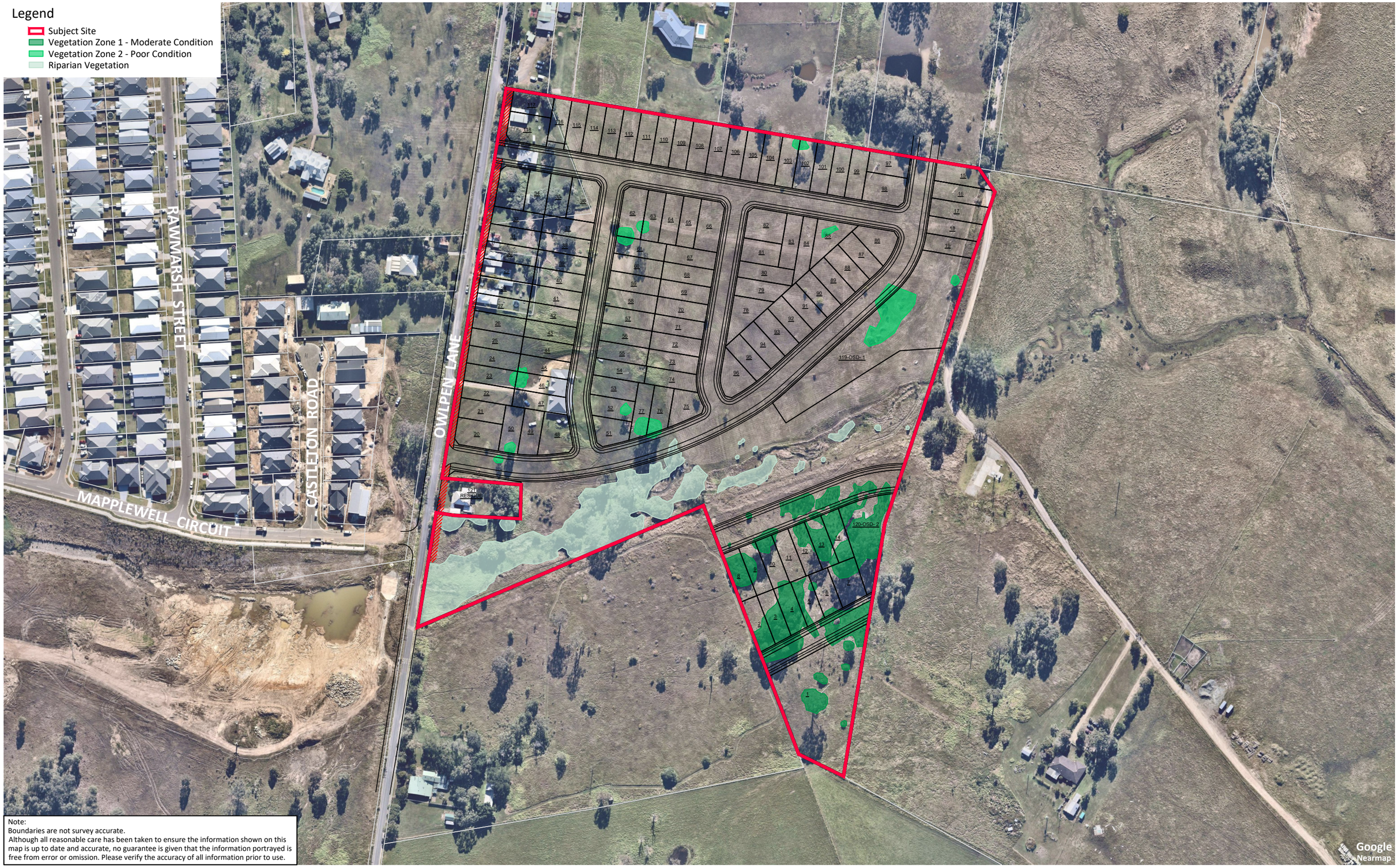


FIGURE 2-4: PLANT COMMUNITY TYPES

Ref No 3133 BDAR B

SITE DETAILS No.21-33 Owlpen Lane Farley
DATE 19 August 2022

NORTH

0 50 100 150

SCALE 2500 @ 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

3.2 Assessment of Direct and Indirect Impacts

The following sections 3.2.1 to 3.2.3 provide an assessment of direct and indirect impacts which were unable to be avoided at the development site in accordance with Section 8 of the BAM.

3.2.1 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 3-2 to 3-3.

Table 3-3: Direct Impacts on Native Vegetation

PCT	BC Act Name / Listing Status	EPBC Act Name / Listing Status	Vegetation Zone (VZ) Name	Direct Impact
1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	Not listed	Not listed	VZ 1: Moderate	0.16 ha
			VZ 2: Poor	0.58 ha

Table 3-4: Change in 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
PCT 1593 - Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	VZ 1: Moderate	To be cleared entirely / 0.78 ha	47.2	0	-47.2	-47.2
	VZ 2: Poor	To be cleared entirely / 0.14ha	14.8	0	-14.8	-14.8

3.2.2 Indirect Impacts

The indirect impacts of the development have been identified and are outlined in Table 3-8. A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures have been applied. Likelihood criteria, consequence criteria and risk matrix are provided in Table 3-5, Table 3-6 and Table 3-7.

Table 3-5: Likelihood Criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote (Rare or practically impossible)	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Table 3-6: Consequence Criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
Negligible (Minimal impact or no lasting effect)	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Table 3-7: Risk Matrix

Consequence	Likelihood				
	Almost certain	**Likely**	**Possible**	**Unlikely**	**Remote**
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 3-8: Risk Assessment for all Identified Potential Indirect Impacts

Indirect Impact	Development Phase	Risk (pre-mitigation)	Risk (post-mitigation)	Nature	Extent	Frequency	Duration	Timing
Inadvertent impacts on adjacent habitat or vegetation	Construction and operation	Medium	Low	Potential damage to adjacent habitat or vegetation	Adjacent vegetation	Daily, during construction	During construction	Potentially long-term impacts
Sedimentation and contaminated and/or nutrient rich run-off	Construction and operation	Medium	Low	Potential runoff during construction works	Into downstream areas	During heavy rainfall or storm events	During rainfall events	Potentially long-term impacts
Noise, dust or light spill	Construction and operation	Medium	Low	Noise and dust created from machinery during construction. No night works during construction. Minor noise and light during operation from residents	Adjacent vegetation	Daily during construction and sporadically during operation	Daily during construction and sporadically during operation	Short-term impacts during construction phase, long-term impacts during operation
Transport of weeds and pathogens from the site to adjacent vegetation	Construction and operation	Medium	Low	Potential spread of weed and pathogens from incoming machinery and equipment, as well as from gardens established in new lots	Potential to spread into nearby habitat	During construction and operation	Ongoing for the life of the development	Potentially long-term impacts
Rubbish dumping	Construction and operation	Low	Low	Potential rubbish dumped by workers and/or residents	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

Wood collection	Construction and operation	Low	Low	Potential removal of habitat by workers and/or residents	Potential habitat to be removed from areas outside the development footprint	Anytime during construction and operation	Ongoing for the life of the development	Ongoing for the life of the development
Bush rock removal and disturbance	Construction and operation	Low	Low	Potential removal of habitat by workers and/or residents	Potential habitat to be removed from areas outside the development footprint	Anytime during construction and operation	Ongoing for the life of the development	Ongoing for the life of the development
Vehicle strike	Construction and operation	Low	Very Low	Potential for native fauna to be struck by working machinery and moving vehicles	Within access roads and within development footprint	Daily, during construction and operational phases	Ongoing for the life of the development	Potential long-term impacts.
Increased risk of fire	Construction and operation	Medium	Low	Potential for fire to spark during construction and operation from any machinery or electrical works	Adjacent vegetation	Anytime during construction and operation	Anytime during construction and operation	Anytime during construction and operation

3.2.3 Potential Prescribed Biodiversity Impacts

No prescribed biodiversity impacts are anticipated from the proposed development. The site does not contain any habitat features identified in s.8.2.1.2 of the BAM. The proposal would not severe or significantly interfere with a habitat corridor.

3.1 Impact Summary

3.1.1 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 assessment.

3.1.2 Impacts Which Require an Offset

3.1.3 Ecosystem Credits

As per Section 10.2 of the BAM, the removal of native vegetation within the site requires offsetting to achieve the 'no net loss standard'. To calculate the required offsets in the form of ecosystem credits, the BAM Calculator has taken into consideration the impact area along with the loss in VIS and the biodiversity risk weighting of the PCTs. Table 3-8 Details the Credits required

Table 3-9 Ecosystem Credits required

Vegetation Zone (PCT)	Impact Area (ha)	Future VIS	Vegetation Integrity Score Loss	Biodiversity Risk Weighting	Credit Requirements
Zone 1 PCT 1593 Poor	0.58	0	-47.2	1	7
Zone 2 PCT 1601_Moderate	0.16	0	1.5	2	0
Total					7

3.1.4 Species Credits

If a Species Credit species is either identified on the site during survey, assumed to be present, or confirmed present within an expert report, a 'species polygon' is required to be produced for the area of suitable habitat within the site for the species. The size of this polygon is entered into the BAM Calculator, which determines the number of credits

required to offset the removal of suitable habitat based upon the quality of habitat and biodiversity risk weighting of the species. No species credits are required for the proposal.

Refer to Appendix E for BAM summary reports.

3.1.5 Impacts Not Requiring an Offset

N/A

3.1.6 Identification of Areas Not Requiring Assessment

N/A

4 BIODIVERSITY CREDIT REPORT

The Biodiversity Credit Report is provided in the following pages.

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00035180/BAAS18020/22/00035181	Owlpen Lane - Streamlined	16/06/2022
Assessor Name	Report Created	BAM Data version *
Sarah Elizabeth Jones	08/09/2022	54
Assessor Number	BAM Case Status	Date Finalised
BAAS18020	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (Small Area)	BOS Threshold: Area clearing threshold

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter												
1	1593_Moderate	Not a TEC	47.2	47.2	0.58	PCT Cleared - 49%	Low Sensitivity to Gain			1.00		7

2	1593_Poor	Not a TEC	14.8	14.8	0.16	PCT Cleared - 49%	High Sensitivity to Gain			1.50		0
											Subtotal	**7**
											Total	**7**

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

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APPENDIX A SITE PLANS

APPENDIX B PLOT FLORISTIC SURVEY DATA

APPENDIX C RECORDED SPECIES LIST

Scientific Name	Common Name
Cacatua galerita	Sulphur Crested Cockatoo
Cacatua sanguinea	Little Corella
Canis lupus familiaris	Common Dog
Corvus coronoides	Australian Raven
Crinia signifera	Brown Froglet
Eolophus roseicapilla	Galah
Gymnorhina tibicen	Australian Magpie
Lichenostomus chrysops	Yellow-Faced Honeyeater
Manorina melanocephala	Noisy Miner
Platycercus elegans	Crimson Rosella
Platycercus eximius	Eastern Rosella
Rhipidura leucophrys	Willie Wagtail
Trichoglossus moluccanus	Rainbow Lorikeet

APPENDIX D QUALIFICATIONS, LICENSING AND CERTIFICATION

Qualifications

Fieldwork for this project was undertaken by Logan Shea and Ollie Broun. Report writing for this project was undertaken by Logan Shea and Ollie Broun with editing and review by Sarah Jones. Qualifications are provided in the table below.

Sarah Jones	***Ecologist / Bushfire Planning Consultant*** B.Env.Sc., G.DIP.DBPA (Design for Bushfire Prone Areas) *BAAS 18020 Accredited Assessor, as required by the Biodiversity Conservation Regulation 2017 and accredited to apply the BAM* Member of the Ecological Consultants Association of NSW

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.

Certification

As the project certifier, I, Sarah Jones make the following certification:

- This Biodiversity Development Assessment Report has been prepared in accordance with the Biodiversity Assessment Method established under the NSW Biodiversity Conservation Act 2016.
- The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the site;
- Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, or where the survey work has been undertaken with specified departures from industry standard guidelines, details of which are discussed and justified in Section 2;

- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the *Animal Research Act 1995, National Parks and Wildlife Act 1974* and the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

Signature of Certifier:

Sarah Jones
B.Env.Sc., G.DIP.DBPA (Design for Bushfire Prone Areas)
Ecologist / Bushfire Planner

BAAS 18020 Accredited Assessor

APPENDIX E BAM SUMMARY REPORTS

BAM Candidate Species Report

Proposal Details

Assessment Id 00035180/BAAS18020/22/00035181	Proposal Name Owlpen Lane - Streamlined	BAM data last updated * 16/06/2022
Assessor Name Sarah Elizabeth Jones	Report Created 08/09/2022	BAM Data version * 54
Assessor Number BAAS18020	Assessment Type Part 4 Developments (Small Area)	BAM Case Status Open
Assessment Revision 0	Date Finalised To be finalised	BOS entry trigger BOS Threshold: Area clearing threshold

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

List of Species Requiring Survey

Name	Presence	Survey 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
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
North Rothbury Persoonia	Persoonia pauciflora	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00035180/BAAS18020/22/00035181	Owlpen Lane - Streamlined	16/06/2022
Assessor Name	Report Created	BAM Data version *
Sarah Elizabeth Jones	08/09/2022	54
Assessor Number	BAM Case Status	Date Finalised
BAAS18020	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (Small Area)	BOS Threshold: Area clearing threshold

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter												
1	1593_Moderate	Not a TEC	47.2	47.2	0.58	PCT Cleared - 49%	Low Sensitivity to Gain			1.00		7

2	1593_Poor	Not a TEC	14.8	14.8	0.16	PCT Cleared - 49%	High Sensitivity to Gain			1.50		0
											Subtotal	**7**
											Total	**7**

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

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00035180/BAAS18020/22/00035181	Owlpen Lane - Streamlined	16/06/2022
Assessor Name	Report Created	BAM Data version *
Sarah Elizabeth Jones	08/09/2022	54
Assessor Number	Assessment Type	BAM Case Status
BAAS18020	Part 4 Developments (Small Area)	Open
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Area clearing threshold	To be finalised

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

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Spotted-tailed Quoll	Dasyurus maculatus	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Diamond Firetail	Stagonopleura guttata	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Glossy Black-Cockatoo	Calyptorhynchus lathami	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter

Grey-headed Flying-fox	Pteropus poliocephalus	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Large Bent-winged Bat	Miniopterus orianae oceanensis	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Little Bent-winged Bat	Miniopterus australis	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Little Lorikeet	Glossopsitta pusilla	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Regent Honeyeater	Anthochaera phrygia	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Scarlet Robin	Petroica boodang	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Speckled Warbler	Chthonicola sagittata	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
Swift Parrot	Lathamus discolor	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
White-bellied Sea-Eagle	Haliaeetus leucogaster	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter
White-throated Needletail	Hirundapus caudacutus	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	Refer to BAR
Diamond Firetail	Stagonopleura guttata	Refer to BAR
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	Refer to BAR
Glossy Black-Cockatoo	Calyptorhynchus lathami	Refer to BAR
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Refer to BAR
Little Bent-winged Bat	Miniopterus australis	Refer to BAR
Little Lorikeet	Glossopsitta pusilla	Refer to BAR

Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Scarlet Robin	Petroica boodang	Refer to BAR
Speckled Warbler	Chthonicola sagittata	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR
White-bellied Sea-Eagle	Haliaeetus leucogaster	Refer to BAR
White-throated Needletail	Hirundapus caudacutus	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00035180/BAAS18020/22/00035181	Owlpen Lane - Streamlined	16/06/2022
Assessor Name	**Report Created**	**BAM Data version ***
Sarah Elizabeth Jones	08/09/2022	54
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18020	Part 4 Developments (Small Area)	Open
Assessment Revision	**Date Finalised**	**BOS entry trigger**
0	To be finalised	BOS Threshold: Area clearing threshold

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

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	1593_Moderate	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	Moderate	0.58	1	
2	1593_Poor	1593-Red Ironbark - Spotted Gum - Prickly-leaved Paperbark shrubby open forest of the Lower Hunter	Poor	0.16	1	

APPENDIX F PHOTOS


S 32°43'56.10"
E 151°31'4.06"
iPhone 11
22 Mar 2022 at 1:07:06 pm
▲ 15.7 m, 52° NE
f/1.8 1/998s
22/3/2022, 1:07 pm


S 32°43'48.79"
E 151°31'4.25"
iPhone 11
22 Mar 2022 at 1:46:09 pm
▲ 27.4 m, 101° SE
f/1.8 1/1678s
22/3/2022, 1:46 pm


S 32°43'50.93"
E 151°31'12.25"
iPhone 11
22 Mar 2022 at 2:05:47 pm
▲ 12.5 m, 149° SE
f/1.8 1/2817s
22/3/2022, 2:05 pm


S 32°43'50.42"
E 151°31'14.06"
iPhone 11
18 Jul 2022 at 12:29:01 pm
▲ 12.2 m, 116° SE
f/1.8 1/1927s
18/7/2022, 12:29 pm


S 32°43'55.14"
E 151°31'7.95"
iPhone 11
18 Jul 2022 at 1:30:23 pm
▲ 14.6 m, 292° NW
f/1.8 1/475s
18/7/2022, 1:30 pm


S 32°43'56.80"
E 151°31'11.08"
iPhone 11
22 Mar 2022 at 12:38:17 pm
▲ 19.5 m, 299° NW
f/1.8 1/833s
22/3/2022, 12:38 pm


S 32°43'48.79"
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