



BaptistCare Macquarie Park:
157 Balaclava Road, Macquarie Park
Biodiversity Development Assessment Report

FINAL REPORT

Prepared for Ethos Urban on behalf of BaptistCare

31 October 2022

BAPTISTCARE MACQUARIE PARK CONCEPT MASTER PLAN

Appendix J Biodiversity Development
Assessment Report (BDAR)

State Significant Development Application (SSDA)

Prepared for BaptistCare NSW & ACT

31 October 2022

Revision [A]

Biosis offices

NEW SOUTH WALES

Albury

Phone: (02) 6069 9200

Email: albury@biosis.com.au

Newcastle

Phone: (02) 4911 4040

Email: newcastle@biosis.com.au

Sydney

Phone: (02) 9101 8700

Email: sydney@biosis.com.au

Western Sydney

Phone: (02) 9101 8700

Email: sydney@biosis.com.au

Wollongong

Phone: (02) 4201 1090

Email: wollongong@biosis.com.au

VICTORIA

Ballarat

Phone: (03) 5304 4250

Email: ballarat@biosis.com.au

Melbourne

Phone: (03) 8686 4800

Email: melbourne@biosis.com.au

Wangaratta

Phone: (03) 5718 6900

Email: wangaratta@biosis.com.au

Document information

Report to:	BaptistCare NSW & ACT
Prepared by:	Sarah Allison, Felicity Williams, Jake Schwebel
Accredited Assessor:	Callan Wharfe (BAAS18138)
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- Jake Schwebel and Todd Horton (assistance in the field)
- Astrid Mackegard (mapping)

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Glossary

Assessment Area	All land within 500m of a linear development and 1500m of a broader development site
BAM	NSW Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	NSW <i>Biosecurity Act 2015</i>
BOS	Biodiversity Offsets Scheme
CEMP	Construction Environmental Management Plan
DA	Development Application
DBH	Diameter at Breast Height
DCDB	Digital cadastral database
DAWE	Commonwealth Department of Agriculture, Water and Environment
Development footprint	The area of land that is directly impacted by the proposal
Development site	The broader area in which the subject land is located.
DoIW	Directory of Important Wetlands
DPIE	NSW Department Planning Industry and Environment
DPI	NSW Department of Primary Industries
DTDB	Digital topographic databases
Ecosystem credit species	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development
EES	NSW Environment, Energy and Science Group
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation of Australia
LEP	Local Environmental Plan
LGA	Local Government Area

Locality	Area located within 10 kilometres radius from the subject land
LPI	NSW Land and Property Information
MNES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
EES	NSW Environment, Energy and Science Group
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
SALIS	NSW Soil and Land Information System
SEARs	Secretary's Environmental Assessment Requirements
SEPP	NSW State Environmental Planning Policy
SIS	Species Impact Statement
Species credit species	A class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates
SSD	State Significant Development
Subject land	The areas within or the combined areas of the development site, and any indirect and prescribed impacts.
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection
TPZ	Tree Protection Zone
WM Act	NSW <i>Water Management Act 2000</i>

Certification and Declarations

I certify that this report has been prepared on the basis of the requirements of, and information provided under, the Biodiversity Assessment Method (DPIE 2020) and s6.15 of the *Biodiversity Conservation Act 2016*.

In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct.

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

Signature: A handwritten signature in black ink, appearing to read 'CAW/H'.

Date: 31/10/2022

BAM Assessor Accreditation Number: BAAS18138

Executive summary

BaptistCare proposes a master plan for the future redevelopment of its landholding at 157 Balaclava Road, Macquarie Park New South Wales (hereafter referred to as the development site) (Figure 1). The project will include for the potential future redevelopment of the existing aged care/retirement living facility, to a mixed use development. As proposed in the Concept Master Plan (SSD-46561712), the project will be undertaken in stages, commencing with the works as proposed in the stage 1 'Vertical Village' (SSD-46561716) application. However, for the purpose of the ecological investigations and assessment of impacts required for these two separate applications, one assessment has been undertaken. This report has been provided as part of the submission for both State Significant Development Applications (SSDAs), SSD-46561712 and SSD-46561716, however direct impacts to biodiversity values will only occur as a result of the Concept Master Plan (SSD-46561712) project.

The Concept Masterplan includes the establishment of building envelopes for residential dwellings, seniors housing, retail, commercial and allied health facilities, a school, intersection upgrades, pedestrian connections, parks, streets and landscape design. The Vertical Village will involve clearing and enabling works earthworks, road creation and demolition and construction of one building for the purposes of seniors housing. A separate BDAR (Biosis 2022) has been prepared to accompany the SSD Application for the Stage 1 Vertical Village (SSD-46561716)

The project is considered a State Significant Development (SSD) and will be assessed under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Vegetation within the subject land comprises planted native vegetation, planted exotic vegetation and one threatened ecological community (TEC) *Sydney Turpentine-ironbark Forest in the Sydney Basin Bioregion* listed as a Critically Endangered Ecological Community (CEEC) under the *Biodiversity Conservation Act 2016* (BC Act). This BDAR has been prepared by Biosis' experienced ecological consultants, and has been reviewed and certified by Callan Wharfe, an Accredited Assessor (BAAS18138), to accompany the Development Application (DA). This BDAR describes the outcome of the development assessment case (35184) conducted consistent with the NSW Biodiversity Assessment Method (BAM) and Biodiversity Offsets Scheme (BOS).

Avoidance of all remnant native vegetation, comprising a TEC, has not been possible due to project design and earthworks requirements, relating to the underlying geology of the site. However retention of planted native vegetation has been undertaken, and impacts have been restricted to 0.03 hectares of PCT 1281 representing Sydney Turpentine-ironbark Forest CEEC and 0.66 hectares of planted native vegetation. Consideration has been given to avoiding and minimising impacts to biodiversity where possible during the assessment and preliminary design. Mitigation and management measures will be put in place to adequately address impacts associated with the proposal, both direct, indirect and prescribed.

One CEEC and habitat for one threatened species, were recorded within the subject land, and the vegetation integrity (VI) score of the vegetation to be impacted was calculated as 34.6. As such, in accordance with Section 10 of the BAM, the following offsets are required to be secured for the proposed development:

- One ecosystem credit for Sydney Turpentine – Ironbark Forest in the Sydney Basin Bioregion for impacts to PCT 1281 within the subject land.
- One species credit for Large-eared Pied Bat *Chalinolobus dwyeri* foraging habitat impacted by the proposed works within the subject land.

The project is not considered likely to result in a significant impact to species or communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and as such a referral to the Commonwealth Minister of the Environment is not required.

Stage 1 – Biodiversity assessment

1 Introduction

This report has been prepared to accompany a SSDA for a Concept Master Plan for the site located at 157 Balaclava Road, Macquarie Park.

Specifically, consent is sought in this Concept SSDA (SSD-46561712):

A mixed use development comprising a maximum GFA of 190,000m² dedicated to a range of land uses including:

- Student Housing;
- Seniors Housing;
- Build to Rent;
- Retail;
- Residential;
- Mixed uses including commercial and allied health; and
- A school.
- Maximum building heights and GFA for each development block;
- Public domain landscape concept, including parks, streets and pedestrian connections;
- Provision of BaptistCare Macquarie Park Design Guidelines to guide the detailed design of future buildings; and
- Vehicular and intersection upgrades.

The BaptistCare site is located at 157 Balaclava Road, Macquarie Park and is legally identified as Lot 60 in DP 1107965. The site is located near the corner of Herring Road and Epping Road within the City of Ryde Local Government Area (LGA). It is directly south of Macquarie University and in close proximity to Macquarie Shopping Centre. The surrounding area is characterised by a mix of commercial and education uses, as well as student accommodation and residential dwellings.

The site comprises a significant land holding with street frontages to Balaclava Road and Epping Road. It currently accommodates several low-medium density buildings that are connected via internal footpaths and lower order road networks. The total site area of the BaptistCare landholding is 63,871 square metres.

Biosis Pty Ltd was commissioned by Ethos Urban on behalf of BaptistCare to undertake a biodiversity assessment of a proposed redevelopment for provision of the Macquarie Park Place Strategy. The purpose of this assessment was to apply the BAM (DPE 2022a) to the proposed development, and provide Ethos Urban with a BDAR. The BDAR is to be submitted to the Department of Planning and Environment (DPE) as part of a SSDA, under Part 4 of the EP&A Act, for the proposed development.

The project is being undertaken in two stages, the 'Concept Masterplan' and 'Stage 1 Vertical Village', however for the purpose of the ecological investigations and assessment of impacts required for these two separate stages, one assessment has been undertaken. This BDAR has been prepared as part of the submission for both SSDAs, however impacts assessed herein relate to the Concept Master Plan project only. A separate BDAR (Biosis 2022) has been prepared to accompany the SSDA for the Stage 1 Vertical Village (SSD-46561716).

1.1 Project description

The site is located approximately 18 kilometres north-west of the Sydney Central Business District (CBD), covers approximately 6.4 hectares and is defined as the extent of Lot 60 DP1107965. The proposed redevelopment is within the B4 zoned land located at 157 Balaclava Road, Macquarie Park (Lot 60 DP1107965) (Figure 1). The redevelopment will include seniors housing, student accommodation, residential buildings for rent and sale, a new school, retail and commercial, and community land uses (Figure 1). Associated works within the development site will encompass the removal of trees and vegetation clearing, civil works, and landscaping. The proposed masterplan will result in removal of a very small areas of *Sydney Turpentine-ironbark Forest in the Sydney Basin Bioregion*, listed as critically endangered under the Biodiversity Conservation (BC) Act 2016.

Biosis was previously engaged by Ethos Urban on behalf of BaptistCare to undertake an initial site assessment to determine the ecological constraints of the study area.

The project triggers the NSW BOS as a SSD. The BC Act requires that the BAM be applied to all proposals that trigger the BOS, and that a BDAR is required to be submitted to the approval authority.

1.2 Purpose of this assessment

This BDAR will:

- Address the BAM (DPIE 2020) and the BOS.
- Identify how the proponent has avoided and minimised impacts to biodiversity.
- Identify any potential impact that could be characterised as serious and irreversible.
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the proposed development.
- Consider and assess the proposal in accordance with other relevant legislation such as the Commonwealth EPBC Act.

All biodiversity assessments have been undertaken in accordance with the BAM, and this BDAR has been reviewed and certified by Accredited Assessor Callan Wharfe (BAAS18138). This BDAR describes the outcome of the development assessment case (35184) conducted consistent with the BAM.

1.3 The subject land, development footprint and assessment area

The terms subject land, development footprint and assessment area are used throughout this BDAR and are defined as follows, and illustrated on Figure 1.

- The subject land is defined as the total area of region of Lot 60 DP1107965 and is approximately 6.4 ha in area. The lot is located 1 km south of the M2 Motorway bounded by Hornsby and Ku-ring-gai in the north, Willoughby and Lane Cove in the east, and Parramatta in the west, approximately 18 km north-west of the Sydney Central Business District (CBD). The land is located in the City of Ryde Local Government Area (LGA) and the Greater Sydney Local Land Services (LLS) Region and is zoned as B4 under the *Ryde Local Environmental Plan 2014* (LEP).
- The development footprint comprises 6.4 ha in area and comprises the area directly impacted by the proposed works.
- The assessment area includes the subject land and the area of land within the 1500 m buffer zone surrounding the subject land and is approximately 898.7 ha in area.

1.4 Sources of information

Sources of information used in the assessment included relevant databases, spatial data, literature and previous site reports.

In order to provide a context for the assessment area, records of flora and fauna from within 5 kilometres (the locality) were collated from the following databases and datasets were reviewed:

- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act (DCCEEW 2022).
- NSW BioNet - the database for the Atlas of NSW Wildlife, NSW Department of Planning and Environment, for species, populations and ecological communities listed under the BC Act (DPE 2022b).
- NSW BAM Calculator.
- Biodiversity values map (DPE 2022c).
- Native vegetation regulatory map (DPE 2022d).
- BAM Important Areas maps (DPE 2022e).
- PlantNET (The Royal Botanic Gardens and Domain Trust) (RBGDT 2022).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015.

Other sources of biodiversity information relevant to the assessment area were sourced from:

- The NSW Plant Community Types (PCTs), as held within the BioNet Vegetation Classification database (DPE 2022a).
- Relevant vegetation mapping, such as *The Native Vegetation of the Sydney Metropolitan Area* (DPE 2016a).

The following reports were also reviewed and relied on to provide additional information:

- *BaptistCare Macquarie Park Redevelopment - Ecological Constraints Assessment* (Eco-logical 2019).
- *Macquarie Park – Master Plan Scoping Report* (Ethos Urban 2022).
- *BaptistCare – Macquarie Park Place Strategy* (Place Partners 2021).
- *Macquarie Park Master Plan and Concept Design, Request for Proposal – Ecology and Biodiversity Advice* (Ethos Urban 2012).
- *Biodiversity development assessment report waiver* (NSW Environment and Heritage).

Basemap data was obtained from NSW Land and property information (LPI) 1:25,000 digital topographic databases, with cadastral data obtained from LPI digital cadastral database.

The following spatial datasets were utilised during the development of this report:

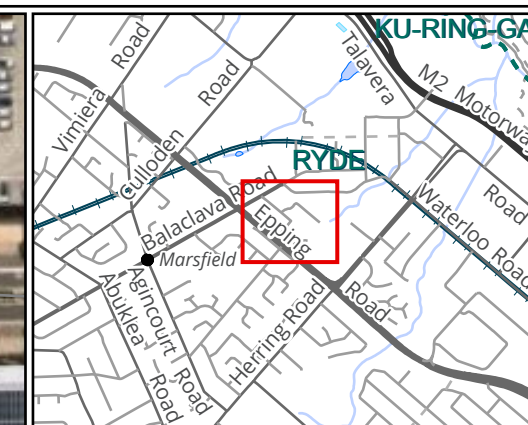
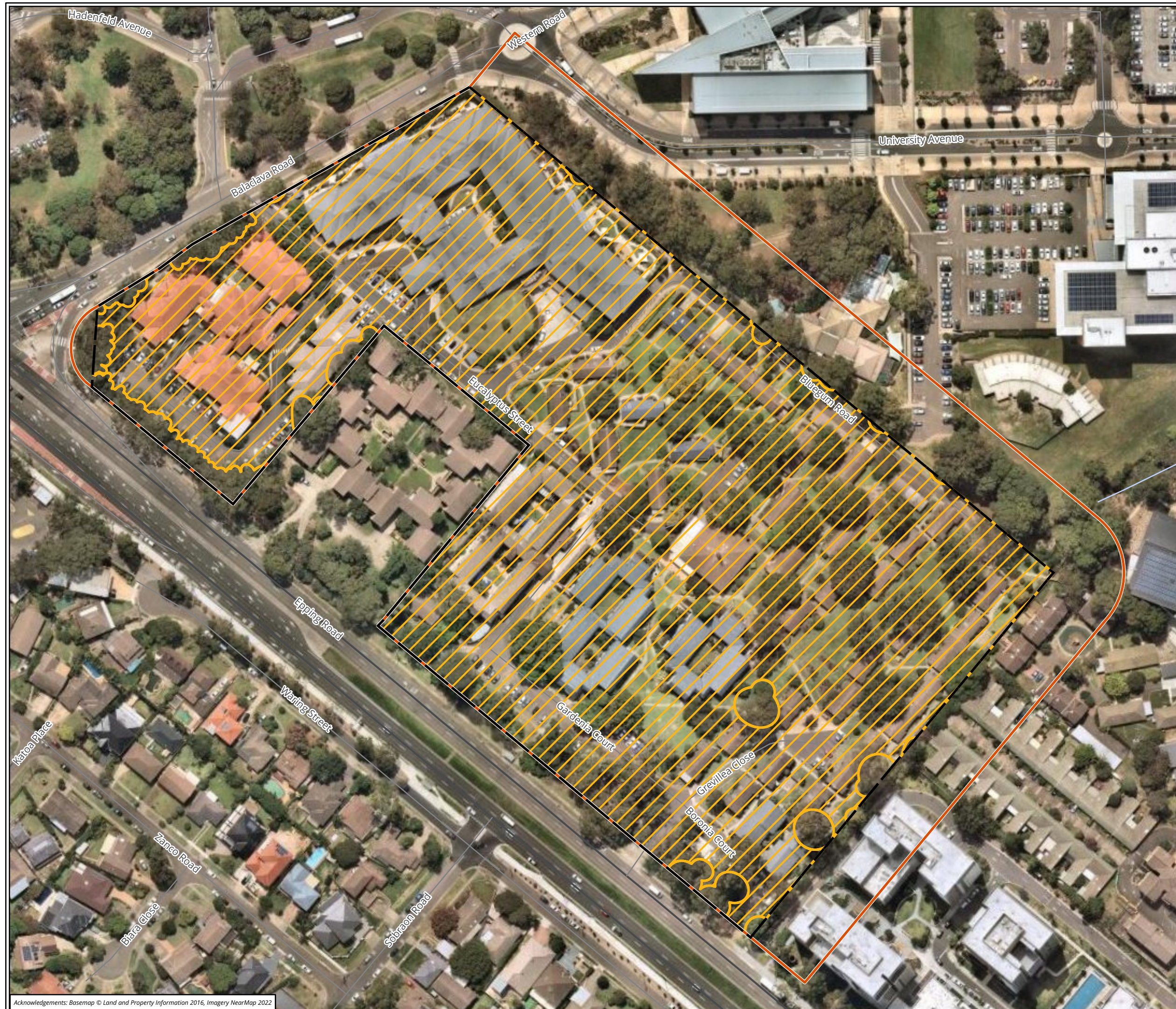
- Catchment Boundaries of New South Wales dataset.
- Mitchell Landscapes Version 3.0.
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7.
- Spatial data associated with *The Native Vegetation of the Sydney Metropolitan Area* (DPE 2016a).
- NSW Soil and Land Information System (SALIS).

- Mapping has been produced using a Geographic Information System (GIS). The following maps and data have been provided:
 - Digital mapping with aerial photography showing 1:1000 or finer.
 - Site map as described in subsection 3.1.1 of the BAM.
 - Location map as described in subsection 3.1.2 of the BAM.
 - Landscape map with features including 1500 metre buffer, as described in section 3.1.3 of the BAM.

1.5 Legislative requirements

The project has been assessed against relevant biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999.*
- *Environmental Planning and Assessment Act 1979.*
- *Biodiversity Conservation Act 2016.*
- *Fisheries Management Act 1994.*



Legend

- Subject land
- Development site
- Development footprint

Figure 1 Subject land

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3
Coordinate System:
GDA 1994 MGA Zone 56



Matter: 37762, Date: 02 August 2022,
Drawn by: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_BDAR_F1_SubjectLand

2 Landscape Context

This chapter describes the landscape and site context of the subject land, describing the landscape features present within the subject land and within a 1500 metre buffer, as required by the BAM (DPE 2022a). Figure 3 shows the location of the subject land and landscape features within the 1500 metre buffer.

2.1 Subject land description

The subject land is located 1 kilometre south of the M2 Motorway bounded by Hornsby and Ku-ring-gai in the north, Willoughby and Lane Cove in the east, and Parramatta in the west, approximately 18 kilometres north-west of the Sydney CBD. Current land use is listed as B4 Mixed Use under the LEP.

The subject land is approximately 6.4 hectares, containing patches of native vegetation surrounded by urban residential area.

The subject land is within the Glenorie 1:100k soil landscape (Hazelton and Tille 1990). The Glenorie landscape is characterised by undulating to rolling low hills on Wianamatta Group shales. The soil is shallow to moderately deep Yellow Podzolic Soils and Gleyed Podzolic Soils along drainage lines. Vegetation consists of almost completely cleared tall open-forest (wet sclerophyll forest). Common canopy species for the area include remnant Sydney blue gum *Eucalyptus saligna* and Blackbutt *Eucalyptus pilularis*. Other species include Turpentine *Syncarpia glomulifera*, Grey Ironbark *Eucalyptus paniculata*, White Stringybark *Eucalyptus globoidea* and Rough-barked Apple *Angophora floribunda*. Common understory species include Pittosporum *Pittosporum undulatum* and coffee bush *Breynia oblongifolia* (Benson 1980). Most original vegetation has been extensively cleared, except for larger trees in many residential areas.

2.1.1 Native vegetation cover

Vegetation within the assessment area (within the 1500 metre buffer area) was assessed using aerial photographic interpretation, field survey results and existing vegetation mapping.

The total area of the assessment area is 898.7 hectares, with the area of native vegetation mapped within the assessment area being 118.4 hectares. This is a native vegetation cover of 13.2 % (>10 -30 % class as defined in Section 3.2.3 of the BAM) and this value was entered into the BAM calculator.

Cleared areas within the assessment area include 657.3 hectares.

2.1.2 Bioregions

The assessment area occurs within the Sydney Basin IBRA bioregion and the Cumberland IBRA subregion. The Sydney Basin Bioregion lies on the central east coast of NSW and covers an area of approximately 3,624,008 hectares. It occupies about 4.53 per cent of NSW and is one of two bioregions contained wholly within the state. The bioregion extends from just north of Batemans Bay to Nelson Bay on the central coast, and almost as far west as Mudgee. The bioregion is bordered to the north by the North Coast and Brigalow Belt South bioregions, to the south by the South East Corner Bioregion and to the west by the South Eastern Highlands and South Western Slopes bioregions. The Sydney Basin Bioregion is one of the most species diverse in Australia. This is a result of the variety of rock types, topography and climates in the bioregion (DPE 2016a).

2.1.3 Rivers and streams

The development site is located within the Greater Sydney LLS Region and the Port Jackson/Georges River catchment. The closest river-mouth is the Lane Cove River (a fourth-order watercourse) located

approximately 1.39 kilometres to the north of the development site. Tributaries occurring in proximity to the subject land include an unnamed first-order creek running north-east from the eastern corner of the site, a first-order stream Mars Creek, located approximately 300 metres to the north-west of the subject land and a second-order stream, Shrimpton's Creek, approximately 600 metres east of the subject land

There are no Key Fish Habitats as mapped by the NSW Department of Primary Industries (DPI) within the subject land (DPI 2013) however, Key Fish Habitat is mapped north-east of the subject land associated with the Lane Cove River.

2.1.4 Wetlands

No local wetlands were identified within the subject land or development footprint. The closest waterbodies of significance include Lane Cove River approximately 3.6 kilometres to the south east and Parramatta River, approximately 4.7 kilometres south of the development site, both listed as important wetlands (DPE 2010) (Environment Australia 2001).

2.1.5 Connectivity

The subject land does not form part of any recognised biodiversity corridors, flyways or significant habitat connectivity features.

Vegetation in the subject land is comprised of PCT 1281 and planted native vegetation located along roadsides and dispersed around buildings as part of more formal landscaped areas. Habitat fragmentation occurs across the subject land and surrounding area, however limited connectivity is preserved through bushland extending north towards riparian vegetation associated with Lane Cove River (Figure 4). These connectivity features provide breeding, foraging and dispersal resources for terrestrial and arboreal mammals, flying mammals, and avifauna in the locality.

2.1.6 Geological features

There were no recorded karst, caves, crevices, cliffs or other areas of geological significance within the development site or within the assessment area.

2.1.7 Areas of outstanding biodiversity value

There are no areas of outstanding biodiversity (DPE 2022f) or biodiversity values (DPE 2022c) mapped within the development site.

2.1.8 NSW (Mitchell) Landscape

The development site occurs within the Pittwater Mitchell Landscape (Mitchell 2002). This landscape is characterised by a deep elongated harbour with steep cliffed margins on horizontal Triassic quartz sandstone. The landscape includes small pocket beaches and more extensive Quaternary estuary fill of muddy sand at the head of most tributary streams, a general elevation of 0 to 80m and a local relief 10 to 50m (Mitchell 2002)

Common vegetation communities found in this landscape are woodlands and open forest of Sydney Peppermint *Eucalyptus piperita*, Smooth-barked Apple *Angophora costata*, Red Bloodwood *Corymbia gummifera* and Blackbutt *Eucalyptus pilularis*. Sheltered gullies contain some Turpentine *Syncarpia glomulifera*, Coachwood *Ceratopetalum apetalum* and Water Gum *Tristaniopsis laurina*. Estuarine sands were originally dominated by saltmarsh but have been taken over by Grey Mangrove *Avicennia marina* in the past century (Mitchell 2002).

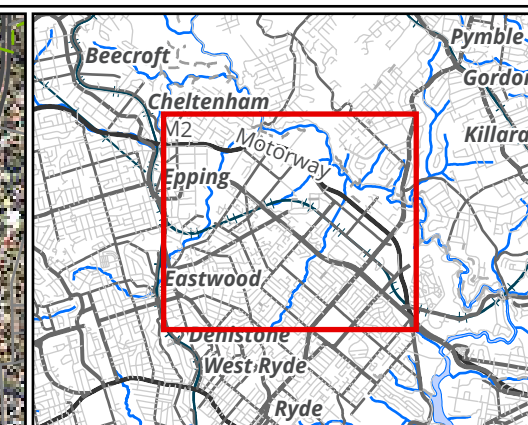
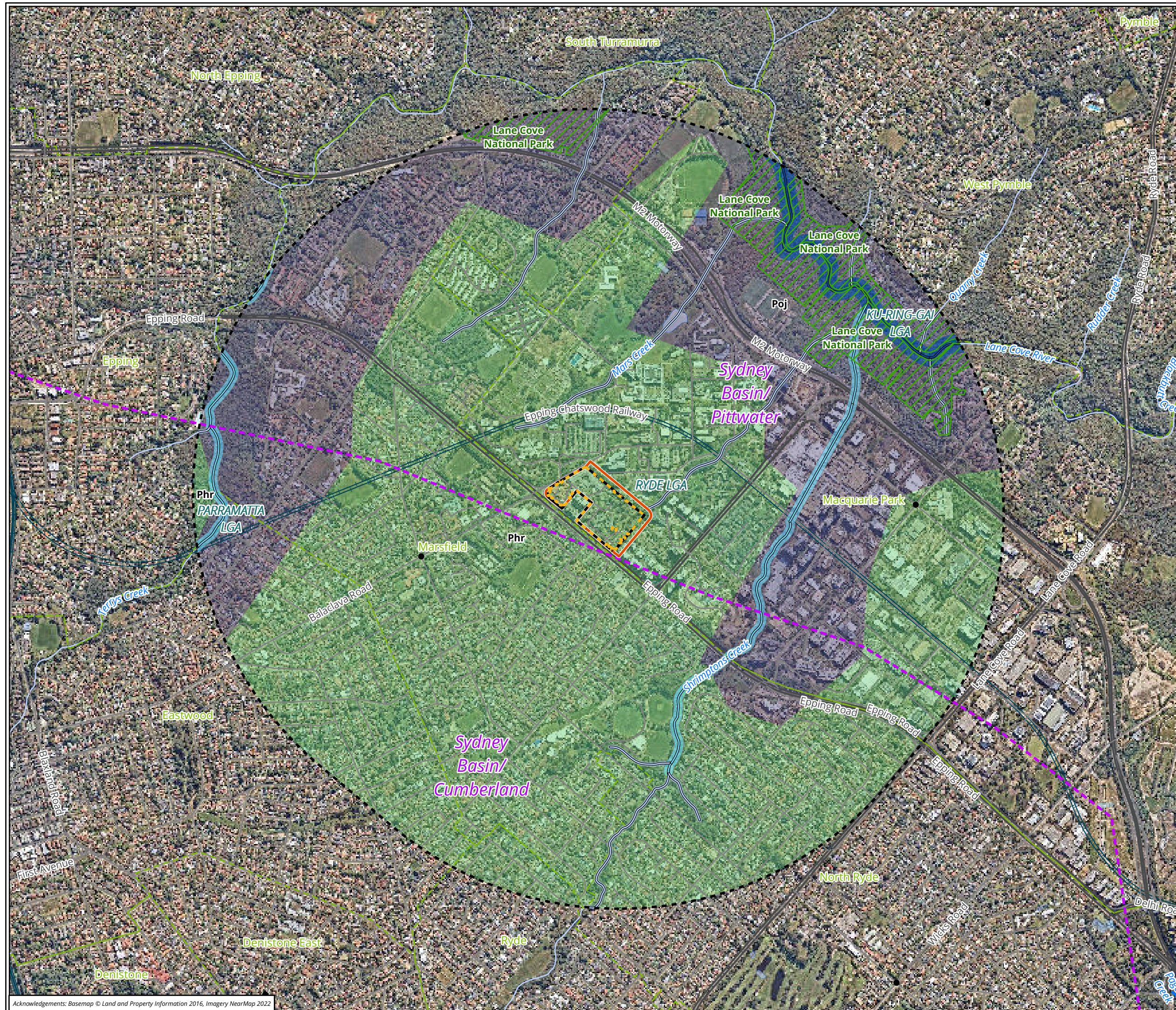
2.1.9 Additional landscape features

The subject land and 1,500 metre assessment area do not contain any soil hazard features or other additional features that are required to be assessed.

2.1.10 Hydrology

Assessment of the potential for the subject land to support groundwater dependent ecosystems (GDEs) was undertaken using the Australian Government's Bureau of Meteorology Groundwater Dependant Ecosystems Atlas (BOM 2019) and GDE High Ecological Value Aquatic Ecosystems (HEVAE) Spatial Portal (OEH & DPI Fisheries 2020). The subject land is not mapped as having GDE's according to BOM (2019) or DPI Fisheries (2020).

The subject land is not mapped as having Groundwater Vulnerability (LEP).



Legend

- Subject land
- Development site
- Development footprint
- Assessment area
- IBRA Region/Sub-region
- National Park/Reserve

Strahler stream order / buffers

- 1
- 2
- 3

Mitchell landscapes

- Phr, Pennant Hills Ridges
- Poj, Port Jackson Basin

Figure 3 Location map

0 100 200 300 400 500

Metres

Scale: 1:15,000 @ A3

Coordinate System:
GDA 1994 MGA Zone 56



Matter: 37762, Date: 19 September 2022
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F3_Location

3 Native vegetation

The development site supports 0.03 hectares of PCT 1281 with high levels of disturbance and 0.66 hectares of planted native vegetation. The vegetation within the development site consists of one PCT in low condition. The single patch of remnant native vegetation within the development site is small, highly isolated, and subject to high levels of modification as a result of historical ground disturbance.

3.1 Native vegetation and habitat assessment

3.1.1 Native vegetation extent

The extent of native vegetation, TECs and vegetation integrity within the subject land was determined using the results of site investigations undertaken as part of the current assessment, previous studies undertaken at the site (EcoLogical Australia 2020) and Section 4 of the BAM (DPIE 2020). Figure 4 provides a map of the native vegetation extent recorded within the assessment areas, development site and subject land, as assessed during field investigations undertaken in August 2022, and via desktop assessments. The figure includes all areas of native vegetation (native ground cover and areas with canopy) within the subject land. Areas not shown as native vegetation cover within Figure 4, include cleared areas, buildings, and other infrastructure and are addressed further below.

3.1.2 Review of existing information

Existing information regarding native vegetation was reviewed to inform field investigations including:

- The *Native Vegetation of the Sydney Metropolitan Area* (DPE 2016b).
- Database searches outlined in section 1.4.
- BaptistCare Macquarie Park Redevelopment – Ecological Constraints Assessment (EcoLogical Australia 2020).
- *Scoping Report Macquarie Park – Master Plan* (Ethos Urban 2022).
- *BaptistCare – Macquarie Park Place Strategy* (Place Partners 2021)

Based on the results of the background review and the requirements of the BAM with respect to this BDAR, appropriate surveys were designed for the subject land and development footprint.

3.1.3 Field investigation of biodiversity values

An initial site assessment was undertaken on the 28 April 2022, additional systematic biodiversity assessment was conducted 8 August 2022 under the terms of Biosis' Scientific Licence issued by the EES under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 May 2023). Fauna survey was conducted under approval CSB 17/892 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2023).

Assessment in accordance with the BAM was overseen by Accredited Assessor Callan Wharfe (BAAS18138).

The development site was surveyed in accordance with the BAM (DPIE 2020), which involved:

- The identification and mapping of PCTs according to the structural definitions held in the BioNet Vegetation Classification database, with reference to information provided in *The Native Vegetation of the Sydney Metropolitan Area* (DPE 2016b).

- Undertaking floristic plots within each vegetation zone in accordance with Section 4 of the BAM (DPIE 2020), considering varying condition states and avoidance of ecotones, areas of disturbance, and edges.
- The identification of native and exotic plant species, according to the Flora of NSW (Harden 1992, 1993, 2000, 2002) with reference to recent taxonomic changes.
- Targeted searches for plant species of conservation significance according to Surveying Threatened Plants and Their Habitats (DPE 2022g).
- Incidental observations using the “random meander” method (Cropper 1993).
- Identification of previous and current factors threatening the ecological function and survival of native vegetation within and adjacent to the development site.
- An assessment of the natural resilience of the vegetation of the site.
- Identifying and mapping fauna habitats (e.g. hollow-bearing trees, rock outcropping etc.), assessing their condition and value to threatened fauna species, and considering threatened species’ habitat constraints.
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).

The conservation significance of plant species and plant communities was determined according to:

- BC Act for significance within NSW
- EPBC Act for significance within Australia.

Detailed field mapping and collection of GPS point locations were conducted using hand-held (uncorrected) tablet units (Samsung Galaxy Tab X) running the ArcGIS Field Maps application, using the inbuilt GPS, and aerial photo interpretation. Spatial locations are therefore considered to have an accuracy of generally ± 5 metres.

Areas of native vegetation for which a PCT could validly be assigned were identified and delineated in the field, and their condition determined and assigned. Identification of PCTs within the subject land was confirmed with reference to the community profile descriptors (and diagnostic species tests) held within the *Native Vegetation of the Sydney Metropolitan Area* (DPE 2016b) and NSW BioNet Vegetation Classification database (DPE 2022g). Locations of floristic plots surveyed are shown on Figure 6.

Further details of targeted survey for threatened flora and fauna species are provided in Section 4 below.

3.1.4 Local data

No local data has been used for native vegetation assessment.

3.1.5 Non-native vegetation

The majority of the vegetation within the subject land consists of planted native and planted exotic vegetation associated with landscaped gardens. Planted exotic vegetation did not contain species native to NSW and was comprised of vegetation associated with formal gardens (vegetable gardens, rose gardens etc) and landscaping (Figure 5). Planted native vegetation could not be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal, due to the species composition present (Table 2).

Areas not shown as native vegetation cover within Figure 5, and which do not provide habitat for threatened species, are not included for further assessment in accordance with Section 5.1.1.5 of the BAM (DPIE 2020). Non-native vegetation which does provide habitat for threatened species is required to be assessed.

Non-native vegetation and planted native vegetation has been assessed for threatened species. Habitat resources are limited within the study area due to the disturbed, isolated and urbanised nature of the habitat, which limits its suitability for threatened fauna. Highly mobile fauna including birds and bats may exploit available resources on a seasonal or transient basis as part of a broad foraging range, but the available habitat is considered unlikely to support resident threatened fauna species.

3.1.6 Plant community types

The following Plant Community Types (PCT) were assessed as present within the subject land:

- PCT 1281 *Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion* (Table 1)
- Planted native vegetation (Table 2)
- Planted exotic vegetation (Table 3)

Table 1 to Table 3 provide detailed descriptions of the vegetation community and planted vegetation recorded within the subject land. Vegetation communities recorded within the subject land are shown on Figure 5.

Table 1 PCT 1281

PCT 1281 <i>Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion</i>	
Common name	<i>Sydney Turpentine - Ironbark forest</i>
Vegetation formation	Wet Sclerophyll Forest
Vegetation class	Northern Hinterland Wet Sclerophyll Forest
Extent within subject land	0.03 ha
Condition	This community at the subject land was recorded in a low condition state existing as two isolated canopy trees with an understory dominated by planted exotic species.
Description	<p>PCT 1281 typically exists as a tall open forest characterised by a midstory of sclerophyllous shrubs and small trees over a grassy ground cover. The upper strata is typically dominated by Sydney Turpentine <i>Syncarpia glomulifera</i> and Red Mahogany <i>Eucalyptus resinifera</i> with scattered occurrences of Ironbark species such as Grey Ironbark <i>Eucalyptus paniculata</i> and Broad-leaved Ironbark <i>Eucalyptus fibrosa</i>. The lower strata typically contains midstory species such as; Sweet Pittosporum <i>Pittosporum undulatum</i>, Elderberry <i>Panax Polyscias sambucifolia</i> and Forest Oak <i>Allocausarina torulosa</i> over groundcover species such as; <i>Dianella caerulea</i> Blue Flax-lily, Spiny-headed Mat-rush <i>Lomandra longifolia</i>, Weeping Grass <i>Microlaena stipoides</i> and Bordered Panic <i>Entolasia marginata</i>.</p> <p>Within the subject land, this community was limited to two isolated canopy trees including Sydney Turpentine and Red Mahogany. The lower strata were subject to significant levels of modification consisting mostly of planted exotic species. Nonetheless, midstory species present included; Silky Oak <i>Grevillea robusta</i>, Lilly Pilly <i>Acmena smithii</i> and Illawarra Flame Tree <i>Brachychiton acerifolius</i>. Groundcover species present included; Lily of the Nile <i>Agapanthus africanus</i>, Japanese Sacred Bamboo <i>Nandina domestica</i>, Coastal Rosemary <i>Westringia fruticosa</i>, Ginger Lily <i>Hedychium gardnerianum</i>, Panic Veldtgrass <i>Ehrharta erecta</i> and Sweet Violet <i>Viola odorata</i>.</p>
Survey effort	One BAM plot/transect (Figure 6).


PCT 1281 Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion	
Justification of PCT	Vegetation mapping (<i>Native Vegetation of the Sydney Metropolitan Area</i> (DPE 2016b) suggests the presence of this PCT within the landscape surrounding the subject land. Canopy species identified are consistent with species characteristic of this PCT. The subject land is within the Pittwater IBRA sub-bioregion
TEC Status	This PCT forms a component of the Critically Endangered Ecological Community (CEEC) <i>Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion</i> as it occurs within the correct region and contains characteristic diagnostic species. This PCT does not meet the commonwealth listing criteria for the CEEC, <i>Turpentine-Ironbark Forest of the Sydney Basin Bioregion</i> , listed under the EPBC Act, as the PCT is highly degraded and does not meet the minimum patch size requirement of 1 ha. Further information on TECs is provided in Section 3.1.7 below.
Estimate of percent cleared value of PCT (BioNet)	90 % (DPE 2022a).
Picture	 <p>Photo 1 PCT 1281 within the subject land</p>


Table 2 Planted native vegetation

Planted native vegetation	
Name	Planted native vegetation
Extent within subject land	1.74 ha
Description	Planted native vegetation across the subject land could not be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal, due to the species assemblage present and dominant species throughout. The planted native vegetation occurs as managed gardens in a landscape setting, characterised by a dominance of the non-indigenous Lemon Scented Gum <i>Corymbia citriodora</i> with a sub-dominance of a mix of trees and understory species including Tallowwood <i>Eucalyptus microcorys</i> , River Oak <i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i> , Black Tea-tree <i>Melaleuca bracteata</i> , Coastal Rosemary <i>Westringia fruticosa</i>

Planted native vegetation	
	<p>and Crimson Bottlebrush <i>Callistemon citrinus</i>, which do not occur together in nature and are not a naturally occurring assemblage.</p> <p>Planted native vegetation occurred predominantly around the boundary of the subject land, with scattered occurrences throughout the cleared areas and existing buildings.</p> <p>The planted native vegetation also included occasional Spotted Gum <i>Corymbia maculata</i>, Smooth-barked Apple <i>Angophora costata</i> Swamp Mahogany <i>Eucalyptus robusta</i>, Weeping Bottlebrush <i>Callistemon viminalis</i> and Crimson Bottlebrush <i>Callistemon citrinus</i>.</p> <p>The groundcover was largely absent and included areas of mulch. Where a groundcover was present, it was dominated by exotic weed and planted urban species such as; Bindyi <i>Soliva sessilis</i>, Panic Veldgrass <i>Ehrharta erecta</i>, Paddys Lucerne <i>Sida rhombifolia</i>, Common Chickweed <i>Stellaria media</i>, Catsear <i>Hypochaeris radicata</i>, Sky Flower <i>Duranta erecta</i>, Myrtle-leaf Milkwort <i>Polygala myrtifolia</i> and Cobblers Pegs <i>Bidens pilosa</i>. Other small areas of planted native vegetation occurred over landscaped lawns comprised of Buffalo Grass <i>Bouteloua dactyloides</i>.</p>
Survey effort	Two BAM plots/transects (Figure 6)
TEC Status	This vegetation type is not consistent with any NSW or Commonwealth listed TEC.
Picture	 <p>Photo 2 Planted native vegetation within the subject land</p>

Table 3 Planted exotic vegetation

Planted exotic vegetation	
Name	Planted exotic vegetation
Extent within subject land	1.05 ha
Description	<p>This vegetation type is characterised by planted exotic/urban species present in scattered locations throughout the subject land. This vegetation type is predominantly devoid of any native vegetation and exists as scattered exotic trees and landscaped gardens. Dominant canopy trees present include Chinese Tallow <i>Triadica sebifera</i>, Jacaranda <i>Jacaranda mimosifolia</i>, Southern Magnolia <i>Magnolia grandiflora</i>, Sweetgum <i>Liquidambar styraciflua</i> and numerous pines <i>Pinus species</i>.</p>

Planted exotic vegetation	
	Areas of landscaped gardens predominantly contain Deptford Pink <i>Dianthus armeria</i> , Camellia <i>Camellia japonica</i> , Blue Lilyturf <i>Liriope muscar</i> , Aloe <i>Aloe vera</i> , Gardenia <i>Gardenia jasminoides</i> , Snowflake <i>Leucojum aestivum</i> , Laurustine <i>Viburnum tinus</i> , Lily of the Nile <i>Agapanthus africanus</i> , Japanese Sacred Bamboo <i>Nandina domestica</i> , Coastal Rosemary <i>Westringia fruticosa</i> , Ginger Lily <i>Hedychium gardnerianum</i> , Sweet Violet <i>Viola odorata</i> , Madagascar Periwinkle <i>Catharanthus roseus</i> and Rosemary <i>Grevillea rosmarinifolia</i> .
Survey effort	One BAM plot/transect (Figure 6)
TEC Status	This vegetation type is not consistent with any NSW or Commonwealth listed TEC.
Picture	 <p>Photo 3 Planted exotic vegetation within the subject land</p>

3.1.7 Threatened ecological communities

Vegetation within the subject land was found to represent one TEC listed under the NSW BC Act, as outlined in Table 4 and below, and illustrated on Figure 8.

Table 4 Summary of BC Act TECs within the subject land

BC Act TEC	Listing status	Area (Ha)
<i>Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion</i>	Critically Endangered	0.03 ha

3.1.8 Planted native vegetation

Where only part of the subject land contains planted native vegetation, the streamlined assessment module provided in Appendix D of the BAM may be used to assess that part of the development, activity, clearing or biodiversity certification proposal.

Assessment of the planted native vegetation within the subject land in accordance with Appendix D of the BAM is provided in Table 5 below.

Table 5 Planted native vegetation - streamlined assessment

Decision Key		
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?		No. The planted native vegetation cannot be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal - Go to question 2
2. Is the planted native vegetation:	a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and	No
	b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	No – Go to 3
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: <ul style="list-style-type: none"> • a. a species recovery project • b. Saving our Species project • c. other types of government funded restoration project • d. condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat • e. legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) • f. ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or • g. approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)? 		No – Go to 4

Decision Key	
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	No – Go to 5
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	Yes – The vegetation was likely planted for aesthetic and functional reasons. The vegetation must be assessed in accordance with D2- Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	N/a

In accordance with Section D2 (of Appendix D of the BAM), the assessor must assess the suitability of the planted native vegetation for use by threatened species and record any incidental sightings or evidence (e.g. scats, stick nests) of threatened species credit species using, inhabiting or being part of the planted native vegetation.

Section 8.4 of the BAM must be applied to mitigate and manage impacts on these species if there is evidence that threatened species are using the planted native vegetation as habitat. Species credits are not required to offset the proposed impacts.

The planted native vegetation within the subject land has been assessed for habitat use by threatened species. The planted native vegetation is considered likely to be utilised by one threatened species, as part of foraging movements of the Large-eared Pied Bat. The planted native vegetation may also be utilised on occasion as part of foraging and dispersal movements by mobile ecosystem credit species listed in Section 4.1 of this report. Actions to avoid and minimise impacts to the Large-eared Pied Bat and ecosystem species, as well as retained vegetation and general fauna within the subject land are outlined in section 5 of this BDAR.

3.2 Vegetation integrity assessment

3.2.1 Vegetation zones and patch size class

PCTs within the subject land were assessed and stratified, based on broad condition state, into vegetation zones in accordance with Section 4.3 of the BAM. This resulted in one vegetation zone identified within the development footprint. Table 6 describes provides details on the number of BAM floristic plots undertaken in the zone. Survey effort undertaken within the planted native vegetation and planted exotic vegetation are also provided.

Patch size classes for each vegetation zone present within the subject land were assessed as per Section 4.3.2 of the BAM (DPIE 2020) using a select process in ArcGIS. All native vegetation with a gap of less than 100

metres from the next area of native vegetation (or ≤ 30 metres for non-woody ecosystems), is considered a single patch, with a patch able to extend onto adjoining land.

Native vegetation within the subject land was mapped sequentially and it was found to form part of a very small patch of connecting vegetation with an area of less than five hectares. The connected vegetation comprises a small linear strip of riparian vegetation along a waterway to the north east of the subject land. This vegetation is separated by buildings and roads from larger patches of native vegetation within Lane Cove National Park further to the north east.

Patch size classes for each vegetation zone are also outlined in Table 6 below.

Table 6 Vegetation zones within the subject land

Vegetation zone	Plant Community Type	Condition	BAM plots completed	Development footprint	Max. patch size development footprint
1281_Low	PCT 1281 <i>Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion</i>	Low	1	0.03 ha	5 ha
Planted native vegetation	N/A – planted natives not occurring in a natural distribution or assemblage	Planted	2	0.66	N/A
Planted exotic vegetation	N/A – exotic vegetation	Planted	1	0.97	N/A

3.2.2 Vegetation integrity

Vegetation integrity, or condition, was assessed using data obtained from undertaking BAM plots within the vegetation zones, as per Section 4.3.4 of the BAM (DPIE 2020). Plot data was collected via:

- A 20 metre x 50 metre quadrat and 50 metre transect for assessment of site attributes and function.
- A 20 metre x 20 metre quadrat, nested within the larger quadrat for full floristic survey to determine composition and structure of the PCT.

The minimum number of BAM plots per vegetation zone was determined using Table 3 of the BAM (DPIE 2020). A total of four BAM plots have been completed within the vegetation zones present development footprint, details are provided in Table 7 and Figure 6.

Table 7 BAM plots completed within the subject land

BAM plot reference	Vegetation zone
37762_P1	1281_Low
37762_P2	Planted exotic vegetation
37762_P3	Planted native vegetation
37762_P4	Planted native vegetation

Assessment of vegetation integrity was undertaken using standard benchmark data as outlined in the BAM and held in the BioNet Vegetation Classification database. A list of flora species was compiled for each BAM plot completed and is included in Appendix 3. Records of all flora species will be submitted to EES for incorporation into the Atlas of NSW Wildlife.

3.2.3 Vegetation integrity score

Plot data was entered into the BAM calculator to determine vegetation integrity score. Plot data are presented in Appendix 3, with vegetation integrity scores for each vegetation zones provided in Table 8.

Table 8 Vegetation zone integrity scores

Vegetation zone	Composition score	Structure score	Function score	Vegetation integrity score*	IBRA subregion
1281_Low	19.9	32.5	64.3	34.6	Pittwater

*Benchmark (pristine) condition vegetation would receive a VI score of 100.

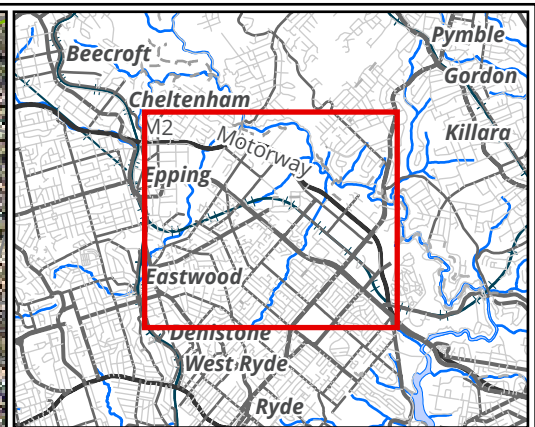
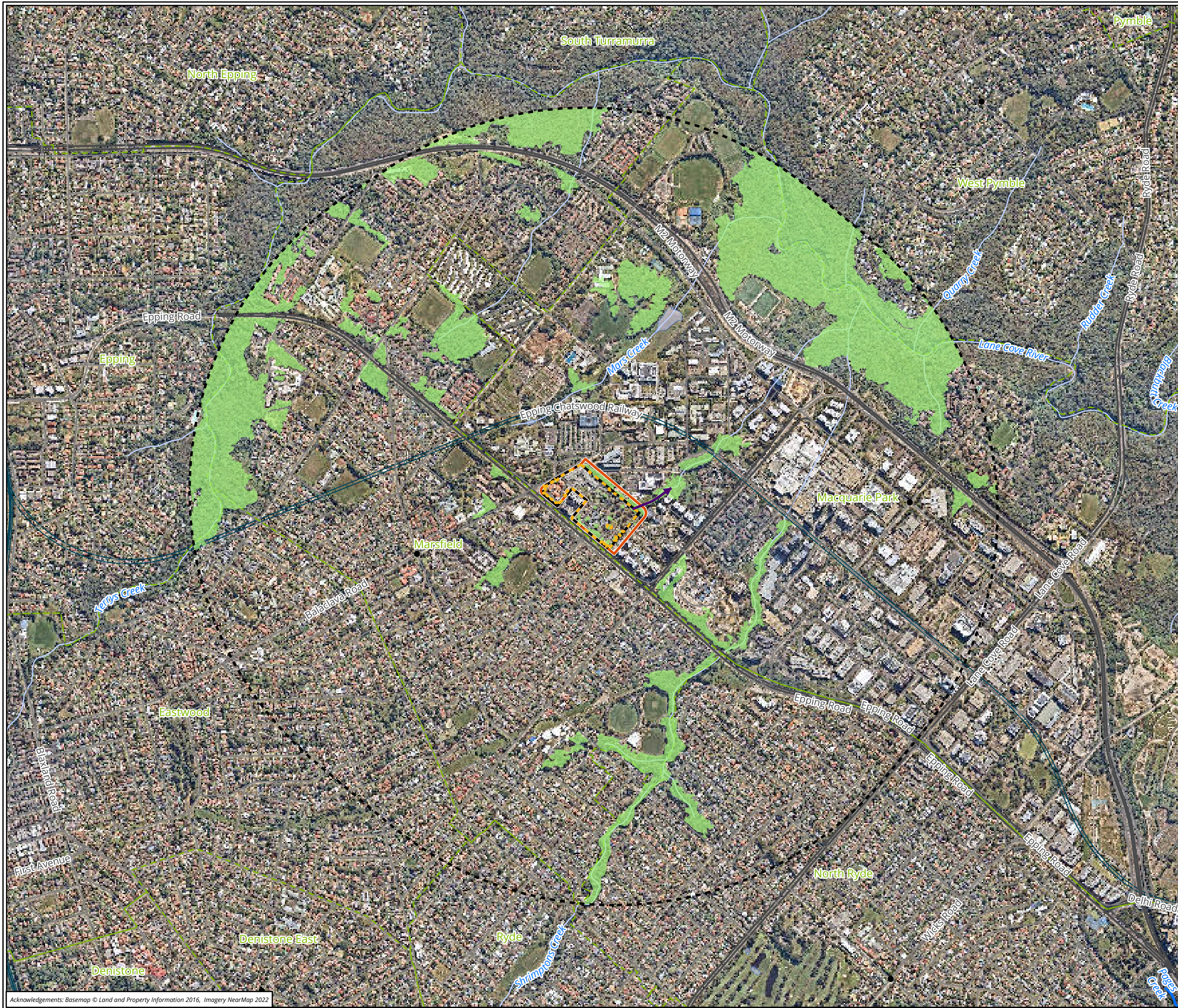
As outlined in Section 9.2.1 of the BAM, an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community.
- ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

As such, ecosystem credit offsets are only required for vegetation zone 1281_Low as it has a VI score of 34.6 and is representative of a critically endangered ecological community.

3.2.4 Scattered trees

No scattered/paddock trees were present within the subject land and therefore were not entered into the scattered tree calculator. Any proposed clearing of native vegetation that does not meet the definition of scattered trees was assessed with Section 4 of the BAM (DPIE 2020).



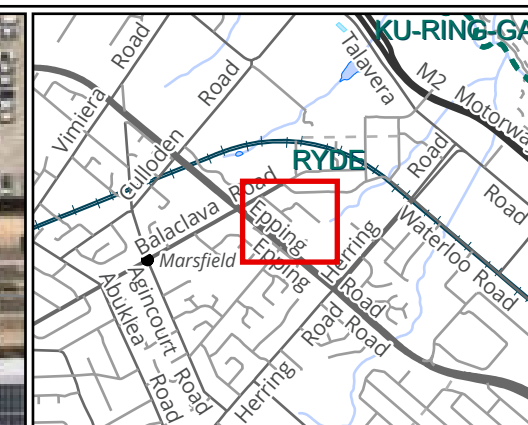
- Legend**
- Subject land
 - Development site
 - Development footprint
 - Assessment area
 - Habitat connectivity
 - Native vegetation

Figure 4 Native vegetation extent

0 100 200 300 400 500
Metres
Scale: 1:15,000 @ A3
Coordinate System:
GDA 1994 MGA Zone 56

biosis

Matter: 37762, Date: 20 September 2022
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F4_NativeVeg



Legend

- Subject land
- Development site
- Development footprint
- ➔ Hollow-bearing tree
- Cleared

Plant Community Types

- 1281 - Turpentine - Grey
- Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion
- Planted native
- Planted exotic
- Grassed area

Figure 5 Vegetation within the subject land

0 10 20 30 40 50

Metres

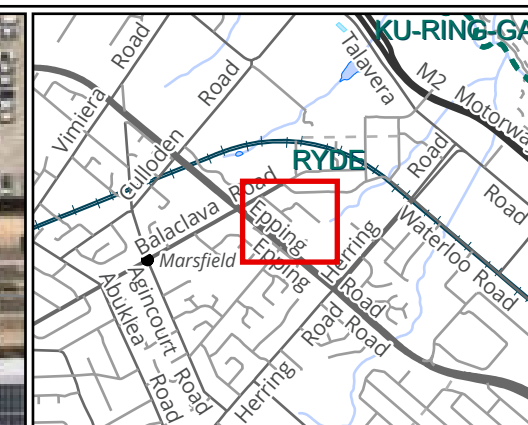
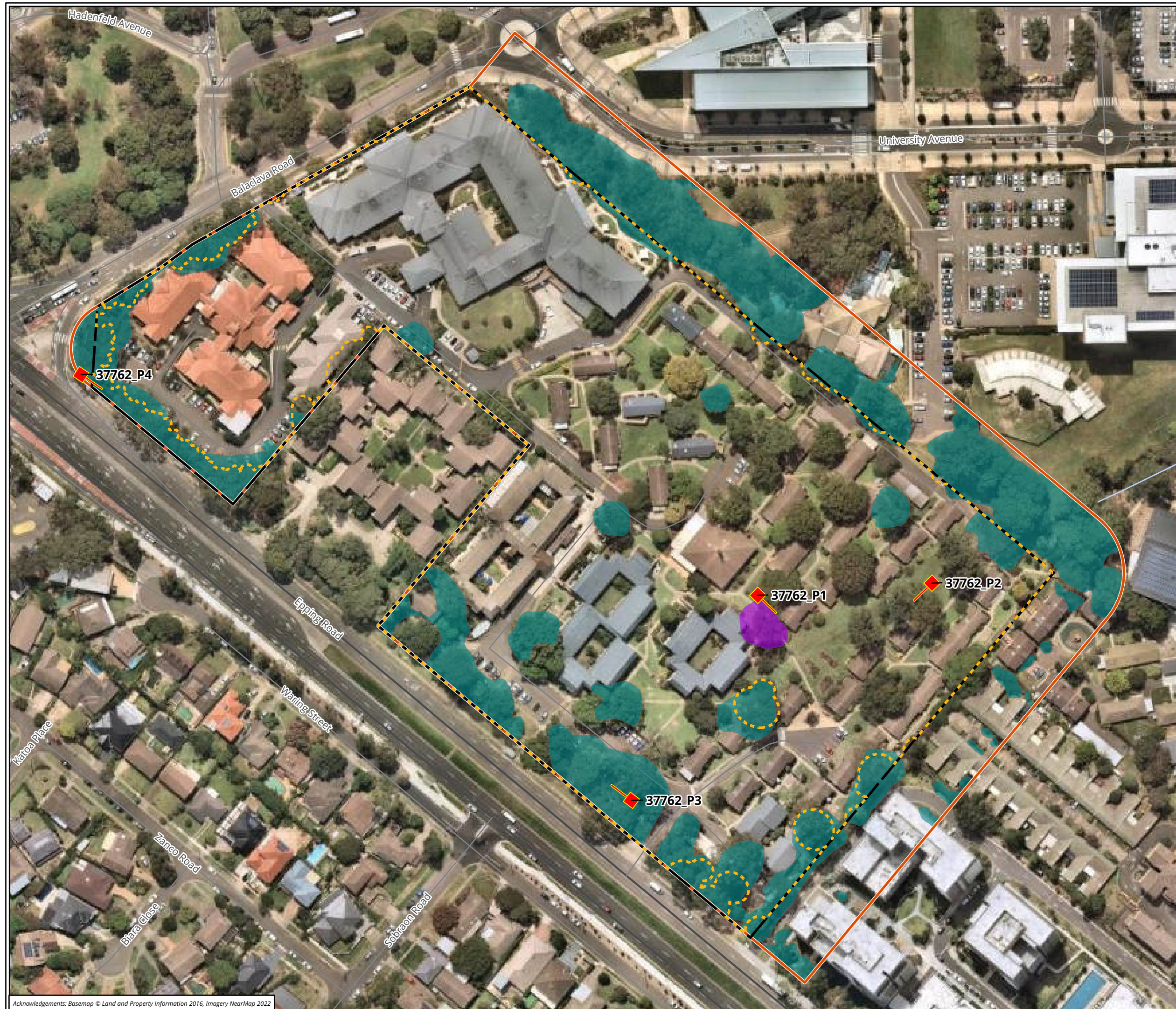
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Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762, Date: 19 September 2022
 GIS: AM, Checked by: SNA, Last edited by: amackegard
 Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
 Layout: 37762_FS_BiosisVeg



Legend

- Subject land
- Development site
- Development footprint
- ◆ BAM plot

Vegetation zones

- 1281-Low
- Planted native

Figure 6 Vegetation zones and plot locations

0 10 20 30 40 50

Metres

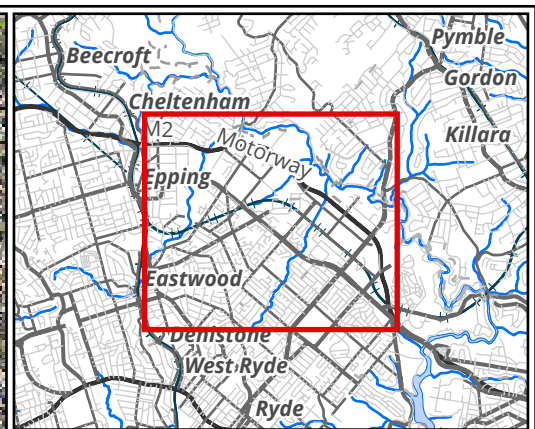
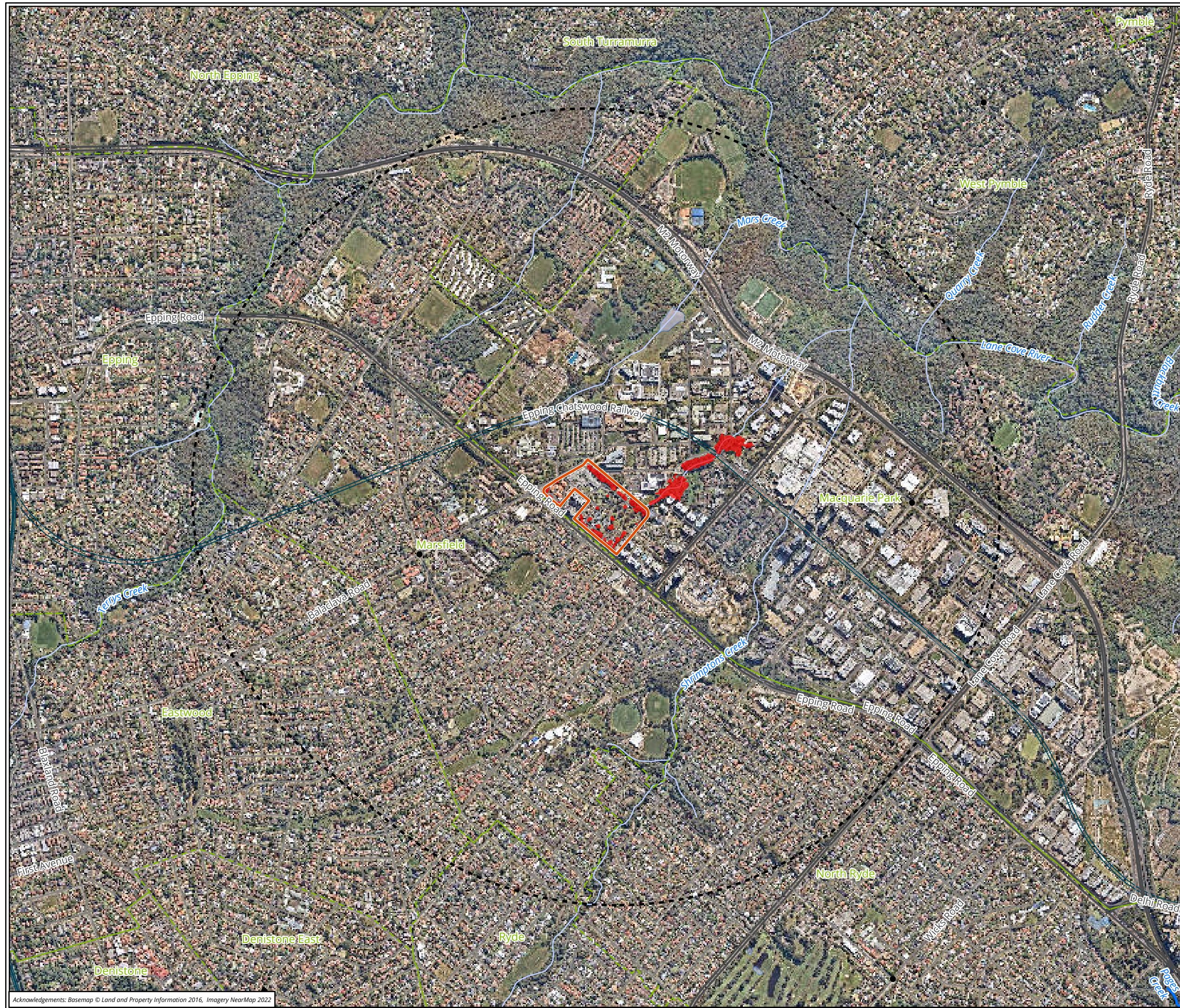
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Coordinate System:

GDA 1994 MGA Zone 56



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 GIS: AM, Checked by: SNA, Last edited by: amackegard
 Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
 Layout: 37762_F6_VegZones



Legend

Subject land

Assessment area

Patch size

<5ha (1281 Low, Planted native)

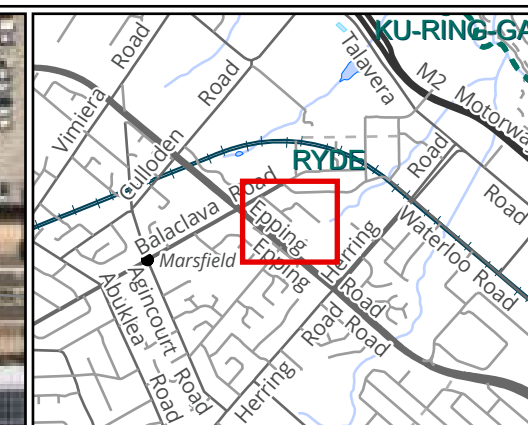
Figure 7 Patch size

0 100 200 300 400 500
Metres

Scale: 1:15,000 @ A3
Coordinate System:
GDA 1994 MGA Zone 56

biosis

Matter: 37762, Date: 19 September 2022
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F7_PatchSize



Legend

- Subject land
- Development site
- Development footprint

TECs - BC Act

- Sydney Turpentine-Ironbark
- Forest in the Sydney Basin Bioregion

Figure 8 Threatened ecological communities within the subject land

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762,
Date: 19 September 2022,
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.mxd

4 Threatened species

4.1 Ecosystem credit species

A list of predicted species (ecosystem credit species) expected to occur within the subject land was generated as per Section 5 of the BAM. Impacts to these species require assessment, however targeted survey is not required as these species are assumed to occur, based on the occurrence of the PCT, habitat constraints, native vegetation cover in the landscape and calculated patch sizes. These species are identified as ecosystem credit species in the Threatened Biodiversity Data Collection (TBDC). Table 9 lists the ecosystem credit species that could not be discounted, based on geographical restrictions or a lack of suitable habitat, from using the subject land on occasion.

These species were considered when prescribing management and mitigation measures for the project.

Table 9 Ecosystem credit species (predicted species) with potential to occur

Species name	Common name
<i>Anthochaera phrygia</i>	Regent Honeyeater
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo
<i>Calyptrorhynchus lathamii</i>	Glossy Black-Cockatoo
<i>Daphoenositta chrysoptera</i>	Varied Sittella
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle
<i>Glossopsitta pusilla</i>	Little Lorikeet
<i>Hieraaetus morphnoides</i>	Little Eagle
<i>Hirundapus caudacutus</i>	White-throated Needletail
<i>Lathamus discolor</i>	Swift Parrot
<i>Lophoictinia isura</i>	Square-tailed Kite
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat
<i>Miniopterus australis</i>	Little Bent-winged Bat
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat
<i>Ninox connivens</i>	Barking Owl
<i>Ninox strenua</i>	Powerful Owl
<i>Petroica boodang</i>	Scarlet Robin
<i>Petroica phoenicea</i>	Flame Robin
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox

Species name	Common name
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat
<i>Tyto novahollandiae</i>	Masked Owl

Three ecosystem credit species were discounted from occurring within the study area and included:

- Rosenberg's Goanna *Varanus rosenbergi*
- New Holland Mouse *Pseudomys novaehollandiae*
- Broad-headed Snake *Hoplocephalus bungaroides*

The subject land occurs within a highly urbanised landscape and does not contain suitable microhabitat such as termite mounds, rock outcropping or crevices, sandy soil and dense or heathy vegetation, and any habitat connectivity to areas containing these habitat features. Therefore the subject land was not considered suitable for use by these ecosystem credit species.

4.2 Species credit species

Species credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence, or components of their habitat. Species credit species are identified in the TBDC.

The potential for a species to occur within the subject land was assessed in accordance with Section 5.2 of the BAM. Species with geographical restrictions, or habitat constraints not present within the subject land, were not required to be assessed. A total of 27 predicted species credit species have been excluded from occurring within the subject land based on a lack of suitable habitat, substantial degradation of existing potential habitat and lack of required microhabitat features.

Appendix 2 provides the lists of species credit species predicted to occur within the subject land based on the IBRA subregion within which the project occurs, the native vegetation cover present within the 1500 metre assessment area, the PCT present within subject land, and patch sizes (listed in Table 6). A detailed assessment of potential for occurrence, and potential for impact, for all species credit species predicted to occur within the subject land is provided in Appendix 2.

A targeted survey or an expert report is required to confirm the presence of these species on the subject land, or alternatively the species can be assumed to be present (DPIE 2020). One species credit species was considered to potentially occur within the subject land and has been assumed present.

No additional species credit species that were not predicted by the BAM Calculator (BAM-C) or BioNet to occur within the subject land were added to the assessment as candidate species credit species. The habitat is considered unlikely to support any further threatened species due to its disturbed and highly modified condition.

Threatened flora

Habitats for threatened flora species within the subject land are largely considered degraded due to the high degree of management and nearby vehicular traffic. Open areas are typically dominated by exotic vegetation whether it be grassed areas, or planted exotic vegetation. This comprises the habitats associated with all of the PCT 1281, planted native vegetation and planted exotic vegetation within the subject land. Native vegetation occurs as an isolated and edge effected patch and therefore, no candidate flora species credit

species were considered to have potential to occur and targeted survey was not required. Incidental searches undertaken did not record any naturally occurring threatened species. A full assessment of the predicted flora species credit species is provided in Appendix 2.

One threatened flora species, Magenta Lilly Pilly *Syzygium paniculatum* was recorded within the subject land. This species occurs as a rainforest tree and is commonly used in landscaping. Within the subject land, the Magenta Lilly Pilly recorded is a planted individual adjacent to the road. The subject land does not provide suitable natural habitat for this species and would not naturally occur within the location, as such impacts to the individual do not require further consideration or offsetting.

Threatened fauna

Fauna habitat assessment was undertaken to determine the presence of microhabitats and other critical habitat components (habitat constraints) suitable for all predicted fauna species outlined in Appendix 2. Habitat assessments focused on the presence of the following features within the subject land:

- Habitat trees including large and/or hollow-bearing trees, stick nests, availability of flowering shrubs and canopy/understorey feed tree species.
- Soil type and presence of cliffs, overhangs and other rocky areas.
- Condition and type of native vegetation and the presence of exotic species.
- Presence and condition of pools and waterways.
- Quantity of ground litter and woody debris.
- Searches for indirect evidence of fauna (i.e. feathers, tracks and scats).
- General degradation of the site as a result of past and current disturbances such as vegetation clearing and industrial land management practices.
- Topography and landscape morphology.
- Presence of Flying-fox camps.

Fauna habitat assessment was undertaken to determine whether the vegetation to be impacted by the proposed development contained microhabitats suitable to support the candidate fauna species credit species, as outlined in Appendix 2.

Habitat within the subject land is highly modified due to past disturbance. Vegetation consists of planted urban native vegetation, exotic vegetation, and two remnant trees consistent with PCT 1281. Due to the disturbed and fragmented nature of the habitat available within the subject land, most threatened species listed in Appendix 2 could be readily discounted as likely to occur.

Habitat features with potential to support threatened species credit species were identified during these habitat assessments. These features have been summarised in Table 10.

Table 10 Habitat features with potential to support threatened species credit species

Habitat feature	Presence within the development footprint
Hollow-bearing trees	One small hollow (less than 5cm diameter), potentially suitable for use by insectivorous bats was observed within an exotic planted tree. It is unlikely that this would be suitable for threatened fauna due to its size and isolated location. As the site is greater than 200 metres from the nearest suitable waterway or

Habitat feature	Presence within the development footprint
	waterbody, it is unlikely that this hollow would be suitable for roosting or breeding by Southern Myotis.
Feed tree species	Native and exotic tree species within the subject land may provide suitable foraging resources for mobile species known to occur in urban environments such as Grey-headed Flying-fox and Little Lorikeet. The subject land was largely lacking in trees and shrubs providing food resources for smaller mammals, however Casuarina species may provide foraging resources for Glossy-black Cockatoo on occasion.
Caves and rocky overhangs	There are no caves or rocky overhangs within the subject land. No other suitable roosting habitat for cave-roosting bats (such as culverts, mine shafts etc.) were recorded.
Rocky outcrops and sandstone crevices	There are no rocky outcrops or sandstone crevices within the subject land.
Major and minor watercourses and waterbodies (i.e. dams)	There are no waterbodies within the subject land. The closest waterways are Mars Creek, approximately 300 metres to the north-west of the subject land and an unnamed first-order creek extending north-east of the subject land.
Woody debris and leaf litter	No woody debris and limited leaf litter occur within the subject land. Small patches associated with garden beds and planted native vegetation occurred however, due to historical ground disturbance and the highly modified nature of the vegetation present, woody debris and leaf litter are considered unsuitable for providing habitat for threatened species such as the Dural Land Snail.

Field capture of detailed fauna habitat information allowed for confirmation of presence/absence of habitat features and microhabitats for a range of candidate threatened species across surveyed portions of the development footprint and impact assessment area. Fauna habitat assessments were captured using ArcGIS points and polygons attributed with specific habitat criteria that allowed for the exclusion of the potential for occurrence of various candidate species from the subject land.

Vegetation in the subject land may provide marginal foraging habitat for highly mobile threatened native fauna species such as the Grey-headed Flying-fox, Little Lorikeet and microbats such as the Eastern Bent-winged Bat and Little Bent-winged Bat which may forage on insects occurring above or within the site but are not reliant on terrestrial features.

No threatened biota were encountered during the site visit. Fauna observed within the subject land included generalist avifauna known to utilise the urban matrix.

The subject land does not contain suitable breeding habitat for any threatened fauna. No large stick nests were observed and the subject land does not contain any waterbodies or waterways suitable for supporting threatened frogs or migratory waders. One small hollow was observed in an exotic planted tree within the impact area but due to its size and isolated location, this hollow is considered unlikely to be utilised by threatened fauna. Although Southern Myotis is known to roost in tree hollows, the distance of the subject land from suitable foraging habitat for this species (greater than 200 metres from the nearest waterbody or waterway with pools or stretches big enough to constitute suitable habitat), makes it unlikely to be suitable for this species as roosting or breeding habitat. No hollow-bearing trees occur within the subject land that would be suitable breeding habitat for threatened birds and mammals.

Turpentine, planted Spotted Gum, Bangalay and Red Mahogany are listed as Koala use trees in the Central Coast koala management area, in accordance with the SEPP (Biodiversity and Conservation) 2021. While these species may provide foraging habitat for Koala, the habitat in the subject land is considered degraded for this species given the habitat occurs as predominantly planted vegetation, the position of the subject land in the broader landscape and the high level of potential threats provided by the highly urbanised environment.

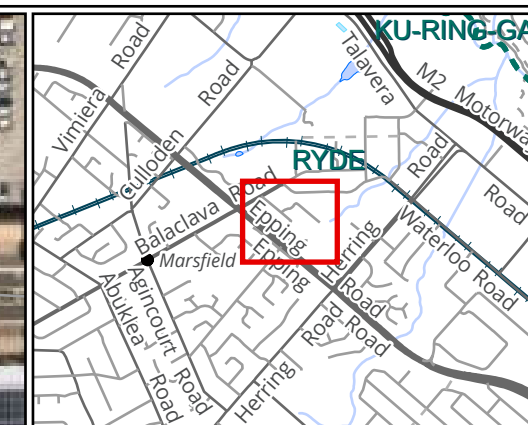
One candidate fauna species credit species, Large-eared Pied Bat was considered likely to occur within the subject land. Large-eared Pied Bat is a dual credit species, requiring consideration for both foraging and breeding habitat. No breeding habitat for this species occurs within the subject land, or within 200 metres and the species of the development footprint, and as such there is no potential for a Serious and Irreversible Impact (SII) to the species. Large-eared Pied Bat is considered likely to be present as part of foraging movements only and has been assumed present. No additional candidate fauna species credit species required further assessment.

4.2.1 Threatened species survey details

No targeted surveys were undertaken for threatened fauna species.

4.2.2 Incidental flora and fauna surveys

No threatened species were recorded during incidental surveys undertaken as part of the current assessment. Incidental non-threatened flora and fauna recorded during the current assessment are included in Appendix 3 and Appendix 4.



Legend

- Subject land
- Development site
- Development footprint
- Hollow-bearing tree
- Targeted flora survey

Threatened flora

- + *Syzygium paniculatum* - Magenta Lilly Pilly

Figure 9 Threatened ecological communities within the subject land

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762, Date: 20 September 2022
 Drawn by: AM, Checked by: SNA, Last edited by: amackegard
 Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
 Layout: 37762_F9_TargetedSurveys

4.2.3 Local data

No local data has been used for threatened species assessment.

4.2.4 Expert reports

Sections 5.2 and 5.3 of the BAM outlines that an expert report may be obtained instead of undertaking a species survey for a project, where the expert report is prepared by a person who, in the opinion of the Environment Agency Head, possesses specialised knowledge based on training, study or experience to provide an expert opinion in relation to the biodiversity values to which an expert report relates (DPIE 2020).

No expert reports were utilised for the current assessment.

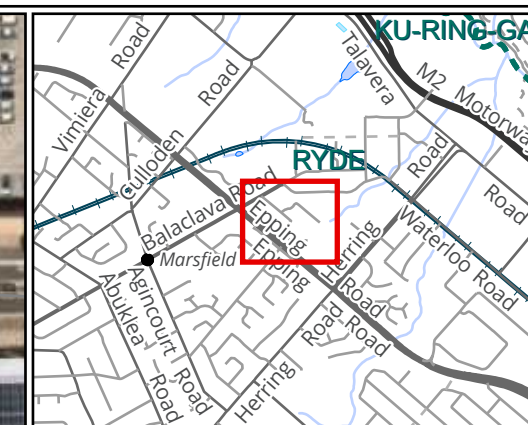
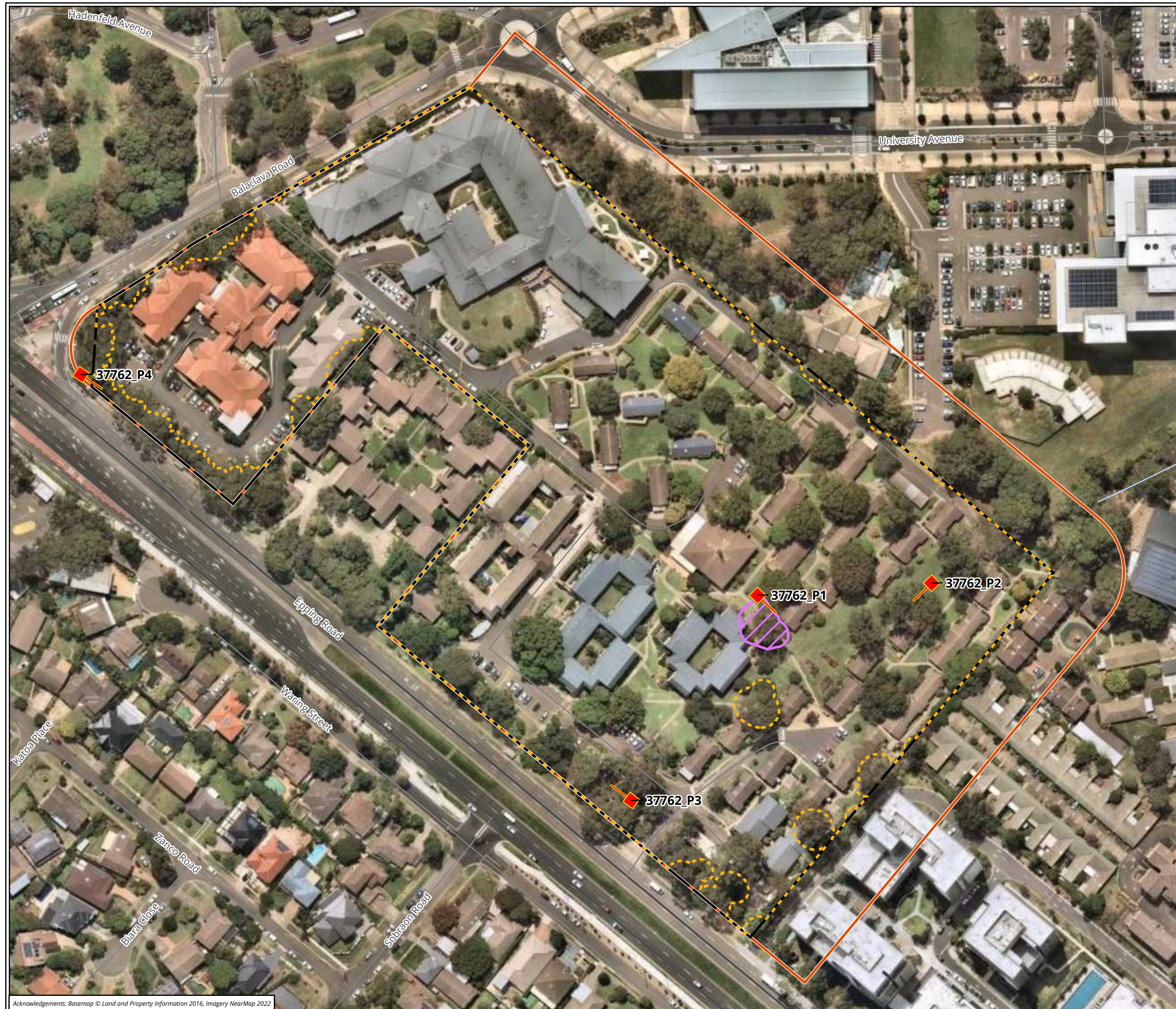
4.2.5 Threatened species summary and polygons

Habitat for one threatened species would be impacted by the project.

Table 11 provides details of threatened species impacted by the project and outlines the attributes that comprise the threatened species polygons. The presence of threatened species impacted by the project is illustrated on Figure 10.

Table 11 Threatened species polygons within the development footprint

Threatened species	Impact (ha / No. indiv.)	Unit of measure	Biodiversity risk weighting	Polygon attributes
Fauna				
Large-eared Pied Bat <i>Chalinolobus dwyerii</i>	0.03 ha	Area	2	PCT 1181, supporting habitat suitable for the species' foraging activities.



- Legend**
- Subject land
 - Development site
 - Development footprint
 - ◆ BAM plot
 - Threatened species polygons**
 - Large-eared Pied Bat

Figure 10 Threatened species polygons

0 10 20 30 40 50
Metres
Scale: 1:1,500 @ A3
Coordinate System:
GDA 1994 MGA Zone 56



Matter: 37762, Date: 21 September 2022
GIS: AM, Checked by: SNA, Last edited by: Iharley
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F10_ThrSpPoly

Stage 2 – Impact assessment (biodiversity values)

5 Avoid and minimise impacts

This section demonstrates the efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with BAM, including an analysis of alternatives:

- Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology.
- Routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route.
- Alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location.
- 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.
- Efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design.
- Identification of site constraints that have been considered in determining the location and design of the proposal.

5.1 Actions to avoid/minimise project impacts

The principal means to reduce impacts on biodiversity values within the development site is to avoid and/or minimise the removal of native vegetation and fauna habitat. Additional recommendations include measures to mitigate residual impacts after all measures to avoid and minimise impacts have been considered in Table 12.

Figure 11 shows the final development footprint, while Figure 12 shows an alternative footprint considered to avoid or minimise impacts on biodiversity values. The final proposal footprint (including construction and operation) as well as indirect impact zones where applicable and demonstrated prescribed impacts are provided in Figure 13 and Figure 14.

As part of the design development process, a number of options were considered for the future layout of the site. This process gave regard to opportunities and constraints associated with the site with the overarching intent of creating a place-based, master-planned approach to re-development. Opportunities to avoid impacts are limited due to the small, isolated nature of the biodiversity values present within the subject land. Retention of existing planted native vegetation, particularly mature trees, has been prioritised where possible. The master Plan maintains an overall canopy cover of 38%.

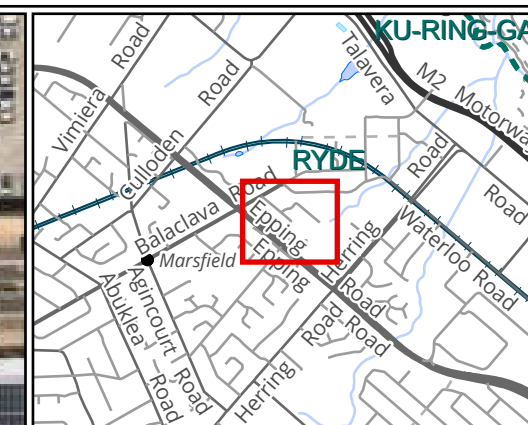
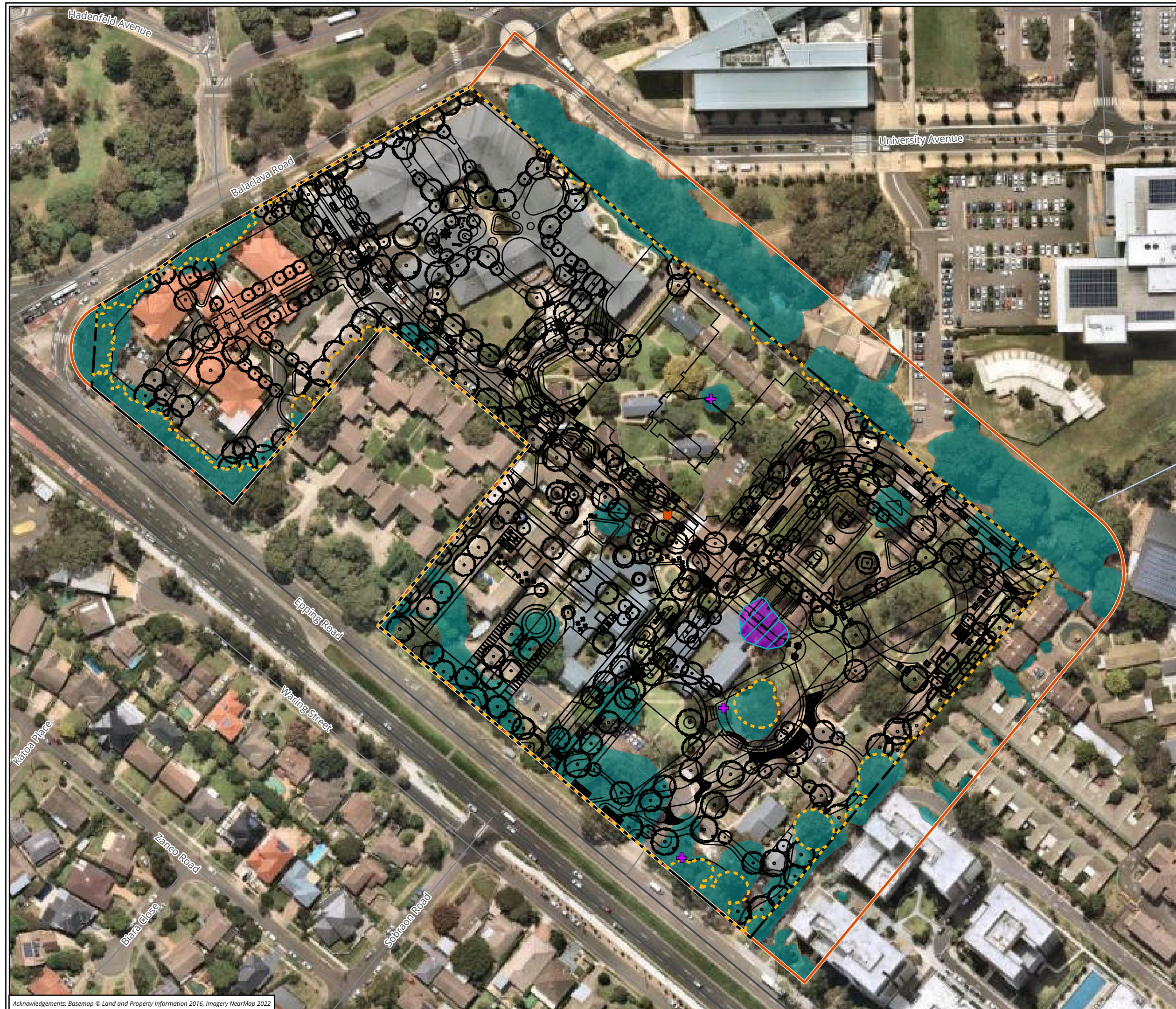
Options to avoid impacts to CEEC Sydney Turpentine Ironbark Forest were highly limited due to project design and earthworks requirements, the small size of the vegetation and its location within the development footprint. Arboriculture assessment also found that part of the community only had a 'moderate' retention value. Alternatives were considered where this vegetation was retained however, they were unable to be progressed due to engineering constraints associated with the geology of the site. As the site has a significant drop in level to the south-east, future development allowing retention of the CEEC would have needed to allow for an amended level for this part of the site. This would result in a build up of nonpermeable surfaces in close proximity that would have unacceptable consequences to future flood risk.

Biodiversity impacts will be minimised through standard construction and environmental management mitigation measures (such as pre-clearance inspections).

Table 12 Avoidance and minimisation of impact

Avoidance and minimisation components	Action	Outcome	Timing	Responsibility
<i>Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology.</i>	Removal of trees containing habitat features (Figure 5) undertaken by two-stage removal, including supervision by an ecologist.	Avoid impacts to fauna during clearing.	Prior to clearing of vegetation	Proponent and project ecologist
<i>Routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route.</i>	Avoid areas containing planted native vegetation providing potential foraging habitat within the subject land.	Reduction in removal of planted native vegetation.	Prior to work commencement	Proponent
<i>Alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location</i>	Given the significant landholding, alternate sites were not considered appropriate for the proposal objectives. Redevelopment of the existing BaptistCare site was preferred.	The project has been sited to be undertaken in an already highly urbanised environment, within close proximity to existing infrastructure and urban amenities.	Planning stages	Proponent
<i>Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design.</i>	Avoidance of areas of in-tact vegetation through siting the development within an existing developed area. Minimising removal of existing planted native vegetation.	Retention of mature trees where possible which provide higher quality potential resources for highly mobile common fauna in the wider locality.	Planning phase, following ecological constraints assessment, prior to work commencement	Proponent

Avoidance and minimisation components	Action	Outcome	Timing	Responsibility
<i>Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal.</i>	Siting of the earthworks and building footprints around engineering constraints associated with the geology of the site.	Removal of 0.03 hectares of PCT 1281 comprising Sydney Turpentine – Ironbark Forest CEEC.	Prior to work commencement.	Proponent



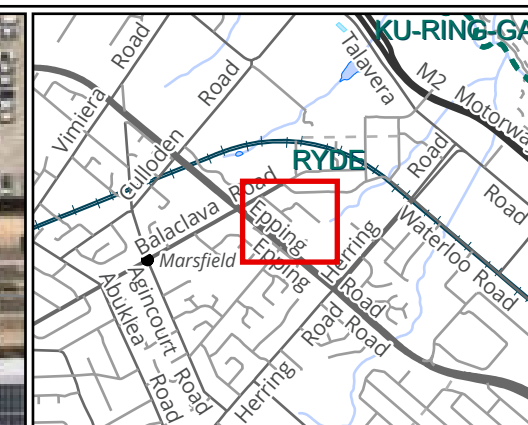
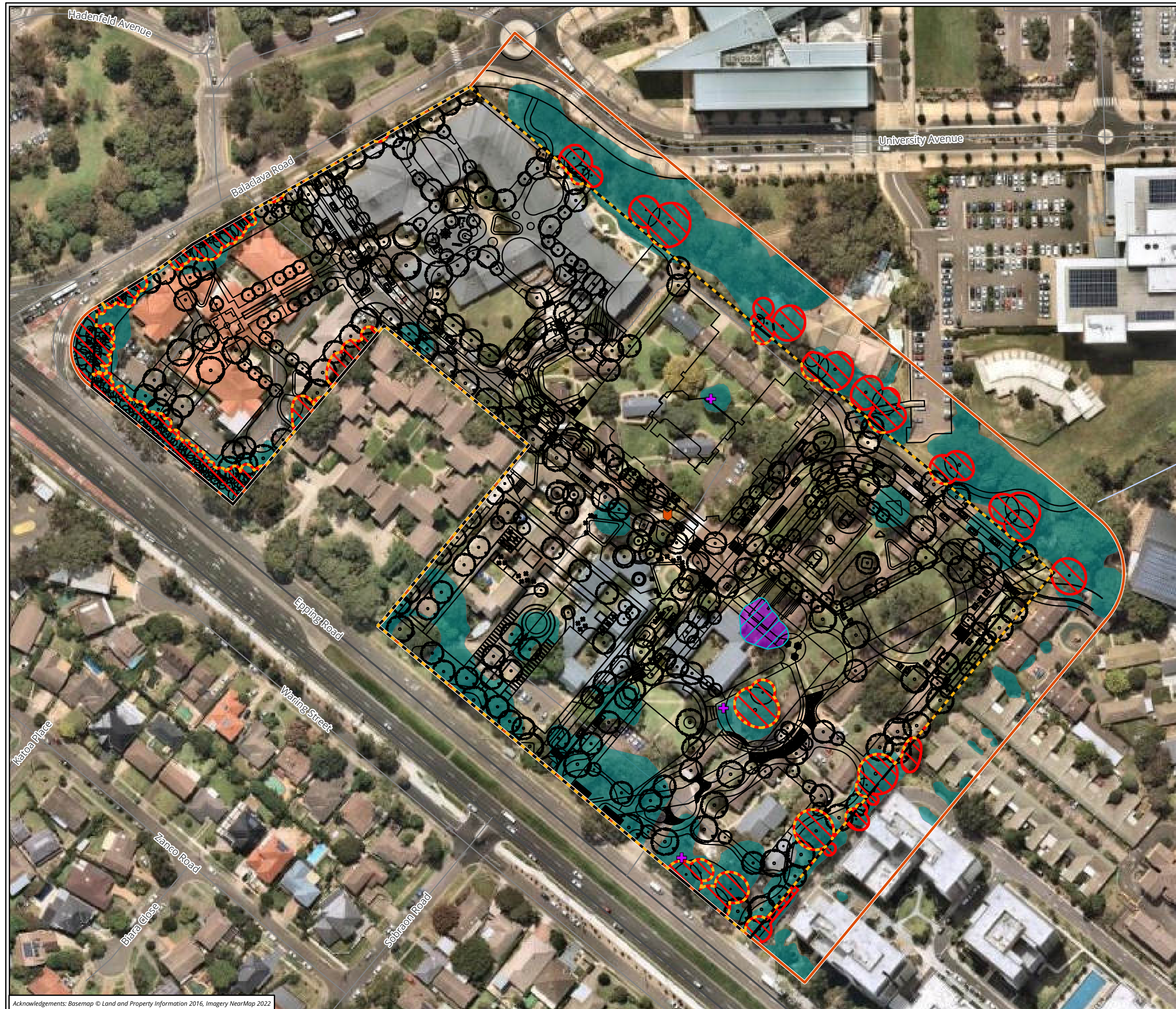
- Legend**
- Subject land
 - Development site
 - Development footprint
 - ✶ Hollow-bearing tree
 - Proposed development
- Vegetation zones**
- 1281-Low
 - Planted native
- TECs - BC Act**
- Sydney Turpentine-Ironbark
 - Forest in the Sydney Basin Bioregion
- Threatened flora**
- + *Syzygium paniculatum* - Magenta Lilly Pilly

Figure 11 Final development footprint

0 10 20 30 40 50
Metres
Scale: 1:1,500 @ A3
Coordinate System:
GDA 1994 MGA Zone 56



Matter: 37762, Date: 20 September 2022
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F11_FinalDevFootprint



Legend

- Subject land
- Development site
- Development footprint
- Hollow-bearing tree
- Alternative footprint
- Area of avoidance - trees to be retained

Vegetation zones

- 1281-Low
- Planted native

TECs - BC Act

- Sydney Turpentine-Ironbark
- Forest in the Sydney Basin Bioregion

Threatened flora

- + *Syzygium paniculatum* - Magenta Lilly Pilly

Figure 12 Alternate options and avoidance

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762, Date: 20 September 2022
 GIS: AM, Checked by: SNA, Last edited by: amackegard
 Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
 Layout: 37762_F12_OptionsAvoidance

6 Impacts that are unable to be avoided

Assessment of direct and indirect impacts unable to be avoided has been undertaken in accordance with the BAM (DPE 2022g). The following direct and indirect impacts are unable to be avoided in progressing the proposed development.

6.1 Direct impacts

Direct impacts include vegetation clearing calculated from the area of proposed building footprints, roads and easements for service infrastructure.

Direct impacts arising from the project include:

- Removal of 0.03 ha of *Turpentine-ironbark Forest in the Sydney Basin Bioregion*, listed as critically endangered under the BC Act.
- Removal of 0.66 ha of planted native vegetation.
- Removal of 0.98 ha of planted exotic vegetation.
- Removal of 0.69 ha of potential foraging habitat for threatened and non-threatened fauna.

These impacts will be permanent and will occur from the outset of the development. Mitigation measures outlined in Section 5.1 above will help to minimise the potential impacts to biodiversity values that remain present within the subject land.

A summary of PCTs/zones directly impacted is demonstrated in Table 13. A summary of the direct impacts to species credit habitat or individuals is demonstrated in Table 14.

Table 13 Summary of direct impacts to vegetation

Zone	PCT	TEC	Area within subject land (ha)	Area impacted (ha)	VI Score
1281_Low1	1281	Sydney Turpentine – Ironbark Forest	0.03	0.03	34.6

Table 14 Summary of direct impacts species credit habitat or individuals

Species	Sensitivity	Area (ha) or count
Large-eared Pied Bat	Very high sensitivity to Potential Gain	0.03

6.1.1 Loss of hollow bearing trees

One exotic, hollow-bearing tree will be removed. This tree does not provide potential roosting habitat for threatened fauna.

6.2 Indirect impacts

Potential indirect impacts arising from the project are outlined and addressed in Table 15, areas of estimated indirect impact are shown in Figure 13.

Table 15 Avoidance and minimisation of impact

Indirect impact	Assessment / likelihood of occurrence
Inadvertent impacts on adjacent habitat or vegetation	Impacts to adjacent vegetation during construction and operational phase can be prevented or minimised through appropriate exclusion fencing, implementation of a CEMP detailing best practice environmental protection measures, strict water quality practices and stormwater controls, and by ensuring any lighting is directed towards the developed area, rather than towards the adjacent retained habitats.
Reduced viability of adjacent habitat due to edge effects	Adjacent habitats are currently subject to a high degree of edge effects due to prior clearing and surrounding existing urban land use. Since little (1.66 ha) vegetation is to be removed from the subject land, and increase to edge effects is not expected to occur to the remnant vegetation surrounding the subject land, as a result of the proposed development.
Reduced viability of adjacent habitat due to noise, dust or light spill	It is predicted that the adjacent habitat will be impacted in a small way by noise, dust and light spill, during construction and operation of the future development of the subject land. However, this will be managed via best practices outlined in a CEMP. The subject land also already occurs as a residential area, and light and noise pollution is most likely moderate. This will likely not substantially increase due to the proposed future development.
Transport of weeds and pathogens from the site to adjacent vegetation	Weeds occurring within the subject land are common with those occurring within adjacent vegetation to be retained. Increased transport of pathogens and weeds is unlikely to occur, but will be managed by biosecurity measures outlined in the CEMP.
Increased risk of starvation, exposure and loss of shade or shelter	The habitat present in the subject land is considered marginal for most fauna species given the disturbed condition, however may provide potential foraging habitat for species which occur in urban environments. The proposed future development will not result in an increased risk of starvation, exposure and loss of shade or shelter to native species due to the small total area of vegetation being removed which is a very small proportion of commensurate habitats available in the immediate vicinity.
Loss of breeding habitats	No specialist breeding habitat will be impacted by the proposed future development.
Trampling of threatened flora species	No threatened flora species were found, or are considered likely to occur, within the subject land, and thus trampling of threatened flora species is unlikely.
Inhibition of nitrogen fixation and increased soil salinity	Any future excavations or soil disturbance resulting from the future development of the subject land would be largely restricted to areas having undergone significant previous disturbance through urbanisation and development of the current site. As such it is not considered likely that the

Indirect impact	Assessment / likelihood of occurrence
	future development of the subject land would result in substantial changes to the level of nitrogen fixation or soil salinity in the locality.
Fertiliser drift	The proposal would not contribute to fertilizer drift into surrounding areas with future practices. No fertilizer is proposed to be used.
Rubbish dumping	Standard environmental controls for the development would ensure potential impacts are minimised. Works would follow an approved Waste Management Plan.
Wood collection	Future development proposed within the subject land is unlikely to increase access to any retained vegetation, beyond current access capacity.
Removal and disturbance of rocks, including bush rock	The subject land does not support bush rock.
Increase in predators	The subject land already occurs within an urbanised setting with pets, such as dogs and horses, common. The subject land is already largely cleared of remnant vegetation and highly modified with planted species. The remaining vegetation clearance proposed by the development, and proposed land use, is unlikely to increase predatory species populations.
Increase in pest animal populations	<p>The proposal occurs in an urbanised area with pets such as cats <i>Felis catus</i> and dogs <i>Canis lupis familiaris</i> currently occurring within the locality as well as pest animals such as Rats <i>Rattus rattus</i> and European Rabbit <i>Oryctolagus cuniculus</i>. The proposal will not result in an increase in available habitat for these species and is unlikely to lead to an increase in pest animal populations.</p> <p>Suitable waste disposal implemented during and post construction will further reduce the resources available for pest species.</p>
Changed fire regimes	The proposal occurs in an urbanised area. Appropriate asset protection zones and fire mitigation systems will be implemented for the future development and the proposal will not result in an increased risk of fire, or alter current regimes.
Disturbance to specialist breeding and foraging habitat, e.g. Beach nesting for shorebirds	There are no mapped Important Areas within the region. The proposal would not result in any disturbance to specialist breeding or foraging habitat.
Fragmentation of movement corridors	Movement corridors are currently restricted in width and availability through the locality. The project will result in the removal of 1.64 ha of native and planted native vegetation. Vegetation within the locality occurs as patchy fragments which are loosely connected along parks, roads and riparian corridors. Vegetation within the subject land occurs at the edge of a patch, less than 5 hectares in area.

6.3 Prescribed impacts

Assessment of prescribed biodiversity impacts are outlined and addressed in Table 16 below and shown in Figure 14.

Table 16 Assessment of prescribed impacts

Prescribed impact	Assessment / likelihood of occurrence
Karst, caves, crevices, cliffs, rocks and other geological features of significance	The development will not impact on threatened species or ecological communities associated with karst, caves, crevices or cliffs. Lane Cove National Park approximately 1.6 km north of the subject land contains areas of sandstone outcropping which may provide cliffs, overhangs and crevices suitable for use by threatened species.
Occurrences of human-made structures and non-native vegetation	Threatened species that can use human made structures as habitat with potential to occur in the subject land include Eastern Bent-winged Bat and Little Bent-winged Bat. There are no human made structures in the subject land that would be suitable for these bats to use as roosting habitat. A total of 0.03 ha of PCT 1281, 0.66 ha of planted native vegetation and 0.97 ha of exotic planted vegetation within the subject land will be directly impacted by the development. Due to the lack of microhabitat and modified structure of the vegetation present, non-native vegetation is unlikely to be used as breeding habitat by any threatened species. Planted vegetation provides potential foraging resources for highly mobile, urban-adapted native fauna such as the Grey-headed Flying-fox.
Corridors or other areas of connectivity linking habitat for threatened entities	The removal of 0.03 ha of native vegetation is expected to have little impact on the connectivity of threatened species habitat. The subject land is highly fragmented and subject to previous disturbance associated with past and current land uses. Threatened species such as Grey-headed Flying-fox that may utilise the study area on occasion are highly mobile and capable of exploiting resources across a broad home range. The species is unlikely to be impacted by removal of the vegetation within the subject land given their highly mobile nature and that there is higher quality vegetation within the locality that is readily accessible for this species.
Water bodies or any hydrological processes that sustain threatened entities	There are no waterways or dams that sustain threatened entities within the subject land.
Protected animals that may use the proposed wind farm development site as a flyway or migration route	There are no wind turbines involved in this project.
Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community	The risk of increased vehicle strike due to the proposal is low and would generally be limited to vehicle movements to and from the construction site, which would occur on existing busy roads. Vehicle strike associated with the development is unlikely to affect any threatened fauna.

6.4 Impacts considered uncertain

There are no impacts considered uncertain for the current assessment.

6.5 Impacts to Groundwater Dependent Ecosystems (GDE)

Assessment of the potential for the subject land to support groundwater dependant ecosystems (GDEs) was undertaken using the Australian Government's Bureau of Meteorology Groundwater Dependant Ecosystems Atlas (BOM 2019). The subject land is not mapped as supporting GDEs associated with an aquifer in Appendix 8 of the *Risk Assessment Guidelines for Groundwater Dependent Ecosystems* (DPI 2012). The subject land is not mapped as having Groundwater Vulnerability (LEP 2014).

6.6 Aquatic habitat impacts relating Fisheries Management Act matters

There are no aquatic habitat impacts relating to the *Fisheries Management Act 1994*.

6.7 Impacts to Matters of National Environmental Significance (MNES)

An assessment of the impacts of the proposed development on Matters of National Environmental Significance (MNES), against heads of consideration outlined in Commonwealth of Australia (2013) was prepared to determine whether referral of the proposed development to the Commonwealth Minister for the Environment is required. MNES relevant to the proposed development are summarised in Table 17.

Table 17 Assessment of the proposed development against the EPBC Act

Matter of NES	Project specifics	Potential for significant impact
Threatened species	No threatened species predicated to occur within the subject land and listed under the EPBC Act are considered likely to be impacted by the removal of the two trees which form PCT 1281, or planted vegetation within the subject land.	The removal of two trees, and 0.66 ha of planted native vegetation which may, on occasion provide foraging resources is not considered likely to impact the Grey-headed Flying-fox and a Significant Impact Criteria assessment is not considered necessary.
Threatened ecological communities	There are no TECs within the subject land that are listed under the EPBC Act. Sydney Turpentine – Ironbark Forest did not meet the size threshold for listing under the EPBC Act.	No potential for impact.
Migratory species	Migratory species are considered unlikely to occur within the subject land given its location in the landscape and lack of suitable habitat features.	No potential for impact.
National Heritage Places	There are no National Heritage Places within the subject land.	No potential for impact.
Wetlands of international importance (Ramsar sites)	There are no wetlands of international importance within or in close proximity to the subject land.	No potential for impact.

7 Mitigation and management of impacts

Identification of measures to mitigate or manage impacts has been undertaken in accordance with the BAM (DPIE 2020), including considerations such as:

- Techniques, timing, frequency and responsibility.
- Identification of measures for which there is risk of failure.
- Evaluation of the risk and consequence of any residual impacts.
- Documentation of any adaptive management strategy proposed.

Identification of measures for mitigating impacts related to:

- Displacement of resident fauna.
- Indirect impacts on native vegetation and habitat.
- Mitigating prescribed biodiversity impacts.
- Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain.

Table 18 Measures to mitigate and manage impacts

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
Impacts to native vegetation and habitat	Where possible, design building envelope to retain canopy species.	Where possible, hollows retained for use by local fauna. Reduction in the removal of native vegetation.	Final lot layout and building design. Prior to vegetation removal.	Proponent
Displacement of resident fauna	A CEMP should be implemented that would include the following sub-plans or protocols: <ul style="list-style-type: none"> • Vegetation clearance protocol. • Hollow-bearing tree removal specification. • Fauna injury protocol. 	Mitigate risk of impact to environmental controls during project construction.	Ongoing/throughout earthworks.	Construction contractor
	Any hollow-bearing trees marked for removal should be removed according to	No direct impact to resident fauna during vegetation removal.	Immediately prior to vegetation removal.	Qualified ecologist and construction contractor

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	a vegetation clearance protocol to ensure no injury or loss of fauna, including: <ul style="list-style-type: none"> Inspection of hollow-bearing trees by a qualified ecologist immediately prior to removal. 			
	All vegetation is to be inspected immediately prior to removal by construction contractors to confirm absence of foraging fauna in Urban Native/Exotic vegetation. If fauna is observed, unexpected threatened species find procedure, as detailed in a CEMP, to be implemented.	No direct impact to resident fauna during vegetation removal.	Immediately prior to vegetation removal.	Construction contractor
Indirect impacts on native vegetation and habitat	Install appropriate stormwater and erosion controls on site.	No further degradation to retained vegetation and habitats.	Ongoing/throughout earthworks.	Construction contractor
	Where appropriate native vegetation cleared from the study area should be mulched for re-use on the site	Stabilisation of bare ground	Ongoing/Throughout construction.	Construction contractor
	Installation of appropriate exclusion fencing around trees and vegetation to be retained in the study area: <ul style="list-style-type: none"> The radius of the tree protection 	No further degradation to retained vegetation and habitats.	Before and throughout construction.	Construction contractor

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	<p>zone (TPZ) is calculated for each tree by multiplying its diameter at breast height by 12, in accordance with the Standards Australia Committee (2009).</p> <ul style="list-style-type: none"> A TPZ should not be less than 2 m, or greater than 15 m, except where crown protection is required (Standards Australia 2009). This would include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area'. <p>Identify the location of any 'No Go Zones' in site inductions and a Construction Environmental Management Plan.</p>			
Indirect impacts to resident fauna and adjacent habitat	<p>Reduction of impacts resulting from external lighting is recommended, and can be adapted from Part 4 (good lighting design principles) of the Dark Sky Planning Guideline (DPE 2016), including:</p> <ul style="list-style-type: none"> Installing light fitting shields with an opaque cover, mounted horizontally 	No indirect impact to fauna in retained vegetation and habitats.	Ongoing.	Construction contractor.

Measures to mitigate and manage impacts	Action	Outcome	Timing	Responsibility
	<p>across the top of the lighting module. These shielding attachments allow only the downward projection of light.</p> <ul style="list-style-type: none"> Direct lights downwards and avoid shining directly onto the public amenities, which have the potential to reflect light skywards. <p>Utilise low beam angles that are close to vertical where possible to minimise light glare.</p>			
Adaptive management strategies proposed to monitor and respond to impacts on biodiversity values that are uncertain	Implementation of an appropriate CEMP during works.	Mitigate risk of impact to environmental controls during project construction.	Ongoing/throughout earthworks.	Construction contractor

7.1 Adaptive management strategy

Construction and operational management plans will all contain an adaptive management component. Adaptive management strategies will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and are key to the successful implementation of crucial objectives yet also allow flexibility to changing dynamics and ongoing feedback and results. This includes measures to monitor predicted and uncertain impacts which will trigger adaptive management actions and allow for effective and quick responses.

8 Impact summary

8.1 TECs and threatened species

This section outlines the impact summary for the project which has identified and assessed impacts on TECs and threatened species that are at risk of a SAI including:

- Addressing all criteria for each TEC listed as at risk of an SAI present on the subject land.
- Addressing all criteria for each threatened species at risk of an SAI present on the subject land.
- 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.
- Identification of impacts requiring offset.
- Identification of impacts not requiring offset.
- Identification of areas not requiring offset.

Figure 15 illustrates the TECs at risk of an SAI within the subject land.

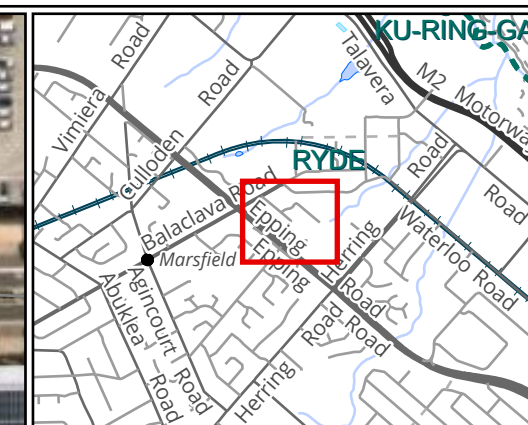
Figure 16 shows the location of impacts requiring offset, impacts not requiring offset and areas not requiring assessment.

8.2 Serious and irreversible impacts

In accordance with Clause 6.7 of the BC Regulation an impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

- Principle 1: It will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.*
- Principle 2: It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.*
- Principle 3: It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.*
- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.*

One TEC, Sydney Turpentine-Ironbark Forest (BC Act) is considered to meet the above principles and will be impacted by the development. A detailed SAI assessment is provided in **Error! Reference source not found..**



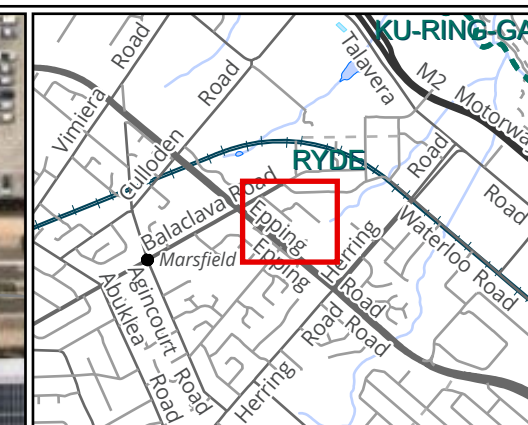
- Legend**
- Subject land
 - Development site
 - Development footprint
 - Indirect impacts

Figure 13 Estimated zones of indirect impact for the proposal

0 10 20 30 40 50
Metres
Scale: 1:1,500 @ A3
Coordinate System:
GDA 1994 MGA Zone 56



Matter: 37762, Date: 26 September 2022
GIS: AM, Checked by: SNA, Last edited by: jbeckius
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
Layout: 37762_F13_IndirectImpacts



Legend

- Subject land
- Development site
- Development footprint
- Prescribed impacts

Figure 14 Prescribed impacts

0 10 20 30 40 50

Metres

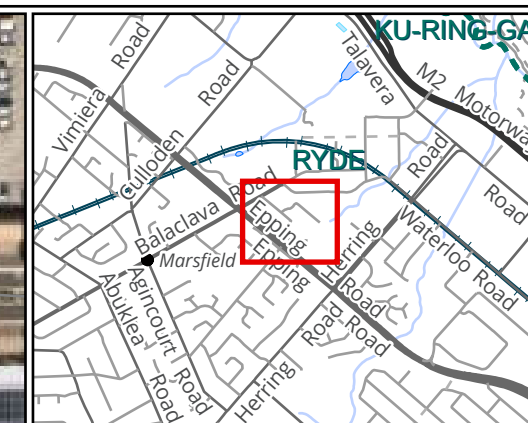
Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762, Date: 26 September 2022
 GIS: AM, Checked by: SNA, Last edited by: jbeckius
 Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.aprx
 Layout: 37762_F14_PrescribedImpacts



Legend

- Subject land
- Development site
- Development footprint

SAIL entities

- 1281 - Turpentine - Grey
- Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion

Figure 15 Serious and Irreversible Impacts

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762,
Date: 22 September 2022,
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.mxd

8.3 Identification of impacts requiring offset

8.3.1 Impacts to native vegetation (ecosystem credits)

As outlined in Section 9.2.1 of the BAM, the assessor must determine an offset for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

- a) ≥ 15 , where the PCT is representative of an EEC or a CEEC.
- b) ≥ 17 , where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community.
- c) ≥ 20 , where the PCT does not represent a TEC and is not associated with threatened species habitat.

On this basis, offsets are required for vegetation zone 1281_Low as it has a vegetation integrity score greater than 15.

The offset requirement for the proposal was calculated using the BAM Calculator. Table 19 provides a summary of the ecosystem credit offsets required for impacts from proposed development at the subject land.

Table 19 Offsets required (ecosystem credits)

Vegetation zone	Area (ha)	Impact	VI score	Offset required	TEC	HBTs	Credit requirement
1281_Low	0.03	Clearance	34.6	Yes	Yes	No	1

8.3.2 Impacts to threatened species and their habitat

As outlined in Section 9.2.2 of the BAM an offset is also required for the impacts of the proposals on the habitat of threatened species assessed for ecosystem credits and associated with a PCT in a vegetation zone with a vegetation integrity score of ≥ 17 .

The offset requirement for the proposal was calculated using the BAM Calculator. Table 20 provides a summary of the species credit offsets required for impacts from proposed development at the subject land.

Table 20 Offsets required (species credits)

Vegetation zone	Species	Habitat condition (VI score) loss	Area (ha)	Biodiversity risk weighting	Credit requirement
1281_Low	Large-eared Pied Bat	-34.6	0.03	3	1

Species polygons for the Large-eared Pied Bat impacted by the project are illustrated in Figure 16 below.

8.4 Identification of impacts not requiring offset

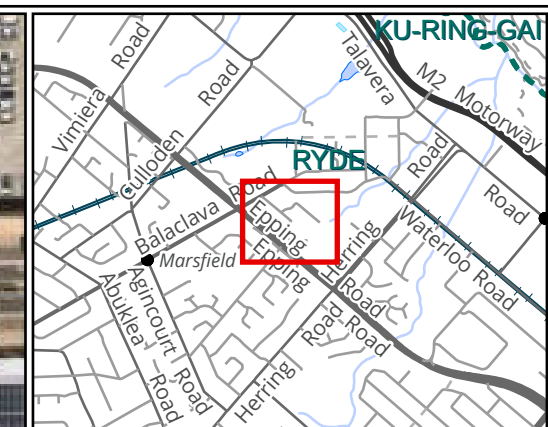
Following assessment the following impacts do not require offsetting in accordance with BAM:

- Removal of 0.66 ha of planted native vegetation.
- Removal of 0.97 ha of planted exotic vegetation.

8.5 Identification of areas not requiring assessment

Following assessment the following areas do not require assessment in accordance with BAM:

- Existing cleared areas containing buildings, roads and infrastructure.



Legend

- Subject land
- Development site
- Development footprint

Impacts

- Impacts requiring offset
- Impacts not requiring offset
- Areas not requiring assessment

Threatened species polygons

- Large-eared Pied Bat

Plant Community Type

- 1281 - Turpentine - Grey
- Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion
- Planted native
- Planted exotic
- Grassed area

TECs - BC Act

- Sydney Turpentine-Ironbark
- Forest in the Sydney Basin Bioregion

Figure 16 Impacts requiring offsets, not requiring offset, not requiring assessment

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System:

GDA 1994 MGA Zone 56



Matter: 37762,
Date: 23 September 2022,
GIS: AM, Checked by: SNA, Last edited by: amackegard
Location: P:\37700s\37762\Mapping\37762_BDAR\37762_BDAR.mxd

9 Biodiversity credit report

Offsetting through the transfer and retirement of biodiversity credits, or paying into the Biodiversity Conservation Fund, is required for the current assessment for impacts to one vegetation zone at the subject land. A biodiversity credit report is provided on the following pages.

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00035184/BAAS18138/22/00035185	Macquarie Park Precinct	14/10/2022
Assessor Name	Report Created	BAM Data version *
Callan Wharfe	01/11/2022	55
Assessor Number	BAM Case Status	Date Finalised
BAAS18138	Finalised	01/11/2022
Assessment Revision	Assessment Type	
0	Major Projects	

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

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

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

BAM Credit Summary Report

Sydney Turpentine - Ironbark forest												
1	1281_Classname1	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	34.6	34.6	0.03	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
											Subtotal	1
											Total	1

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 SAIL	Species credits
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
1281_Classname1	34.6	34.6	0.03	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	True	1
								Subtotal	1

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Appendices

Appendix 1 Survey methods

Appendix 1.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1992, Harden 1993, Harden 2000, Harden 2002). All doubtful species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 3.

Names of vertebrates follow the Census of Australian Vertebrates maintained by the DAWE (DSEWPac 2009). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only.

Appendix 1.2 Permits and licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by EES (SL100758, expiry date 31 May 2023). The BAM Assessment and quality review of the BDAR was carried out by Accredited Assessor Callan Wharfe (BAAS 18138).

Appendix 1.3 Limitations

Field surveys were undertaken in accordance with the BAM. Ecological surveys provide a sampling of flora and fauna at a given time and season. Factors influencing detectability of species during survey include species dormancy, seasonal conditions, ephemeral status of waterbodies, and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The field survey was conducted in winter during clear weather, this was considered a suitable time to determine the presence of most threatened species given the degraded habitat provided by the subject land.

Surveys undertaken, combined with habitat assessments and desktop analysis are considered sufficient to reach the conclusions herein in regards to this and all other species' likelihood of occurrence within the subject land.

Database searches, and associated conclusions on the likelihood of species to occur within the assessment area, are reliant upon external data sources and information managed by third parties.

Appendix 2 BAM Candidate species assessment

Table A. 1 Threatened flora species assessment

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Acacia bynoeana</i> Bynoe's Wattle	V	E	Yes	Bynoe's Wattle is a semi-prostrate shrub growing up to 1 m tall with shiny stiff narrow phyllodes (1.5-5 cm long, 1-3 mm wide) and single flower heads. This species occurs in central; eastern NSW from the Hunter District to the Southern Highlands and west to the Blue Mountains. It occurs in heath or dry sclerophyll forest on sandy soils and prefers open or disturbed sites. Bynoe's Wattle is associated with Red Bloodwood <i>Corymbia gummifera</i> , Scribbly Gum, Parramatta Red Gum, Saw Banksia <i>Banksia serrata</i> and Narrow-leaved Apple. Associated PCTs relevant to the subject land include 724, 725, 849, 883, 1083 and 1181 in the Cumberland and	Low	Yes	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development and planting of exotic and native species. Site surveys for this species were undertaken within the development footprint between May and October 2020 during the approved survey period for the species. No individuals of this species was detected. Based on the habitat and absence of this species within the development footprint; <i>Acacia bynoeana</i> does not require any further

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Wollemi IBRA subregions. The survey period is year round.					consideration.
<i>Allocasuarina glareicola</i>	E	E	Yes	<i>Allocasuarina glareicola</i> is an erect, depauperate shrub growing between 1-2 m tall with ascending branchlets up to 20 cm and cones 10-13 mm long and 7-8 mm wide (DPE 2022g). This species is restricted to the Richmond district with outliers at Voyager Point in Liverpool. It grows in Castlereagh Woodland on lateritic soils. This species is associated with PCTs 724, 725 and 883 in the Cumberland IBRA subregion (DPE 2022g). The survey period is year round.	Low	Yes	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development and planting of exotic and native species. Site surveys for this species were undertaken within the development footprint between May and October 2020 during the approved survey period for the species. No individuals of this species was detected. Based on the habitat and absence of this species within the development footprint; <i>Allocasuarina glareicola</i> does not require any further consideration.
<i>Acacia prominens</i> Gosford Wattle Hurstville and Kogarah	--	E2	Yes	Occurs at a few sites along the railway line at Penshurst, at Carss Bush Park, Carss Park and there is an unconfirmed siting at	Negligible	No	No	No	The subject land is not within the endangered population geographic distribution.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Local Government Areas				Oatley Park, Oatley. This population is disjunct from other populations (Hunter Valley to Gosford region) and at the southern limit of the range of the species.					
<i>Acacia pubescens</i> Downy Wattle	V	V	Yes	A spreading shrub primarily confined to the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers at Barden Ridge, Oakdale and Mountain Lagoon. Grows in Cooks/River Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland, usually within roadside and bushland remnants. Grows on shale, sandstone, alluvium and gravelly soils, often including ironstone.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development and planting of exotic and native species. Site surveys for this species were undertaken within the development footprint between May and October 2020 during the approved survey period for the species. No individuals of this species were detected.
<i>Acacia terminalis</i> subsp. <i>terminalis</i> MS Sunshine wattle	E	–	No	Sunshine Wattle is found in open coastal eucalypt woodland or forest, usually in sandy soil on creek banks, hill-slopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development and planting

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									of exotic and native species. Site surveys for this species were undertaken within the development footprint between May and October 2020 during the approved survey period for the species. No individuals of this species were detected.
<i>Allocasuarina glareicola</i>	E	E	No	Small, depauperate shrub restricted to a few populations in the Richmond district with an outlier population at Voyager Point in Liverpool. Grows in Castlereagh Woodlands, Cumberland Dry Sclerophyll Forest, Sydney Hinterland Dry Sclerophyll Forest, Sydney Sand Flats Dry Sclerophyll Forests. Grows in lateritic soil.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Asterolasia elegans</i>	E	E	No	Tall, thin shrub found growing north of Sydney in the Baulkham Hills, Hawkesbury and Hornsby districts. Could also occur in the	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Goulburn area. Grows in wet sclerophyll forest on moist hillsides in Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests and North Coast Wet Sclerophyll Forests. Grows on Hawkesbury sandstone.					clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Caladenia tessellata</i> Thick Lip Spider Orchid	V	E	Yes	Small orchid recorded from the Wyong, Ulladulla and Braidwood regions with the Kiama and Queanbeyan populations believed to be extinct. Found in a wide variety of communities including Central Gorge Dry Sclerophyll Forests, Cumberland Dry Sclerophyll Forests, Coastal Floodplain Woodlands and Subalpine Woodlands. Grows on clay loam or sandy soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	V	V	No	Orchid with a distribution spanning from Gibraltar Range National Park southwards to the coastal area near Orbost in	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Victoria. Grows in a variety of communities including Sydney Coastal Dry Sclerophyll Forests, Coastal Heath Swamps, New England Dry Sclerophyll Forests and Sydney Coastal Heaths. Grows in sandy soils.					clearing including development and planting of exotic and native species. Site surveys for this species were undertaken within the development footprint between May and October 2020 during the approved survey period for the species. No individuals of this species were detected.
<i>Camarophyllopsis kearneyi</i>	--	E	Yes	Small agaric fungus restricted to Lane Cove Bushland Park. Grows in Sydney Coastal Dry Sclerophyll Forests.	Low	No	No	No	The subject land is outside the known distribution of the species. The subject is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Darwinia biflora</i>	V	V	No	Erect shrub distributed in the Kuring-gai, Hornsby, Baulkham Hills and Ryde local government areas. Grows on edges of weathered shale capped ridges in the vicinity of an intergrade with Hawkesbury sandstone in Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests and Sydney Coastal Heaths. Grows in shale-sandstone transitional soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Deyeuxia appressa</i>	E	E	No	Erect, perennial grass, endemic to NSW. Restricted to two records, one in 1930 at Herne Bay south of Bankstown and the other in 1941 from Killara near Hornsby. Grows on wet ground in Sydney Coastal Dry Sclerophyll Forests and Eastern Riverine Forests.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	--	V	Yes	Erect shrub distributed from Gosford in the north, Silverdale to the west, Narrabeen in the east and Avon Dam in the south. Grows in scrubs and swamps in a variety of communities including Cumberland Dry, Sydney Hinterland Dry, Northern Hinterland Wet, and Southern Tableland Wet Sclerophyll Forests, Eastern Riverine Forests, and Coastal Valley Grassy Woodlands. Grows in soils with a strong shale influence on sandstone substrates.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Epacris sparsa</i> Sparse Heath	V	V	No	Small, erect shrub restricted to the Grose River within the Hawkesbury and Blue Mountains Local Government Areas. Grows on south-west facing slopes at the base of cliffs, on rock faces and ledges or amongst rocks adjacent to the Grose River in Eastern Riverine Forests. Associated with <i>Tristanopsis laurina</i> , <i>Leptospermum trinervium</i> , <i>Allocasuarina littoralis</i> and <i>Grevillea sericea</i> in	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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				dry scrub vegetation and with <i>Callicoma serratifolia</i> , <i>Backhousia myrtifolia</i> , <i>Austromyrtus tenuifolia</i> , <i>Dracophyllum secundum</i> and <i>Todea barbara</i> in wet, sheltered sites. Grows in small pockets of damp, clay soils.					May and October 2020.
<i>Eucalyptus camfieldii</i> Camfield's Stringybark	V	V	No	Mallee tree restricted to a narrow band stretching from Raymond Terrace to the north and Waterfall in the south. Grows in scattered, localised distributions including sites at Norah Head, Terrey Hills, North Head, Menai, Mt Colah, Peats Ridge and Elvina Bay Trail. Grows in scattered stands near the boundaries of tall coastal heath and low open woodland in a variety of communities including Sydney Coastal Dry Sclerophyll Forests, Eastern Riverine Forests, Sydney Coastal Heaths and Wallum Sand Heaths. Grows in sandy soils on Hawkesbury sandstone.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, the species is conspicuous and no individuals of this species were detected during site surveys between May and October 2020.
<i>Genoplesium baueri</i>	E	E	No	Terrestrial orchid with 13 populations totalling 200 plants	Low	No	No	No	The subject land is degraded due to ongoing

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Bauer's Midge Orchid				distributed between Ulladulla and Port Stephens. Grows on moss gardens in a variety of communities including Sydney Coastal Dry sclerophyll Forests, Sydney Coastal Heaths, Sydney Montane Heaths, Southern Lowland Wet Sclerophyll Forests and Sydney Hinterland Dry Sclerophyll Forests. Grows on sandstone substrates.					maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> Small-flower Grevillea	V	V	Yes	Low spreading to erect shrub sporadically distributed throughout the Sydney Basin, most notably in the Picton, Appin and Bargo regions, in the Cessnock - Kurri Kurri area and isolated populations from Putty to Wyong and Lake Macquarie. Grows in Shale Sandstone Transition Forest, Kurri Sand Swamp Woodland, Coymbia maculata - Angophora costata Open Forest in the Dooralong Area, Sydney Sandstone Ridgetop Woodland at Wedderburn and Cooks	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

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	EPBC	BC							
				River/Castlereagh Ironbark Forest at Kemps Creek. Grows in sandy or light clay soils including tertiary alluviums over thin shales and lateritic ironstone gravels.					
<i>Grevillea parviflora</i> subsp. <i>supplicans</i>	--	E	Yes	Low shrub restricted to a few locations in the Arcadia and Maroota-Marramarra Creek area including Marramarra National Park in Hornsby and Baulkham Hills Local Government Area. Grows in periodically disturbed areas in Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands, Sydney Coastal Heaths and Northern Hinterland Wet Sclerophyll Forests. Grows on sandstone substrates in skeletal sandy soils, also shows a preference for yellow clays with impeded drainage.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Haloragodendron lucasii</i>	E	E	No	Erect shrub restricted to a very narrow distribution on the north shore of Sydney. Grows on sheltered aspects and gentle	Low	No	No	No	Habitat within the subject land is not suitable, the subject land does not contain any creeks and is

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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				slopes below cliff lines adjacent to creeks in Sydney Coastal Dry Sclerophyll Forests, Sydney Montane Dry Sclerophyll Forests, Eastern Riverine Forests, Sydney Coastal Heaths and Sydney Montane Heaths. Grows on sandstone substrates in moist, loamy soil containing high levels of phosphorous.					degraded due to past clearing and development and ongoing land management.
<i>Hibbertia puberula</i>	--	E	Yes	Shrublets with yellow flowers single, or rarely in a cluster of up to 6. Known from Wollemi National Park south to Morton National Park and the south coast near Nowra. Early records of this species are from the Hawkesbury River area and Frenchs Forest in northern Sydney, South Coogee in eastern Sydney, the Hacking River area in southern Sydney, and the Blue Mountains. The species favours low heath on sandy soils or rarely in clay, with or without rocks underneath.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Hibbertia spanantha</i>	C	C	No	Grows in forest with canopy species including <i>Eucalyptus</i>	Low	No	No	No	The subject land is degraded due to ongoing

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	EPBC	BC							
Julian's Hibbertia				<i>pilularis</i> , <i>E. resinifera</i> , <i>Corymbia gummifera</i> and <i>Angophora costata</i> . The understorey is open with species of Poaceae, Orchidaceae, Fabaceae and Liliaceae. The soil is identified as a light clay occurring on a shale sandstone soil transition.					maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Hibbertia superans</i>	--	E	Yes	Occurs from Baulkham Hills to South Maroota in the northern outskirts of Sydney, where there are currently 16 known sites, and at one locality at Mount Boss, inland from Kempsey. No populations are known from a formal conservation reserve. Flowering time is July to December. The species occurs on sandstone ridgetops often near the shale/sandstone boundary.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Hygrocybe anomala</i> var.	--	V	Yes	Known from the type locality, Lane Cove Bushland Park, Lane	Low	No	No	No	Habitat within the subject land is not suitable for this

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<i>ianthinomarginata</i>				<p>Cove and from other locations in the Sydney regional including Royal National Park, Chatswood, Castle Hill and the Blue Mountains (Springwood).</p> <p>Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i>, Grey Myrtle <i>Backhousia myrtifolia</i>, Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i>.</p>					species. Habitat is degraded due to past clearing and development and ongoing land management.
<i>Hygrocybe austropratensis</i>	--	E	Yes	<p>Known from type locality, Lane Cove Bushland Park, Lane Cove and other locations in the Sydney region including Royal National Park, Chatswood, Northbridge and the Blue Mountains (Mount Wilson, Hazelbrook, Springwood). Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i>, Grey Myrtle <i>Backhousia myrtifolia</i>, Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i>.</p>	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.

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<i>Hygrocybe aurantipes</i>	--	V	Yes	Known from type locality, Lane Cove Bushland Park, Lane Cove, and other locations in the Sydney region including Royal National Park, Chatswood, Northbridge and the Blue Mountains (Mount Wilson, Hazelbrook, Springwood). Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> , Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.
<i>Hygrocybe collucera</i>	--	E	Yes	Originally know from type locality at Lane Cove Bushland Park, Lane Cove however may also occur elsewhere in the region. Other possible locations include Chatswood, Royal National Park Wolli Creek and the Blue Mountains (Blackheath, Blaxland, Hazelbrook, Mt Wilson, Lawson). Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> ,	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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				Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .					
<i>Hygrocybe griseoramosa</i>	--	E	Yes	Originally know from type locality at Lane Cove Bushland Park, Lane Cove however may also occur elsewhere in the region. Other possible locations include Chatswood, Royal National Park Wolli Creek and the Blue Mountains (Blackheath, Blaxland, Hazelbrook, Mt Wilson, Lawson). Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> , Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.
<i>Hygrocybe lanecovens</i>	--	E	Yes	Originally know from type locality at Lane Cove Bushland Park, Lane Cove however may also occur elsewhere in the region. Other possible locations include Chatswood, Royal National Park Wolli Creek and the Blue	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Mountains (Blackheath, Blaxland, Hazelbrook, Mt Wilson, Lawson). Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> , Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .					
<i>Hygrocybe reesiaae</i>	--	V	Yes	Known from type locality, Lane Cove Bushland Park, Lane Cove and other locations in the Sydney region including Royal National Park, Chatswood, Castle Hill, Northbridge, Marsfield, East Linfield and the Blue Mountains (Mount Wilson, Hazelbrook). Also found in Tasmania. Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> , Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .	Low	No	No	No	Habitat within the subject land is not suitable for this species. Habitat is degraded due to past clearing and development and ongoing land management.
<i>Hygrocybe rubronivea</i>	--	V	Yes	Known in a few locations including in Lane Cove Bushland	Low	No	No	No	Habitat within the subject land is not suitable for this

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				Park and the Blue Mountains in NSW and in areas of south-east Queensland. However little information exists for populations outside Lane Cove Bushland Park. Occurs in gallery warm temperate forests dominated by Lilly Pilly <i>Acmena smithii</i> , Grey Myrtle <i>Backhousia myrtifolia</i> , Cheese Tree <i>Glochidion ferdinandi</i> and Sweet Pittosporum <i>Pittosporum undulatum</i> .					species. Habitat is degraded due to past clearing and development and ongoing land management.
<i>Hypsela sessiliflora</i>	EX	--	No	Prostrate herb restricted to two adjacent sites growing on a single private property at Erskine Park in the Penrith Local Government Area. Grows in damp places on the Cumberland Plain in Coastal Freshwater Lagoons of the Sydney Basin Bioregion, Cumberland Plain Woodlands, Swamp Oak Floodplain Swamp Forests, and Eastern Riverine Forests.	Negligible	No	No	No	Known distribution of extinct population is outside the subject land. The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species.
<i>Isotoma fluviatilis</i> subsp.	EX	--	No	Known to grow in damp places, on the Cumberland Plain,	Low	No	No	No	The subject land is degraded due to ongoing

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<i>fluviatilis</i>				including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone. May be an early successional species that benefits from some disturbance. Possibly out competed when overgrown by some species such as <i>Cyndon dactylon</i> .					maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Lasiopetalum joyceae</i>	V	V	No	Erect, medium sized shrub restricted to 34 sites within the Hornsby Plateau from Berrilee to Duffys Forest. Grows on lateritic or shale influenced ridgetops in Sydney Coastal Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests and Sydney Coastal Heaths. Grows on sandstone substrates.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Leptospermum deanei</i>	V	V	No	Medium sized shrub confined to the Hornsby, Warringah, Ku-ring-	Low	No	No	No	The subject land is degraded due to ongoing

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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				gai and Ryde Local Government Areas. Grows on forested or woodland slopes or near creeks in Sydney Coastal Dry Sclerophyll Forests, Eastern Riverine Forests, and Sydney Coastal Heaths. Grows on sandy alluvial soil or sand soils over sandstone substrates.					maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
Melaleuca biconvexa Biconvex Paperbark	V	V	No	Large shrub or small tree confined to NSW with scattered, widely dispersed populations around the Jervis Bay area in the south and the Gosford-Wyong area to the north. Grows in damp places, often near streams or low lying areas on low slopes or sheltered aspects in a variety of communities including Hunter-Macleay Dry Sclerophyll Forests, Coastal Swamp Forests, Coastal Floodplain Wetlands, Coastal Freshwater Lagoon and North Coast Wet Sclerophyll Forests. Grows in alluvial soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

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	EPBC	BC							
<i>Melaleuca deanei</i> Deane's Paperbark	V	V	No	Medium sized shrub found growing in two distinct populations in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas along with a few outliers at Springwood and in the Wollemi National Park, Yalwal and the Central Coast regions. Grows in ridgetop woodland in a variety of communities including Sydney Coastal Dry Sclerophyll Forests, South East Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands, Sydney Coastal Heaths. Grows on sandstone substrates in alluvial soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Persicaria elatior</i> Tall Knotweed	V	V	No	Erect herb found growing in south-eastern NSW at Moutn Dromedary, Moruya State Forest near Turlinjah, Upper Avon River catchment north of Robertson, Bermagui and Picton Lakes. Also grows in northern NSW around Raymond Terrace near Newcastle and Cherry Tree and	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native

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				Gibberagee State Forests in the Grafton area. Grows in damp places usually on the margins of waterbodies and in swamp forests in a variety of communities including Coastal Floodplain Wetlands, Coastal Swamp Forests, Eastern Riverine Forests, Coastal Freshwater Lagoons and Coastal Heath Swamps.					species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Persoonia hirsuta</i> Hairy Geebung	E	E	Yes	Spreading, hairy shrub with a scattered distribution throughout Sydney from Singleton to the north, the east coast of Bargo to the south and the Blue Mountains to the west. Grows at elevations between 350 - 600 metres in a variety of communities including Southern Tableland Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Western Slopes Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands, Sydney Coastal Heaths and Southern Escarpment Wet Sclerophyll	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Forests. Grows in sandy soils on sandstone substrates.					
<i>Pimelea curviflora</i> var. <i>curviflora</i>	V	V	Yes	Small to medium sized shrub restricted to the coastal areas of Sydney between northern Sydney and Maroota with an outlying population at Croom Reserve near Albion Park in the Illawarra region. Grows on ridgetops and upper slopes amongst grasses and sedges in a variety of communities including Cumberland Dry Sclerophyll Forests, Sydney Hinterland Dry Sclerophyll Forests, Coastal Valley Grassy Woodlands, Sydney Coastal Heaths and Northern Hinterland Wet Sclerophyll Forests. Can be inconspicuous amongst grasses and sedges although easier to find in October to May when flowering. Grows on sandstone substrates in shale/lateritic soils and shale/sandstone transition soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Pimelea spicata</i> Spiked Rice-	E	E	No	Small erect or spreading shrub with populations occurring in	Low	No	No	No	The subject land is degraded due to ongoing

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flower				two disjunct areas, one occurring on the Cumberland Plain from Marayong and Prospect Reservoir south to Narellan and Douglas Park, and the other occurring in the Illawarra from Landsdowne to Shellharbour and north Kiama. Grows in Maritime Grasslands and Coastal Valley Grassy Woodlands including Cumberland Plain Woodlands and Moist Shale Woodlands within the Cumberland Basin and in Coast Banksia Open Woodland Coastal Grasslands in the Illawarra region. Grows on well-structured clay soils.					maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Prostanthera marifolia</i> Seaforth Mintbush	C	C	No	Small erect straggly shrub restricted to a single population fragmented by urbanisation into three sites located in the northern Sydney suburb of Seaforth. Found growing on ridge tops in association with Silvertop-ash Eucalyptus sieberi and Red Bloodwood Corymbia gummifera within or in close	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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				proximity to Duffys Forest and in Sydney Coastal Dry Sclerophyll Forests. Grows in deeply weathered clay associated with ironstone nodules and scattered shale lenses.					In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Pterostylis saxicola</i> Sydney Plains Greenhood	E	E	No	Deciduous terrestrial orchid restricted to a few small populations located in Western Sydney between Freemans Reach in the north and Picton in the south including Georges River National Park. Found growing near streams in depression on sandstone rock shelves above cliff lines faces, moist, sheltered ridges and creek banks on mossy rocks in Temperate Montane Grasslands, Northern Warm Temperate Rainforests, Southern Warm Temperate Rainforests and Southern Tableland Wet Sclerophyll Forests. Grows in small pockets of shallow shale or shale/sandstone transition soils over sandstone substrates.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Rhizanthella</i>	E	V	No	Terrestrial orchid with a	Low	No	No	No	The subject land is degraded

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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<i>slateri</i> Eastern Australian Underground Orchid				distribution spanning from south-east NSW to south-east Queensland. Recorded in ten populations in NSW including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wisemans Ferry Area, Agnes Banks and near Nowra. A cryptic species which grows beneath the soil surface with flowers being the only part of the plant to occur aboveground in Sydney Sand Flats Dry Sclerophyll Forests, Eastern Riverine Forests, Northern Warm Temperate Rainforests, North Coast Wet Sclerophyll Forests, Northern Hinterland Wet Sclerophyll Forests and Southern Lowland Wet Sclerophyll Forests. Grows in deep loam soils.					due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Rhodamnia rubescens</i> Scrub Turpentine	C	C	Yes	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths,

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
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									landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Rhodomirtus psidioides</i> Native Guava	C	C	Yes	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Syzygium paniculatum</i> Magenta Lily Pilly	V	E	Yes	Small to medium sized rainforest tree restricted to a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Found growing on stabilized dunes near the sea in South Coast Sands Dry	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths,

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				Sclerophyll Forests, Coastal Swamp Forests, Coastal Headland Heaths, Littoral Rainforests, Northern Hinterland Wet Sclerophyll Forests and Southern Lowland Wet Sclerophyll Forests. Grows on grey sandy, gravelly, silty or clay soils over sandstone substrates.					landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Tetratheca glandulosa</i>	--	V	Yes	Small, spreading shrub with 150 populations confined to the Baulkham Hills, Gosford, Hawkesbury, Ku-ring-gai, Pittwater, Ryde and Wyong Local Government Areas. Found growing in a variety of communities including Sydney Sandstone Ridgetop Woodland, Sydney Coastal Dry Sclerophyll Forests, Eastern Riverine Forests, Coastal Valley Grassy Woodlands, Sydney Montane Heaths and North Coast Wet Sclerophyll Forests. Grows in the shallow, yellow clay/sandy loams that are typical of shale/sandstone transition soils where shale caps occur over	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				sandstone substrates such as the Lucas Heights, Gymea, Lambert and Faulconbridge soil landscapes.					
<i>Thesium australe</i> Austral Toadflax	V	V	No	Small, straggling herb with a distribution comprising of small populations scattered along the coast of eastern NSW including the Northern and Southern Tablelands, Tasmania, Queensland and eastern Asia. A root parasite found growing on damp sites in grassland, grassy woodlands and coastal headlands often in association with Kangaroo Grass <i>Themeda triandra</i> in a variety of communities including New England Dry Sclerophyll Forests, Western Slopes Grasslands, Northern Tableland Wet Sclerophyll Forests, Brigalow Clay Plain Woodlands, Subalpine Woodlands and Maritime Grasslands.	Low	No	No	No	The subject land is degraded due to ongoing maintenance and landscaping, previous clearing including development of buildings, roads and paths, landscaping and garden planting of exotic and native species. In addition, no individuals of this species were detected during site surveys between May and October 2020.
<i>Wahlenbergia multicaulis</i> Tangell's Bluebell	--	E2	Yes	There are 13 known sites, two of which are in northern Sydney (Thornleigh and Mt Ku-Ring-Gai)	Negligible	No	No	No	The subject land is not within the geographic region of the endangered

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
in the LGA of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield				with the remainder in western Sydney (Rookwood, Chullora, Bass Hill, Bankstown, Georges Hall, Campsie, South Granville and Greenacre). There are likely to be more sites than those listed here. In Hornsby LGA it occurs in or adjacent to sandstone gully forest. In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest.					population.

Table A. 2 Threatened fauna species assessment

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Anthochaera phrygia</i> Regent Honeyeater (Breeding)	C	C	Yes	Regent Honeyeaters are semi-nomadic, occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Nectar and fruit from mistletoes are also eaten. This species usually nest in tall mature eucalypts and sheoaks.	Negligible	No	No	No	Subject land is not included on the Important Areas map for the species. The species is considered vagrant for the assessment area.
<i>Botaurus poliocephalus</i> Australasian Bittern	E	E	No	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including <i>Typha</i> spp. and <i>Eleocharis</i> spp.. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.	Low	No	No	No	Habitat for this species is not present in the subject land, as it does not contain terrestrial or estuarine wetlands. This species is not associated with the PCTs present in the subject land.
<i>Burhinus grallarius</i>	--	E	Yes	The Bush Stone-curlew is found	Low	No	No	No	The subject land does not

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Bush-stone Curlew				throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range.					contain suitable habitat, habitat is degraded. This species depends on vegetation with an open understorey and suitable fallen debris for cover and foraging (such as dead timber and logs).
<i>Calidris canutus</i> Red Knot	E	--	No	Typically located within intertidal mudflats, sandflats and sandy beaches of sheltered coasts. Occasionally found on sandy open beaches or shallow pools, or in saline wetlands close to the coast.	Low	No	No	No	Habitat for this species is not present in the subject land.
<i>Calidris ferruginea</i> Curlew Sandpiper	C	E	No	Inhabits sheltered intertidal mudflats. Also non-tidal swamps, lagoons and lakes near the coast. Infrequently recorded inland.	Negligible	No	No	No	Habitat for this species is not present in the subject land.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	E	V	Yes	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and	Low	No	No	No	Old growth forests and woodland habitats preferred by the species are not present in the subject land. No suitable hollows are available in the subject land. May occasionally utilise the subject land as part of foraging movements.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.					
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGA	--	E2	Yes	This endangered population is found in the Ku-ring-gai and Hornsby local government areas. The population is believed to be largely confined to an area bounded by Thornleigh and Wahroonga in the north, Epping and North Epping in the south, Beecroft and Cheltenham in the west and Turramurra/South Turramurra to the east. It is known to inhabit areas of Lane Cove National Park, Pennant Hills Park and other forested gullies in the area.	N/A	No	No	N/A	The subject land is located in the City of Ryde LGA therefore this population is not applicable to the subject land.
<i>Calyptorhynchus lathami</i> Glossy Black-Cockatoo (Breeding)	--	V	Yes	Inhabits forest with low nutrients, characteristically with key Allocasuarina species (Forest She-oak Allocasuarina torulosa). Tends to prefer drier forest types. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.	Low	No	No	No	The subject land does not contain suitable habitat for breeding in the form of large hollow-bearing trees. The subject land does not contain preferred feed tree species and contains only marginal foraging resources in the form of River Oak <i>Casuarina cunninghamiana</i>

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Cercartetus nanus</i> Eastern Pygmy-possum	--	V	Yes	The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities.	Low	No	No	No	The subject land does not contain suitable habitat in the form of woodland with hollow-bearing trees. The vegetation of the subject land occurs in a highly modified state and also lacks complex microhabitats suitable as alternative shelter structures such as rock outcrops/crevices and dense shrubs.
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	Yes	Occurs from the Queensland border to Ulladulla, with largest	Low	No	No	No	The subject land has low topographic relief and there

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				numbers from the sandstone escarpment country in the Sydney Basin and Hunter Valley. Primarily found in dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between three and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.					are no rocky areas containing caves within 2 km of the subject land, therefore it is not considered to contain breeding habitat for this species. Forages below the forest canopy in close proximity to roosts therefore the subject land is unlikely to represent suitable foraging habitat.
<i>Charadrius leschenaultia</i> Greater Sand-plover	V	V	No	Entirely coastal in NSW, foraging on intertidal sand and mudflats in estuaries and roosting during high tide on sandy beaches or rocky shores. Individuals have been recorded on inshore reefs, rock platforms, small rocky islands and sand cays on coral reefs, within Australia. Occasional sightings have also occurred on near-coast saltlakes, brackish swamps,	Negligible	No	No	No	Habitat for this species is not present in the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/ undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				shallow freshwater wetlands and grassed paddocks.					
<i>Dasyornis brachypterus</i> Eastern Bristlebird	E	E	No	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia. There are three main populations: Northern - southern Queensland/ northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. The estimated population size is less than 2000 individuals occupying a total area of about 120 sq km. There are now only four populations in the southern Queensland/ northern NSW area with a total of 35 birds, compared to 15 years ago when 14 populations and 154 birds were recorded.	Low	No	No	No	Suitable habitat does not occur within the subject land. Species has a highly restricted distribution that does not overlap with the subject land.
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	E	V	No	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands	Low	No	No	No	Suitable habitat does not occur within the study area. The subject land is within a highly urbanised environment. The species

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha, while males have larger home ranges of between 2000 and 5000 ha. Breeding occurs from May to August.					requires large tracts of native vegetation for foraging.
<i>Falco hypoleucos</i> Grey Falcon	V	E	No	Found over open country and wooded lands of tropical and temperate Australia. Mainly found on sandy and stony plains of inland drainage systems with lightly timbered acacia scrub.	Negligible	No	No	No	Suitable habitat does not occur within the study area, the species rarely occurs east of the great dividing range. No stick nests potentially used by raptors were observed in the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
<i>Grantiella picta</i> Painted Honeyeater	V	V	No	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.	Low	No	No		Subject land is highly degraded and does not contain suitable habitat to support this species.
<i>Heleioporus australiacus</i> Giant Burrowing Frog	V	V	Yes	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250m from breeding sites.	Negligible	No	No	No	The subject land does not provide habitat suitable for this species. Habitat required includes ephemeral and semi-permanent to permanent waterways within native vegetation. This species is not known to occur within previously disturbed areas.
<i>Hieraetus morphnoides</i> Little Eagle	--	V	Yes	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population	Low	No	No	No	This species nests in tall living trees within a remnant patch of open eucalypt forest. The subject land does not contain suitable habitat and no nests or evidence of breeding were

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or <i>Acacia</i> woodlands and riparian woodlands of interior NSW are also used.					observed. May occasionally utilise the subject land for foraging as part of a broad foraging range.
<i>Hirundapus caudacutus</i> White-throated Needletail	V	--	No	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. Breeds in Asia.	Low	No	No	No	Exclusively aerial species unlikely to be affected by the nature and scale of the proposal.
<i>Hoplocephalus bungaroides</i> Broad-headed Snake (Breeding)	V	E	Yes	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.	Negligible	No	No	No	No habitat for this species occurs in the subject land. Habitat in the subject land is considered degraded for this species due to past clearing and development.
<i>Isodon obesulus obesulus</i> Southern Brown Bandicoot (Eastern)	E	E	No	This species prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burn from time to time. A mosaic of post fire vegetation is important for this species.	Low	No	No	No	No habitat for this species occurs in the subject land. Habitat in the subject land is considered degraded for this species due to past clearing and development.
<i>Lathamus discolour</i>	C	E	Yes	The Swift Parrot occurs in	Low	No	No	No	The subject land is not

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Swift Parrot (Breeding)				woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> . Commonly used lerp infested trees include Grey Box <i>E. microcarpa</i> , Grey Box <i>E. moluccana</i> and Blackbutt <i>E. pilularis</i> . This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.					included on the Important Areas map for the species.
Litoria aurea Green and Golden Bell Frog	V	E	Yes	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams	Negligible	No	No	No	No suitable waterbodies present within the subject land to support this species for breeding or foraging.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks , although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land. Breeding usually occurs in summer. Tadpoles, which take approximately 10-12 weeks to develop , feed on algae and other vegetative matter. Adults eat insects as well as other frogs, including juveniles of their own species.					
<i>Litoria brevipalmata</i> Green-thighed Frog	--	V	Yes	Isolated localities along the coast and ranges from just north of Wollongong to south-east Queensland. Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where	Negligible			No	No suitable habitat to support this species within the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				surface water gathers after rain. It prefers wetter forests in the south of its range, but extends into drier forests in northern NSW and southern Queensland.					
<i>Lophoictinia isura</i> Square-tailed Kite (Breeding)	--	V	Yes	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Low	No	No	No	No suitable habitat within the subject land for breeding (timbered watercourse). No evidence of old stick nests were observed in the subject land which may be used by raptors.
<i>Macquaria australasica</i> Macquarie Perch	E	--	No	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal	Negligible	No	No	No	No suitable habitat occurs in the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries					
<i>Miniopterus australis</i> Little Bent-winged Bat (Breeding)	--	V	Yes	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.	Negligible	No	No	No	The subject land does not contain habitat features suitable for roosting or breeding (i.e. culverts, caves, mines or tunnels).
<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat (Breeding)	--	V	Yes	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Negligible	No	No	No	The subject land, and land within 200 metres of the development footprint does not contain habitat features suitable for roosting or breeding (i.e. culverts, caves, mines or tunnels).
<i>Mixophyes balbus</i> Stuttering Frog	V	E	No	This species is usually associated with mountain streams, wet mountain forests and rainforests. It rarely moves very far from the banks of permanent forest streams, although it will forage on	Negligible	No	No	No	The subject land does not contain suitable streams or forest habitat to support this species.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains.					
<i>Myotis macropus</i> Southern Myotis	--	V	Yes	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Low	No	No	No	Subject land lacks suitable waterbodies with pools / stretches 3 metres or wider and does not occur within 200 metres of such waterbodies. It is unlikely that the hollow recorded in an exotic tree at the site would be suitable for roosting.
<i>Ninox connivens</i> Barking Owl	--	V	Yes	Generally found in open forests, woodlands, swamp woodlands, farmlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country. Territories are typically 2000 ha in NSW habitats. Hunts small arboreal mammals or birds and terrestrial mammals when tree hollows are absent.	Low	No	No	No	Subject land is degraded due to urban development and lacks habitat features suitable to support this species.
<i>Ninox strenua</i>	--	V	Yes	The Powerful Owl is endemic to	Moderate	No	No	No	This species requires living or

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Powerful Owl (Breeding)				eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. Recent increases in population density across Sydney and some other semi-urban areas do not seem to be solely due to increased awareness of this flagship species. The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.					dead tress with hollows greater than 20 cm diameter for breeding habitat. No suitable breeding habitat is present within the subject land. The species may utilise the subject land on an occasional basis for foraging as part of a broad home range.
<i>Numenius madagascariensis</i> Eastern Curlew	C	--	No	Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal	Negligible	No	No	No	Habitat for this species is not present in the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				lagoons with large intertidal mudflats or sandflats often with beds of seagrass.					
<i>Petauroides volans</i> Greater Glider	E	--	Yes	The distribution of the Greater Glider includes the ranges and coastal plain of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands. Presence and density of Greater Gliders is related to soil fertility, eucalypt tree species, disturbance history and density of suitable tree hollows. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.	Low	No	No	No	The disturbed and urbanised nature of the subject land is unsuitable for supporting this species.
<i>Petaurus norfolcensis</i> Squirrel Glider	-	V	Yes	Occurs in eastern Australia extending from north eastern Queensland through eastern NSW and down through northern and central Victoria. In NSW, occurs on the coast in a range of habitats including low scrubby eucalypt woodlands and banksia thickets to tall, wet eucalypt forests bordering on rainforest.	Low	No	No	No	Habitat in the subject land is considered degraded. This species requires hollow-abundant vegetation for refuge and breeding, which does not occur in the subject land.
<i>Petaurus norfolcensis</i> Squirrel Glider Barrenjoey	-	V	Yes	The endangered population is within the Pittwater Local Government Area on the	Low	No	No	No	The subject land is not within the geographic range for this endangered population.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
Peninsula				Barrenjoey Peninsula, north of Bushrangers Hill.					
<i>Petrogale penicillata</i> Brush-tailed Rock-wallaby	V	E	No	Occurs along the Great Dividing Range south to the Shoalhaven, and also occurs in the Warrumbungles and Mt Kaputar. Habitats range from rainforest to open woodland. It is found in areas with numerous ledges, caves and crevices particularly with northern aspects. The species forages on grasses and forbs.	Negligible	No	No	No	Natural rocky escarpments, outcrops and cliffs, which are key habitat areas for this species, are absent from the subject land, which does not contain suitable habitat to support this species.
<i>Phascolarctos cinereus</i> Koala	E	E	Yes	In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include <i>Eucalyptus robusta</i> , <i>E. tereticornis</i> , <i>E. punctata</i> , <i>E. haemostoma</i> and <i>E. signata</i> . They are solitary with varying home ranges.	Low	No	No	No	Planted native vegetation and the two remnant trees comprising PCT 1281 within the subject area is considered degraded for the Koala. The vegetation within the subject land is influenced by past disturbance and is highly modified in an urban context. The subject land is within a highly developed, urbanised locality which contains a high level of threat from vehicle strike for the species and constitutes a significant barrier from larger patches of

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									more suitable vegetation. It is unlikely that the subject land could be used by individuals due to the poor quality and connectivity of the remnant vegetation present.
<i>Polytelis swainsonii</i> Superb Parrot	V	V	No	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Forages primarily in grassy box woodland, feeding in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants.	Negligible	No	No	No	The subject land does not contain suitable habitat for this species in the form of grassy woodland or riparian woodlands.
<i>Pommerhelix duralensis</i> Dural Land Snail	E	E	Yes	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the Cumberland IBRA subregion on shale-sandstone transitional landscapes. The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native	Negligible	No	No	No	This species required forested habitats with native ground cover and woody debris, which does not occur in the subject land. The subject land is considered too degraded to support this species.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				cover and woody debris. It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris.					
<i>Pseudomys novaehollandiae</i> New Holland Mouse	V	--	No	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44 ha to 1.4 ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi, and is therefore	Negligible	No	No	No	The subject land does not contain suitable habitat for this species in the form of sandy substrate, heathland understorey and vegetated sand dunes.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				likely to play an important role in seed dispersal and fungal spore dispersal. It is likely that the species spends considerable time foraging above-ground for food, predisposing it to predation by native predators and introduced species. Breeding typically occurs between August and January, but can extend into autumn.					
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox (Breeding)	V	V	Yes	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies, commonly in dense riparian vegetation.	Negligible	No	No	No	No camps (communal breeding / roosting sites) occur within the subject land or immediate vicinity. The subject land therefore does not support breeding habitat. The species may forage occasionally on nectar resources within the subject land as part of a broad home range, however planted native vegetation in the subject land is considered to provide only marginal habitat in the context of the wider locality and the resources available within remnant vegetation of Lane Cove National Park and along

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
									riparian corridors.
<i>Pycnoptilus floccosus</i> Pilotbird	V	--	No	The pilotbird is found from the Wollemi National Park and Blue Mountains National Park in New South Wales through to the Dandenong Ranges, near Melbourne in Victoria. Its natural habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris.	Negligible	No	No	No	Suitable habitat for this species in the form of temperate wet forests with dense understorey does not occur in the subject land.
<i>Rostratula australis</i> Australian Painted Snipe	E	E	No	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, but have been recorded in brackish waters. Forages on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Negligible	No	No	No	The subject land does not contain any suitable shallow inland wetlands to support this species.
<i>Sternula nereis nereis</i> Fairy Tern	V	--	No	The Fairy Tern nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. This species will also frequent embayments, estuarine	Negligible	No	No	No	Habitat for this species is not present in the subject land.

Species	Status		BAM predicted SCS	Habitat Description	Potential occurrence in subject land	BAM Candidate species	Survey required/undertaken	Potential for impact	Candidate species rationale
	EPBC	BC							
				habitats, wetlands and mainland coastlines.					
<i>Tyto novaehollandiae</i> Masked Owl	--	V	Yes	The Masked Owl is found in range of wooded habitats that provide tall or dense mature trees with hollows suitable for nesting and roosting. It is mostly seen in open forests and woodlands adjacent to cleared lands. Prey includes hollow-dependent arboreal marsupials and terrestrial mammals.	Negligible	No	No	No	This species breeds in moist eucalypt forests and woodlands, and relies on medium sized hollows. The subject land does not contain suitable habitats to support this species.

Appendix 3 BAM Plot data

Appendix 3.1 BAM plot field data

Table A. 3 Flora species recorded in the subject land from BAM plots

Family	Scientific name	Common name	37762_P1		37762_P2		37762_P3		37762_P4	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Native species										
Amaranthaceae	Alternanthera sp. A	None							0.1	4
Amaryllidaceae	Crinum spp.	None			0.1	2				
Campanulaceae	Lobelia purpurascens	whiteroot			0.1	10	0.1	10		
Casuarinaceae	Casuarina cunninghamiana subsp. cunninghamiana	River Oak							15	20
Commelinaceae	Commelina cyanea	Native Wandering Jew							0.3	50
Convolvulaceae	Dichondra repens	Kidney Weed	0.1	3	0.1	5				
Cyperaceae	Cyperus gracilis	Slender Flat-sedge	0.1	1	0.1	5			0.1	5
Fabaceae (Mimosoideae)	Acacia melanoxylon	Blackwood	5	1						
Lamiaceae	Westringia fruticosa	Coastal Rosemary	0.1	2					3	20
Lamiaceae	Salvia spp.	None			0.1	5				
Lamiaceae	Teucrium spp.	None			0.1	1				
Lomandraceae	Lomandra longifolia	Spiny-headed Mat-rush							0.2	10
Malvaceae	Brachychiton acerifolius	Illawarra Flame Tree	0.5	1						
Myrtaceae	Melaleuca bracteata	Black Tea-tree					3	2		
Myrtaceae	Leptospermum laevigatum	Coast Teatree					0.3	1		
Myrtaceae	Callistemon citrinus	Crimson Bottlebrush					0.2	3	3	30
Myrtaceae	Acmena smithii	Lilly Pilly	2	5						

Family	Scientific name	Common name	37762_P1		37762_P2		37762_P3		37762_P4	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Myrtaceae	Eucalyptus resinifera	Red Mahogany	10	1						
Myrtaceae	Eucalyptus robusta	Swamp Mahogany					5	2		
Myrtaceae	Eucalyptus microcorys	Tallowwood					10	1		
Myrtaceae	Syncarpia glomulifera	Turpentine	20	1						
Myrtaceae	Callistemon viminalis	Weeping Bottlebrush					0.5	2		
Oxalidaceae	Oxalis perennans	None	0.1	10	0.1	10				
Plantaginaceae	Veronica spp.	None			0.1	1				
Poaceae	Imperata cylindrica	Blady Grass							1	100
Poaceae	Cynodon dactylon	Common Couch	2	200	55	1000				
Poaceae	Oplismenus hirtellus	None			0.1	10				
Poaceae	Microlaena stipoides	Weeping Grass			0.1	5	0.1	5		
Polypodiaceae	Platyserium superbum	Staghorn	0.5	3						
Proteaceae	Grevillea rosmarinifolia	Rosemary Grevillea	0.1	2						
Proteaceae	Grevillea robusta	Silky Oak	0.5	1					0.1	1
Introduced species										
Caprifoliaceae	Abelia x grandiflora	None							0.1	1
Alliaceae	Agapanthus africanus	Lily of the Nile	1	40						
Myrtaceae	Agonis flexuosa	None					1	2		
Asphodelaceae	Aloe vera	None			0.1	1				
Apocynaceae	Araujia sericifera	Moth Vine					0.1	1		
Asparagaceae	Asparagus aethiopicus	Asparagus Fern	0.1	3						
Begoniaceae	Begonia spp.	None	0.1	2						
Asteraceae	Bidens pilosa	Cobbler's Pegs							0.1	10
Poaceae	Bouteloua dactyloides	Buffalo Grass			5	500	5	500		
Crassulaceae	Bryophyllum delagoense	Mother of millions			0.1	1				
Theaceae	Camellia japonica	Camellia			1	5				

Family	Scientific name	Common name	37762_P1		37762_P2		37762_P3		37762_P4	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Brassicaceae	Cardamine hirsuta	Common Bittercress			0.1	20				
Apocynaceae	Catharanthus roseus	Madagascar Periwinkle	0.1	2						
Poaceae	Cenchrus clandestinus	Kikuyu Grass			0.2	20				
Poaceae	Cenchrus setaceus	Fountain Grass	0.1	3					0.1	10
Caryophyllaceae	Cerastium glomeratum	Mouse-ear Chickweed			0.1	2				
Rutaceae	Coleonema pulchellum	None							0.1	2
Asteraceae	Conyza bonariensis	Flaxleaf Fleabane	0.1	1						
Myrtaceae	Corymbia citriodora	Lemon-scented Gum					15	2	20	30
Crassulaceae	Crassula ovata	Jade Plant	0.1	1						
Caryophyllaceae	Dianthus armeria	Deptford Pink			0.1	1				
Verbenaceae	Duranta erecta	Sky Flower			0.1	1	1	3		
Poaceae	Ehrharta erecta	Panic Veldtgrass	0.1	20	0.3	30	0.2	50	0.5	200
Orchidaceae	Epidendrum radicans x secundum hybrid complex	Crucifix Orchid	0.5	2						
Euphorbiaceae	Euphorbia peplus	Petty Spurge	0.2	50						
Rubiaceae	Gardenia jasminoides	None			0.1	2				
Proteaceae	Grevillea banksii	None	0.2	1						
Zingiberaceae	Hedychium gardnerianum	Ginger Lily	0.1	9						
Asteraceae	Hypochaeris radicata	Catsear			0.1	5	0.1	3	0.1	20
Crassulaceae	Kalanchoe spp.	None			0.1	1				
Sapindaceae	Koelreuteria paniculata	None					5	2		
Amaryllidaceae	Leucojum aestivum	Snowflake			0.1	1				
Hamamelidaceae	Liquidambar styraciflua	Sweetgum			25	4				
Liliaceae	Liriope muscari	big blue lilyturf			0.1	1				
Primulaceae	Lysimachia arvensis	Scarlet Pimpernel							0.1	5
Magnoliaceae	Magnolia grandiflora	Southern Magnolia			1	5				

Family	Scientific name	Common name	37762_P1		37762_P2		37762_P3		37762_P4	
			Cvr%	Abund	Cvr%	Abund	Cvr%	Abund	Cvr%	Abund
Fabaceae (Faboideae)	Medicago polymorpha	Burr Medic							0.1	2
Nandinaceae	Nandina domestica	Japanese Sacred Bamboo	0.2	10			0.5	5	0.1	2
Apocynaceae	Nerium oleander	Oleander					0.1	1		
Oxalidaceae	Oxalis debilis var. corymbosa	None					0.1	10		
Poaceae	Paspalum dilatatum	Paspalum			0.1	10				
Apiaceae	Petroselinum crispum	Parsley	0.1	4						
Polygalaceae	Polygala myrtifolia	None	0.1	4			0.1	1		
Malaceae	Pyrus communis	Common Pear			0.3	1				
Ericaceae	Rhododendron spp.	Rhododendron, Azalea	0.1	2	0.1	1				
Araliaceae	Schefflera arboricola	None					0.5	1		
Malvaceae	Sida rhombifolia	Paddy's Lucerne					0.1	10	0.1	2
Asteraceae	Soliva sessilis	Bindyi			0.2	80	0.1	4		
Asteraceae	Sonchus oleraceus	Common Sowthistle	0.1	1	0.1	10	0.1	1	0.2	50
Caryophyllaceae	Stellaria media	Common Chickweed					0.1	20		
Poaceae	Stenotaphrum secundatum	Buffalo Grass	3	300						
Strelitziaceae	Strelitzia reginae	None	0.2	4					0.1	5
Asteraceae	Taraxacum officinale	Dandelion							0.1	10
Apocynaceae	Trachelospermum jasminoides	None			0.1	1				
Plantaginaceae	Veronica persica	Creeping Speedwell			0.1	10				
Adoxaceae	Viburnum tinus	None	0.1	2			1	1		
Violaceae	Viola odorata	Sweet Violet	0.5	50	0.1	1				
Agavaceae	Yucca aloifolia	Spanish Bayonet							0.2	5

Appendix 3.2 BAM plot data sheets

Table 4 BAM plot quadrat summary

Plot ID	PCT	Area (Ha)	Patch size	Condition	Zone	Easting	Northing	Bearing	Comp. Tree	Comp. Shrub	Comp. Grass	Comp. Forbs	Comp. Ferns	Comp. Other	Struc. Tree	Struc. Shrub	Struc. Grass	Struc. Forbs	Stuc. Ferns	Stuc. Other
37762_P1	1281	0.03	5	Low	56	325165	6260775	134	6	2	2	2	1	0	38.0	0.2	2.1	0.2	0.5	0.0
37762_P2	n/a		n/a	Low	56	325240	6260780	226	0	0	4	7	0	0	0.0	0.0	55.3	0.7	0.0	0.0
37762_P3	n/a		n/a	Other	56	325112	6260688	307	3	3	1	1	0	0	15.5	3.5	0.1	0.1	0.0	0.0
37762_P4	n/a		n/a	Other	56	324878	6260869	124	2	2	3	2	0	0	15.1	6.0	1.3	0.4	0.0	0.0
Plot ID	PCT	Area (Ha)	Patch size	Condition	Zone	Easting	Northing	Bearing	Fun. Large Trees	Fun. Hollow Trees	Fun. Litter Cover	Fun Len. Fallen Logs	Fun. Tree Stem 5to9	Fun. Tree Stem 10to19	Fun. Tree Stem 20to29	Fun. Tree Stem 30to49	Fun. Tree 50to79	Fun. Tree Regen	Fun. High Threat Exotic	
37762_P1	1281	0.03	5	Low	56	325165.5	6260775	134	1	0	1.8	0	1	1	1	1	0	1	4.0	
37762_P2	n/a		n/a	Low	56	325239.6	6260780	226	0	0	1.4	0	1	1	0	0	2	1	4.0	
37762_P3	n/a		n/a	Other	56	325111.8	6260688	307	0	0	21	0	1	1	1	1	1	1	3.0	
37762_P4	n/a		n/a	Other	56	324877.7	6260869	124	0	0	54	0	1	1	1	1	0	1	1.0	

Appendix 4 Fauna

Table A. 5 Fauna species recorded at the subject land

Common name	Scientific name
Birds	
Australian Raven	<i>Corvus coronoides</i>
Willie Wagtail	<i>Microeca fascians</i>
Galah	<i>Eolophus roseicapilla</i>
Red Wattlebird	<i>Anthochaera carunculata</i>
Australian Magpie	<i>Cracticus tibicen</i>
Magpie-lark	<i>Grallina cyanoleuca</i>
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>

Appendix 5 SAI

Sydney Turpentine - Ironbark Forest (PCT 1281) is an open-forest association occurring on moderately wet sites, with an annual rainfall of 800 – 1,100 millimeters per year, growing on clay soils derived from Wianamatta shale. It is listed under BC Act as a CEEC. The CEEC is listed in the BioNet Threatened Biodiversity Data Collection (TBDC) as an entity potentially subject to Serious and Irreversible Impact (SAII) in NSW. The CEEC is considered an entity at risk of SAI based on the following principles (DPIE 2019b):

- Principle 1: an ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- Principle 2: an ecological community that is observed, inferred or reasonably suspected to be severely degraded or disturbed.

Given the absence of definitive impact thresholds stated for the community, the potential for a SAI will be determined by the consent authority, guided by the additional assessment provided below in Table 21.

Table 21 Sydney Turpentine - Ironbark Forest SAI assessment

Information required (BAM Section 9.1.1)	Response
1. Impacts to the EEC and the action and measures taken to avoid the direct and indirect impact on the EEC at risk of an SAI.	<p>Impacts to the Sydney Turpentine – Ironbark Forest under the current proposal include removal of 0.03 ha of the CEEC in a low condition state, existing as two isolated canopy trees with an understory dominated by planted exotic species.</p> <p>As part of the design development process, a number of options were considered for the future layout of the site. This process gave regard to opportunities and constraints associated with the site with the overarching intent of creating a place-based, master-planned approach to re-development. Opportunities to avoid impacts are limited due to the small, isolated nature of the biodiversity values present within the subject land. Retention of existing planted native vegetation, particularly mature trees, has been prioritised where possible. The Master Plan maintains an overall canopy cover of 38%.</p> <p>Options to avoid impacts to CEEC Sydney Turpentine Ironbark Forest were highly limited due to project design and earthworks requirements, the small size of the vegetation and its location within the development footprint. Arboriculture assessment also found that part of the community only had a ‘moderate’ retention value. Alternatives were considered where this vegetation was retained however, they were unable to be progressed due to engineering constraints associated with the geology of the site. As the site has a significant drop in level to the south-east, future development allowing retention of the CEEC would have needed to allow for an amended level for this part of the site. This would result in a build up of nonpermeable surfaces in close proximity that would have unacceptable consequences to future flood risk.</p>
2a. evidence of reduction in geographic distribution, as the current total geographic extent of the EEC in NSW	Species and ecological communities that have undergone large reductions or are likely to undergo large reductions in the future are considered to be at greater risk of extinction than those that have undergone or are likely to

Information required (BAM Section 9.1.1)	Response
<p>and the estimated reduction in geographic extent of the EEC since 1970 (not including impacts of the proposal).</p> <p>TBDC or other sources.</p> <p>(SAII Principle 1)</p>	<p>undergo smaller reductions (NSW Threatened Species Scientific Committee 2018).</p> <p>To be considered under this principle, the ecological community should have been observed, estimated, inferred, or reasonably suspected to have undergone, or be projected to undergo, a very large reduction in distribution, being:</p> <ul style="list-style-type: none"> • ≥80% reduction where the reduction is over a 50-year period (i.e. since 1970), either in the past, future, or any part of the past, present and future. (DPIE 2019) <p>Sydney Turpentine – Ironbark Forest is a transitional community that once linked the Cumberland Plain Woodland in drier areas with Blue Gum High Forest on adjacent higher-rainfall areas of the Sydney region (DECC NSW 2008). Sydney Turpentine – Ironbark Forest has undergone extensive clearing for farming and agriculture since European settlement, followed by urban development as Sydney expanded. Although the pre-European extent is uncertain, it is estimated at between 23,000 ha and 30,339 ha. It is considered likely that the reduction in extent exceeds 90% and subsequently less than 10% of the original community remains, approximately 2,940 ha comprised of highly restricted remnants (TSSC 2019).</p>
<p>2b. extent of reduction in ecological function for the EEC using evidence that describes the degree of environmental degradation or disruption to biotic processes.</p> <p>(SAII Principle 2)</p>	<p>Reduction in ecological function relates to the IUCN principle of “very small population size” which for ecological communities means communities have very high levels of either environmental degradation or disruption of biotic processes, and interactions have an increased risk of failure to sustain their characteristic native species assemblages (Bland et al. 2016). Ecological communities that are considered to have a very large degree of environmental degradation or disruption of biotic processes or interactions are those with:</p> <ul style="list-style-type: none"> • ≥90% extent and severity where the disruption or impacts are measured since 1970 • ≥80% extent and severity where the disruption or impacts are over a 50-year period, either in the past, future, or any part of the past, present and future (as per (Bland et al. 2016). (DPIE 2019). <p>i. change in community structure and, ii. change in species composition</p> <p>Since European settlement the community has been largely cleared and thinned across the original extent to make space for urban development and agriculture. Remnants of the community have been subjected to a range of anthropogenic disturbances including logging, grazing by domesticated livestock and burning, which has affected the structure and composition of remnants (TSSC 2019). Removal of large, old trees has resulted in smaller trees occurring in higher density and increased fire frequencies have led to declines in the populations of fire-sensitive species that has resulted in structural simplification of some remnants. Other remnants, where fire has been excluded over the long-term and nutrient and moisture availability have increased, are conversely characterised by higher density and cover of mesic species, and a larger and more diverse population of exotic species as well as fewer understorey species.</p>

Information required (BAM Section 9.1.1)	Response
	<p>iii. disruption of ecological processes, iv. invasion and establishment of exotic species, v. degradation of habitat, and vi fragmentation of habitat</p> <p>The BC Act Final Determination for the community states that there has been very extensive clearing and major fragmentation and isolation of remnants of Sydney Turpentine – Ironbark Forest. Remnants are typically small and fragmented and are susceptible to continuing attrition through clearing for routine land management practices due to their proximity to rural land or urban interfaces, and clearing for asset protection zones and urban development. Continuing threats to the community also include changes in fire frequency, invasion by exotic species, influx of nutrients contained in stormwater runoff, dumped garden refuse and animal droppings.</p> <p>Historic clearing and disturbance of this community has resulted in degradation of habitat within the region by reducing the available areas of intact native vegetation. Removal of vegetation includes follow-on effects such as lowering potential hollow recruitment through high-frequency fire regimes, leading to reduced resources for fauna species. Habitat across the distribution of Sydney Turpentine - Ironbark Forest is highly fragmented due to land clearing and rural / urban development.</p> <p>Whilst there is no guidance as to the proportion of this degradation has occurred in the last 50 years (i.e. since 1970), the EEC is noted in the TBCD as being subject to Principle 2, inferring that it has occurred in recent times.</p>
<p>2c. evidence of restricted geographic distribution, based on the EEC's geographic range in NSW. (SAII Principle 3)</p>	<p>The geographical distribution of ecological communities is defined by the area of occupancy (sensu Bland et al. 2016). Ecological communities with a very limited geographic distribution have an area of occupancy of less than or equal to two 10 x 10 km grid cells (200 km²) or an extent of occurrence of ≤1000 km² (sensu Bland et al. 2016) and one of the following:</p> <ul style="list-style-type: none"> • An observed or inferred continuing decline in: <ul style="list-style-type: none"> – A measure of spatial extent appropriate to the ecological community. – A measure of environmental quality appropriate to characteristic biota of the ecological community. – A measure of disruption to biotic interactions appropriate to the characteristic biota of the ecological community. • Observed or inferred threatening processes that are likely to cause continuing declines in geographic distribution, environmental quality or biotic interactions within the next 20 years. • An ecological community exists at one location. <p>Remnants of Sydney Turpentine – Ironbark Forest occur in Sydney across locations in Baulkham Hills, Hornsby, Ku-ring-gai, Parramatta, Ryde, Sutherland and Hurstville local government areas. Using IUCN criteria, the extent of occurrence (EOO) of Sydney Turpentine – Ironbark Forest is 4,479 km², while the estimated area of occupancy (AOO) is twelve 10 x 10 km grid cells (1,200 km²) (NSW Threatened Species Scientific Committee 2019).</p> <p>The EEC therefore does not meet the first criteria listed above, for having a restricted geographic distribution, and does not meet SAII Principle 3.</p>

Information required (BAM Section 9.1.1)	Response
2d. evidence that the EEC is unlikely to respond to management. (SAIL Principle 4)	<p>There is currently no evidence to suggest that Sydney Turpentine - Ironbark Forest is unlikely to respond to management. Those entities listed as unlikely to respond to management (and thus are irreplaceable) tend to include species where the ability to control key threats is negligible and known reproductive characteristics that severely limit their ability to increase the existing population. Ecological communities as a whole do not align well with these criteria, and specifically Sydney Turpentine - Ironbark Forest does not exhibit either of these traits, thus it does not meet SAIL Principle 4.</p>
3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a EEC, the assessor must record this in the BDAR or BCAR.	<p>Not applicable.</p>
4a. the impact on the geographic extent of the EEC, by estimating the total area of the EEC to be impacted by the proposal.	<p>As discussed above, approximately 2,940 ha of Sydney Turpentine – Ironbark Forest is estimated to remain. The CEEC is known to occur in Sydney across locations in Baulkham Hills, Hornsby, Ku-ring-gai, Parramatta, Ryde, Sutherland and Hurstville local government areas.</p> <p>The proposed development will result in the removal of approximately 0.03 ha of the CEEC from the subject land, comprised of two individual trees with a highly modified understory consisting largely of exotic planted vegetation. The total area of the CEEC to be impacted by the proposal equates to 0.01 % of total area of Sydney Turpentine - Ironbark Forest within NSW, and occurs as a highly fragmented and disturbed patch.</p>
4b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes of the EEC.	<p>i. estimating the size of any remaining, but now isolated, areas of the EEC; including areas of the EEC within 500m of the development footprint or equivalent area for other types of proposals.</p> <p>According to existing vegetation mapping there are several patches of Sydney Turpentine - Ironbark Forest remaining within 500 m of the subject land, combining to approximately 47 ha or 1.6% of the total CEEC remaining. These patches consist of one patch of the CEEC to the north of the subject land, and several other small patches north-east and south-east of the subject land. None of these patches are connected to the remnant trees identified within the subject land however, the proximity of several small patches nearby may contribute to the genetic transfer of flora species between patches. The patches of the CEEC surrounding the subject land will not be impacted by the proposed development.</p> <p>The proposed development will remove 0.03 ha of Sydney Turpentine - Ironbark Forest. Given that the CEEC exists as two isolated trees with a highly modified understory and groundcover composition, it is unlikely that the removal of this patch would contribute to significant disruption of biotic process of the CEEC.</p> <p>ii. describing the impacts on connectivity and fragmentation of the remaining areas of EEC measured by:</p> <ul style="list-style-type: none"> distance between isolated areas of the EEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and

Information required (BAM Section 9.1.1)	Response
	<ul style="list-style-type: none"> • estimated maximum dispersal distance for native flora species characteristic of the EEC, and • other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the EEC as a result of the development <p>The center of the closest mapped remnant patch of Sydney-Turpentine Ironbark Forest to the subject land is approximately 280 m north-east of the subject land. Another patch occurs approximately 400 m to the south-east. The three patches are not connected by remnant vegetation and are isolated from each other by road and building infrastructure in between. The proposed works will result in the removal of 0.03 ha of the CEEC within the subject land. Due to the isolated nature of this patch, its removal would not affect the distance between retained patches. Remnant vegetation to the north-east is connected to two other patches within 50 m. It is also closer to the patch in the south-east (290 m) than the patch within the subject land.</p> <p>Native flora species with wind-borne genetic material, pollinated by larger flying insects and those species dispersed via bird dropping are expected to remain connected, commensurate to the current level of connectivity, after the proposed development. However, the long-term viability of remaining patches may be low due to ongoing disturbances.</p> <p>The proposed construction is unlikely to result in changes to surface water drainage patterns. Any potential sediment or erosion impacts will be managed appropriately through a CEMP. Furthermore, the patch of CEEC to be removed is providing limited ecological function for species of flora and fauna that may occur within the patch, including on a transient basis, due to its fragmented and edge effected nature.</p> <p>iii. describing the condition of the EEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.</p> <p>The vegetation to be removed occurs as a low condition form of the TEC. The community was limited to two isolated canopy trees including Sydney Turpentine and Red Mahogany. The lower strata were subject to significant levels of modification and consisted mostly of planted exotic species within manicured gardens.</p> <p>The proposed works will alter the community structure and composition of the patch to be removed, however, the patch is already fragmented by existing infrastructure and residential development, and the long-term viability of the remnant patch is unlikely to be high.</p> <p>The CEEC occurs in a low condition state within the subject land:</p> <ul style="list-style-type: none"> • Composition condition score: 19.9 • Structure condition score: 32.5 • Function condition score: 64.3

Information required (BAM Section 9.1.1)	Response
	<ul style="list-style-type: none"> • Presence of hollow-bearing trees: None • VI score: 34.6 <p>The proposed works will result in the removal of 0.03 ha of low condition Sydney Turpentine - Ironbark Forest.</p>