



NextDC S5 Data Centre

Small Area Biodiversity Development Assessment Report

NextDC Pty Ltd

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DOCUMENT TRACKING

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Accredited Assessor Certification	 <p>BAAS22030 S. 6.15(1) of the <i>Biodiversity Conservation Act 2016</i> states that: <i>A biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted.</i></p> <p>This Biodiversity Development Assessment Report has been prepared by Hamish Pritchard and Stacey Wilson on the basis of the requirements of (and information provided under) the biodiversity assessment method (BAM 2020). The BAM calculations or outputs from the calculator (BAM-C) pertaining to the development application were finalised on 9 June 2022 and this BDAR was completed on 9 June 2023.</p> <p>No actual, perceived, or potential conflict of interest exists between it or between any one or more of the author's employees, consultants or agents and the project client, or is likely to arise in relation to the report that is submitted for this project.</p>
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Template 2.8.1

Executive Summary

Eco Logical Australia (ELA) was engaged by Next DC Pty. Ltd. to prepare a Streamlined (small area) Biodiversity Development Assessment Report (BDAR) the subject land, on the corner of Waterloo Road and Lane Cove Road, Macquarie Park, NSW, Lot 3 DP112981. The subject land is located within the Ryde local government area.

This report has been prepared consistent with the Biodiversity Assessment Method (BAM) 2020, under the NSW *Biodiversity Conservation Act 2016* (BC Act).

The subject land (Lot 3 DP112981) is located within an industrial area of Macquarie Park. The subject land is located at the corner of Lane Cove Road on the west and Waterloo Road in the north. The eastern and southern boundaries are adjacent to large warehouse buildings which are currently being used by businesses for news and television stations, a mechanic, data distribution centre and car parking spaces associated with those businesses.

Despite the highly urbanised location of the subject land, tracts of remnant native vegetation exist within the subject land, including some planted landscaped areas. The vegetation present is primarily located along the south western portion of the subject land, and native planted areas are located along much of the eastern and central portion of the site. The planted, landscaped areas act as a barrier defining the parking areas/businesses for the existing buildings within development footprint.

The proposed development involves the construction of two multi-storey data centre buildings to serve as a Data Centre precinct. The proposed development will also include the construction of roadways, hard paved areas and updating stormwater infrastructure. The proposed works will involve the following:

- Demolition of existing buildings,
- Clearing of selected vegetation within the development footprint,
- Retention of some of the native vegetation (0.23 ha) at the south-western end of the subject land,
- Earthworks to construct two multi-storey industrial data centre buildings, roadways, paved areas and stormwater infrastructure.

Field survey was undertaken to validate vegetation to native Plant Community Types (PCT), assign threatened ecological communities where applicable and, undertake vegetation integrity (VI) plots within vegetation zones within the subject land.

One native PCT was present within the subject land. PCT 3262 Sydney Turpentine Ironbark Forest was mapped as occurring in one broad condition state, which was in good condition. The understory of the patch of PCT 3262 contained a relatively high cover of native grasses and forbs.

As mentioned above, the remaining vegetation within the subject land was mapped as Planted Native vegetation, or a mix of planted native and exotic landscape plantings. A small portion of the subject land was also mapped as exotic grassland.

The existing buildings were assessed for their potential to contain habitat for threatened fauna species. In particular, microbats were considered as potentially having habitat within the buildings, as they are a faunal group which can utilise buildings as roosting habitat. One small hollow was also present within the subject land and was assessed for its potential to provide roosting habitat for microbat species. A nocturnal microbat survey was conducted utilising an Anabat acoustic device to record potential microbat activity. Upon reviewing the recording, no microbat activity was recorded. Additional external survey of the existing structures on site found no evidence of microbat activity. Following assessment of the buildings and the hollow-bearing tree, it was concluded that neither were likely to be currently used as roosting habitat for threatened microbat species.

Measures to avoid and minimise impacts have been applied to the development footprint and 0.06 ha of PCT 3262 will be retained within the subject land. The residual impacts of the development footprint which are not avoided require the retirement of ecosystem and species credits for biodiversity values. A summary of credit requirements to offset impacts to, PCT 3262 is shown in the table below. No candidate SAI species credit species were identified or assumed present in the development footprint, and therefore no credits are required.

Summary of ecosystem and species credits required to offset residual impacts of the proposed development

Vegetation Zone	PCT ID	PCT Scientific Name	Condition	Direct impact area (ha)	Credits
1	3262	Sydney Turpentine Ironbark Forest	Good	0.35	13

Removal of 0.36 ha of planted native and planted native/exotic vegetation was assessed against *Appendix D: Streamlined assessment module - planted native vegetation* of the BAM 2020 and does not require offsets.

PCT 3262 forms a part of the threatened ecological community (TEC) *Sydney Turpentine ironbark Forest*. This vegetation community is listed as Critically Endangered under the *Biodiversity Conservation Act 2016* (BC Act). PCT 3262 forms a part of the federally listed TEC *Turpentine-Ironbark Forest of the Sydney Basin Bioregion*. However, the vegetation within the subject land did not meet any of the required condition classes and as such, is not recognised as the threatened ecological community under the EPBC Act.

Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion is a candidate for a Serious and Irreversible Impact (SAII) and an assessment has been undertaken to assist the consent authority to decide whether an SAII will result.

Potential foraging habitat for the EPBC Act list species *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Lathamus discolor* (Swift Parrot) and *Pteropus poliocephalus* (Grey-headed Flying-fox) will be affected. An assessment of significance for these species concluded that the proposed development is unlikely to cause a significant impact to Gang-gang Cockatoo, Swift Parrot or Grey-headed Flying-fox. A referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not recommended.

A preclearance survey of the vegetation to be removed and the buildings should be inspected by a qualified ecologist is recommended to ensure that there is no evidence of fauna prior to removal.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
Commonwealth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment (now NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW))
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	NSW <i>Fisheries Management Act 1994</i>
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
NOW	NSW Office of Water
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VIS	Vegetation Information System

1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Hamish Pritchard. The report has also been prepared by Daniel McDonald (BAAS17056), and Stacey Wilson (BAAS22030) who are Accredited Persons to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act). All credit calculations have been undertaken using the BAM Calculator (BAMC) version 67 in case number 00048139/BAAS22003/24/00048140.

Definitions of terminology used throughout this report and set out in the Biodiversity Assessment Method (BAM) are presented in Appendix A.

1.1. General description of the subject land

The subject land is on the corner of Waterloo Road and Lane Cove Road, Macquarie Park, NSW, Lot 3 DP1129811 (subject land). The subject land is located approximately 13 km north-west of the Sydney CBD and 11 km north-east of Parramatta.

The subject land is a single large commercial lot comprised of two buildings with two external car parks, one which is multiple levels, a disused tennis court, and a loading area at the southern part of the subject land. The lot contains a number of trees of varying sizes bordering around the lot and a cleared ground storey that is regularly maintained is present on the north-west of the site. A strip of trees is present between the two building, adjacent to the multi-level parking. Some remnant native vegetation is present in the southern part of the subject land, external to the current fence line, of which some of this vegetation has been proposed to be retained.

This report includes two base maps, the Location Map (Figure 1) and the Site Map (Figure 2).

1.2. Brief description of the proposal

The proposed development is State Significant Development and is to be assessed under Part 4.1 of the EP&A Act. Secretary's Environmental Assessment Requirements have been issued and require assessment as part of SSD-63168959.

The proposed development consists of two multi-storey industrial data centre buildings to serve as a Data Centre precinct. The proposed development will also include the construction of roadways, hard paved areas and updating stormwater infrastructure. The proposed works will involve the following:

- Demolition of existing buildings,
- Clearing of selected vegetation within the development footprint,
- Retention of some of the native vegetation (0.23 ha – 0.07 ha of PCT 3262 and 0.16 ha of Planted Native Vegetation) at the south-western end of the subject land,
- Earthworks to construct two multi-storey data centre buildings, roadways, hard paved areas, and stormwater infrastructure.

1.3. Subject land footprint

The subject land has a total area of approximately 2.45 ha. The construction and operational footprint are wholly within the subject land (Figure 2) and have a total area of 2.23 ha. Some of the remnant native vegetation in the south-western section of the subject land is located outside of the development footprint and is proposed to be retained, along with some trees present along the boundary of the subject land for which tree protection zones have been administered in the development plans. The subject land boundary (which is equivalent to the subject land) and final development footprint, are presented in Figure 2.

For the purposes of this BDAR, the proposal construction footprint and operational footprint will be considered as the same boundary and will be referred to as the 'Development Footprint'. This approach allows the assumed worst-case scenario to be considered when assessing the impacts of the proposal. The subject land is the whole of Lot 3 DP1129811 and comprises the proposed buildings and infrastructure and the proposed vegetation retention area.

1.4. Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification System Version 3.1,
- BioNet / Atlas of NSW Wildlife 5 km database search (NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) 2024a) (accessed May 2022),
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool 5 km radius database search (Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2024a) (accessed April 2024),
- NSW Government ePlanning Spatial Viewer,
- National Flying-fox Monitoring data (DCCEEW 2024b) (accessed April 2024)
- Biodiversity Assessment Method 2020,
- Biodiversity Assessment Methodology Calculator (BAMC) version 67
- NSW Government Biodiversity Values Map (NSW DCCEEW 2024b) (accessed April 2024),
- Threatened species profiles and recovery plans,
- State Vegetation Type Map (SVTM) (State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2022)
- Additional Geographic Information System (GIS) datasets including soil, topography, geology and drainage,
- Ryde Local Environment Plan 2014,
- Ryde Development Control Plan 2014,
- Eco Logical Australia, 2024. 269 Lane Cove Road BDAR Waiver Request Letter. Prepared for NextDC Pty Ltd.

Species searches from both the NSW BioNet database and the Commonwealth Protected Matters Search Tool (PMST) were performed around the co-ordinates, UTM Zone 56, 326691 E, 6259951 S on 11 April 2024. The results of these searches were combined to produce a list of threatened species, populations and communities either previously recorded or considered likely to occur within the subject land. The likelihood of occurrences for threatened species, populations and communities in the subject land was then determined based on location of database records, the likely presence or absence of

suitable habitat in the subject land, and knowledge of the species' ecology. This information informed the subsequent field assessment.

After the field inspection had been completed, the likelihood of occurrence of each species, population or communities was re-assessed. This was based on the increase in knowledge about the extent and type of habitats and which species were present within the subject land. The likelihood of occurrence for threatened species populations and communities within the subject land is present in Appendix D.

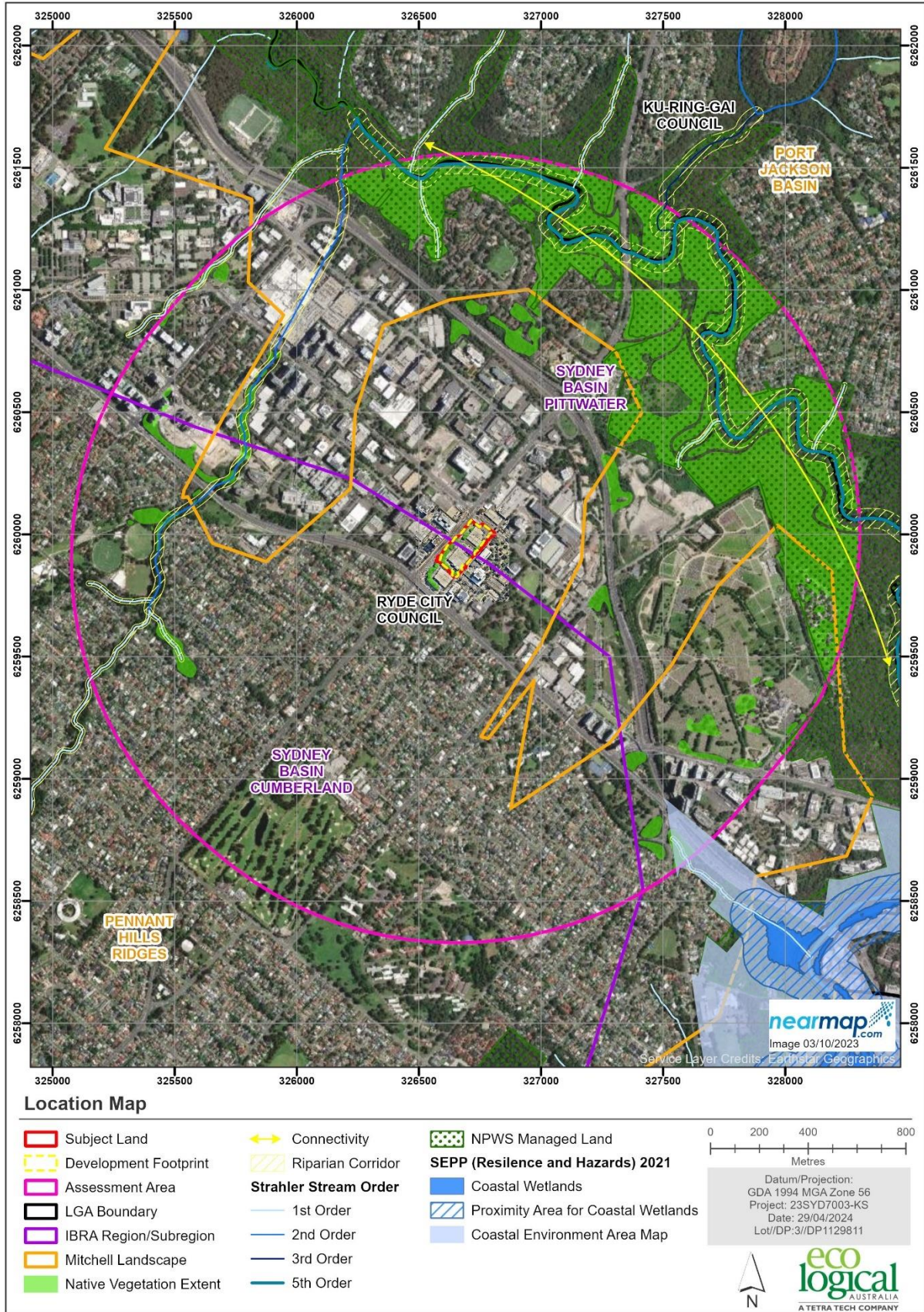


Figure 1: Location Map



Figure 2: Site Map

1.5. Legislative context

Legislation relevant to the subject land is outlined in Table 1.

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Matters of National Environmental Significance (MNES) have been identified on or near the development footprint. This report assesses impacts to MNES and concludes that the development would not have a significant impact on MNES.
State	
<i>Environmental Planning and Assessment Act 1979</i>	<p>The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals.</p> <ul style="list-style-type: none"> The proposed development is State Significant Development and is to be assessed under Part 4.1 of the EP&A Act. Secretary's Environmental Assessment Requirements have been issued and require assessment as part of SSD-63168959.
<i>Biodiversity Conservation Act 2016</i>	The proposed development exceeds the BAM threshold for clearing of native vegetation relevant to the minimum lot size associated with the land. Where no minimum lot size is assigned, the actual size of the lot is used. The proposed development would clear 0.71 ha of native vegetation and the lot size is 2 ha. Therefore, the threshold is exceeded and requires submission of a Biodiversity Development Assessment Report. The Small Area and Planted Native Vegetation streamlined assessment modules have been applied in this BDAR.
<i>Local Land Services Amendment Act 2016</i>	The LLS Act does not apply to areas of the state to which the Chapter 2 of the Biodiversity and Conservation SEPP applies. Chapter 2 of the Biodiversity and Conservation SEPP applies to the City of Ryde local government area.
<i>Fisheries Management Act 1994</i>	The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.
<i>Water Management Act 2000</i>	The project does not involve works on waterfront land. A Controlled Activity Approval under s91 of the WM Act is not required.
Environmental Planning Instruments	
State Environmental Planning Policy (Resilience and Hazards) 2021	This SEPP applies to land in the coastal zone. The subject land is located outside of this zone therefore this SEPP does not apply.

Name	Relevance to the project
State Environmental Planning Policy (Biodiversity and Conservation) 2021	<p>Chapter 2 of the Biodiversity and Conservation SEPP applies to vegetation in non-rural areas, with the aim to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. Chapter 2 applies to development that does not require consent. As this project requires consent under the EP&A Act, this section of the Biodiversity and Conservation SEPP is not relevant.</p> <p>Chapter 4 contains the land-use planning and assessment framework for Koala habitat within the Metropolitan Sydney and Central Coast. City of Ryde Local Government Area (LGA) is not considered land to which the Koala Habitat Protection applies.</p>
State Environmental Planning Policy (Transport and Infrastructure) 2021	This SEPP outlines land zoning where developments are permitted. The current zoning for the subject land is E2 Commercial Centre under the Ryde LEP. This is not a prescribed zone under this SEPP. However, under the Ryde LEP, the proposed development falls under light industry and so will be permissible with consent.
Ryde Local Environment Plan (LEP) 2014	<p>The subject land is zoned E2 Commercial Centre under the Ryde LEP 2014.</p> <p>The site is not mapped on the terrestrial biodiversity layer.</p>
Ryde Development Control Plan (DCP) 2014	<p>Ryde DCP contains provisions relating to tree preservation. Part 9.5 Tree Preservation specifically addresses the objective to avoid and minimise potential conflict between trees and proposed structures. All Development Applications (DA) require a report determining tree retention values. Any trees removed may require replacement planting in accordance with the DCP.</p> <p>An arborist report detailing tree retention values had been previously submitted to the client. Any relevant information from the arborist report to this BDAR will be detailed and referenced within.</p>

2. Streamlined assessment module – small areas

The streamlined assessment module for small areas was utilised in this BDAR. This streamlined assessment includes specific requirements that must be met to assess the impacts on biodiversity values.

Section 2.2 of BAM sets out the streamlined module. Appendix C sets out the circumstances in which the small area assessment can be used. The restrictions for the use of the streamlined assessment module -small area are:

- must only be used according to the area clearing threshold – compliance with this is shown in Table 2,
- must still apply the hierarchy of avoiding and minimising impacts on biodiversity before considering offsetting residual impacts – this is addressed in Section 6,
- may be used to assess the biodiversity values of land that is located within an area on the Biodiversity Values Map, except where the biodiversity value included on the Biodiversity Values Map is core koala habitat identified in a plan of management under Chapter 4 of SEPP (Biodiversity and Conservation) 2021 – Koala Habitat Protection 2021. Ryde LGA is not listed in Schedule 1 of the SEPP and therefore is not land to which the Koala Habitat Protection SEPP applies.

2.1. BAM Appendix C – Small area

Appendix C of the BAM 2020 outlines the streamlined assessment module for assessing small areas. The streamlined assessment module can be applied where the area clearing limits are under a certain threshold, outlined below in Table 2.

Ryde LEP does not provide a minimum lot size for the subject land; therefore, actual lot size is used to determine the minimum lot size. The minimum lot size for the subject land is 2 ha and the area of native vegetation to be cleared is less than 2 ha. Therefore, the small area module has been applied to part of this assessment in accordance with Appendix C of the BAM 2020.

Table 2: Area clearing limits for application of the small area development module

Minimum lot size associated with the property *	Maximum area clearing limit for application of the small area development module
Less than 1 ha	≤1 ha
Less than 40 ha but not less than 1 ha	≤2 ha
Less than 1000 ha but not less than 40 ha	≤3 ha
1000 ha or more	≤5 ha

*shown in the lot size maps made under the relevant local environmental plan (LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

This assessment has applied the hierarchy of avoiding and minimising impacts on biodiversity before considering offsetting residual impacts through retention of remnant native vegetation in the south-western section of the subject land.

2.2. BAM Appendix D – Streamlined Assessment Module Planted Native

The BAM 2020 provides various modules for a BAM assessment that are appropriate for some proposals. The current proposal has two areas of vegetation that are assessed as planted native vegetation.

Planted native species included *Casuarina cunninghamiana*, *Casuarina glauca*, *Eucalyptus deanei*, *Corymbia maculata* and *Eucalyptus cladocalyx*.

Criterion	Response
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.
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 b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	No – the plantings are for the purposes of landscaping a warehouse facility
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: 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. There is one threatened species; <i>Eucalyptus nicholii</i> (Narrow-leaved Peppermint) however planted species that are outside of their geographic range are not considered to form part of the listing.
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 – the purpose of the plantings is for landscaping.
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 plantings are for landscaping purposes
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)?	No.

3. Landscape features

The subject land is highly variable in vegetation present on site. The majority of the vegetation on-site is planted native and exotic vegetation, and exotic grassland. The south-western section of the site contains remnant native vegetation with additional planted native landscaping species. Another small pocket of remnant vegetation is present in the south-eastern corner of the subject land.

The site-based method was applied for this assessment; therefore the assessment area is the 1,500 m buffer surrounding the outside edge of the boundary of the subject land.

The landscape features considered for this assessment are presented in Table 3, Figure 1 and Figure 2.

Table 3: Landscape features

Landscape feature	Subject Land/Subject land	Data source
IBRA Region(s)	Sydney Basin.	Interim Biogeographic Regionalisation for Australia (IBRA), Version 7.
IBRA subregion(s)	Pittwater (north-eastern section) and Cumberland (south-western section) (Figure 2).	IBRA, Version 7.
Rivers and streams	The subject land does not contain any rivers or streams.	NSW LPI Waterway mapping.
Estuaries and wetlands	The subject land does not contain any mapped important or local wetlands.	NSW directory of important wetlands.
Connectivity of different areas of habitat	Connectivity to large tracts of habitat has been disconnected by residential development and roads surrounding the subject land. Some fragmented connectivity may remain for highly mobile species such as birds and bats.	Aerial imagery.
Geological features of significance and soil hazard features	The subject land does not contain areas of geological significance (i.e. karst, caves, crevices, cliffs) and soil hazard features.	Aerial imagery. Field survey.
Areas of Outstanding Biodiversity Value	As there are not AOBV on site, this trigger does not apply.	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2022).
NSW (Mitchell) Landscapes	Pennant Hills Ridges	NSW (Mitchell) Landscapes - version 3.1 (DPIE 2016).
Percent (%) native vegetation extent	The development footprint is approximately 2.23 ha and contains approximately 0.62 ha of native vegetation, including the planted native vegetation. The BAM assessment area is approximately 806.87 ha and contains approximately 112.6 ha of native vegetation (14%).	Calculated using aerial imagery and ArcGIS software

4. Native Vegetation

Vegetation across the majority of the subject land varied and included areas of remnant forest with planted natives, planted trees along the subject land boundary, landscaping and gardens around the existing buildings consisting of native and exotic species, and an exotic grass lawn that looked to be regularly mown and maintained with some native tree species also present. Remnant vegetation was present as a section in the south-west, and a small patch in the south-east of the subject land (Figure 3). Four vegetation zones were validated on the subject land including a single native plant community type (PCT). These are outlined in Table 4 and shown in Figure 3.

The PCT within the subject land corresponds with threatened ecological communities (TECs) listed under the BC Act and EPBC Act.

Table 4: Vegetation zones within the subject land

PCT ID	PCT name	Vegetation Class	Listing Status under the BC Act	Listing Status under the EPBC Act
3262	<i>Sydney Turpentine Ironbark Forest</i>	Northern Hinterland Wet Sclerophyll Forests	Critically Endangered - <i>Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion</i>	N/A – did not meet condition thresholds for listing under the EPBC Act as the Sydney Basin Turpentine-Ironbark Forest of the Sydney Basin Bioregion (critically endangered)
-	-	Planted native vegetation	-	-
-	-	Planted exotic/native	-	-
-	-	Exotic grass	-	-

4.1. Survey Effort

Vegetation survey was undertaken within the subject land by Daniel McDonald and Hamish Pritchard on 19 April 2024.

A total of two full-floristic vegetation plots were surveyed to identify the PCT and TECs on the subject land (Table 5). A total of two vegetation integrity survey plots were undertaken on the subject land to assess the composition, structure and function components of each vegetation zone in accordance with the BAM. The locations of plots undertaken within the subject land is displayed in (Table 5).

All field data collected at full-floristic and vegetation integrity plots is included in Appendix B and Appendix C.

Table 5: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
3262	<i>Sydney Turpentine Ironbark Forest</i>	1
-	Exotic grass	1

4.2. Native vegetation extent on the subject land

The extent of native vegetation within the subject land and development footprint is outlined in Table 6.

Table 6: Extent of native vegetation on the subject land

PCT ID	PCT name	Subject land (ha)	Development footprint (ha)
3262	<i>Sydney Turpentine Ironbark Forest</i>	0.41	0.35
-	Planted native vegetation	0.43	0.27
-	Planted exotic/native vegetation	0.09	0.09

4.3. Plant Community Types present

A single PCT was identified within the subject land and is presented in Table 7 and Figure 3.

The subject land also contained 0.43 ha of planted native vegetation for landscaping purposes which does not conform to a native PCT.

Table 7: Plant community types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area (ha) in subject land	Percent cleared (%)
3262	<i>Sydney Turpentine Ironbark Forest</i>	Northern Hinterland Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	0.41	85.37

4.3.1. Plant Community Type selection justification

In determining the PCT for the subject land, various attributes were considered in combination to assign vegetation to the best fit PCT. Attributes included dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT descriptions in the BioNet Vegetation Classification and the final scientific determinations for TECs. Possible PCT options are provided in Table 8.

PCT 3262 SYDNEY TURPENTINE IRONBARK FOREST

The patch of remnant vegetation in the south-west of the development area was found to be consistent with PCT 3262 *Sydney Turpentine Ironbark Forest*. This patch consisted of an upper stratum mix of mature remnant native and planted native species including *Allocasuarina littoralis* (Black She-oak), *Angophora costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus microcorys* (Tallowwood), *E. resinifera* subsp. *resinifera* (Red Mahogany), and *Syncarpia glomulifera* (Turpentine). Whilst Tallowwood is not native to the subject land and has likely been planted previously for landscaping, the other species are all commonly occurring in *Sydney Turpentine Ironbark Forest*, with *Syncarpia glomulifera* and *Angophora costata* indicative species for this PCT. Other small patches found

in the north-west and south-east of the site also contained associated species including *Corymbia maculata* (Spotted Gum), *Syncarpia glomulifera*, *Angophora costata*, and *Eucalyptus resinifera* subsp. *resinifera*.

The understorey of the patch of PCT 3262 in the south-western corner contained a mix of remnant, planted native and exotic plants. Midstorey plants associated with the PCT were present, however in low numbers, including *Denhamia silvestris* (Narrow-leaved Orangebark), *Dodonaea triquetra* (Large-leaf Hop-bush) and *Pittosporum undulatum* (Sweet Pittosporum). The groundstorey contained a low cover of native grasses and forbs, including *Dianella caerulea* var. *producta* (Blue Flax-lily), *D. longifolia* var. *longifolia* (Blueberry Lily), *Dichondra repens* (Kidney Weed), *Microlaena stipoides* (Weeping Grass), and *Oplismenus aemulus* (Australian Basket Grass). These were interspersed with a moderate cover of exotic grasses, shrubs and other weeds including *Agapanthus praecox* (Agapanthus), *Axonopus fissifolius* (Narrow-leafed Carpet Grass), *Cynodon dactylon* (Common Couch) and *Ehrharta erecta* (Panic Veldtgrass).

Table 8: Potential PCTs

Selected PCT ID	PCT Name	Other PCT options
3262	<i>Sydney Turpentine Ironbark Forest</i>	<p>3136 Blue Gum High Forest – The characteristic tree species of this PCT, <i>Eucalyptus saligna</i> (Sydney Blue Gum) was not observed during the field survey. Other species commonly attributed to this PCT were observed however many of these are also associated with <i>Sydney Turpentine Ironbark Forest</i>, of which the composition more closely resembled.</p> <p>3259 Sydney Coastal Shale-Sandstone Forest – Whilst the dominant canopy species in the surveyed area were characteristic species for this PCT (<i>Angophora costata</i>, <i>Allocasuarina littoralis</i> and <i>Eucalyptus resinifera</i>), the midstorey and understorey species composition did not resemble the sparse dry sclerophyll shrubs generally associated with this PCT.</p> <p>3586 – the dominant canopy species in the surveyed area were not typical of this PCT, nor was the locality i.e. ridgetops on the coast and hinterland.</p>

4.4. Threatened Ecological Communities

Threatened ecological communities within the subject land are present in Table 9.

Table 9: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
3262	Critically Endangered	<i>Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion</i>	0.41	Critically Endangered	<i>Turpentine-Ironbark Forest of the Sydney Basin Bioregion</i>	Community does not meet listing criteria to be listed under the Federal community

4.4.1. Sydney Turpentine-Ironbark Forest

The PCT 3262 vegetation within the subject land is consistent with the TEC *Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion*, listed as a Critically Endangered Ecological Community (CEEC) under the BC Act (Table 9). The patch contains the following features that identify it as Sydney Turpentine-Ironbark Forest under the BC Act:

- Location – the subject land is located within the Sydney Basin.
- Dominant canopy species – *Eucalyptus resinifera*, *Angophora costata*, *Syncarpia glomulifera* (Turpentine) are listed as characteristic upper-storey species in the Final Determination.
- Species assemblage – many of the species listed in the Final Determination for Sydney Turpentine-Ironbark Forest were present with the patch, including: *Breynia oblongifolia* (Breynia), *Denhamia* (formerly *Maytenus*) *silvestris* (Narrow-leaved Orangebark), *Microlaena stipoides* (Weeping Grass), *Oplismenus aemulus* (Australian Basket Grass), *Pittosporum undulatum* (Sweet Pittosporum), and *Pseuderanthemum variabile* (Pastel Flower).
- Diversity and structure – The area of this PCT is structurally a forest and contains a moderate diversity and cover of native grasses and forbs (see section 1.3, above, and Appendix B for list of species).

Turpentine-Ironbark Forest of the Sydney Basin Bioregion is listed as CEEC under the EPBC Act. Within the subject land, no patches of PCT 3262 vegetation met the condition thresholds outlined in the approved listing advice (Commonwealth of Australia, 2014) due to patch sizes being less than 1 ha in size. Native trees were present in adjacent areas, however these areas did not have a native midstorey/understorey which would exclude them from meeting the condition thresholds. Therefore, the PCT within the subject land is not considered to be the EPBC Act listed community. Section 9.1 contains further details on the assessment against condition thresholds.

4.5. Vegetation integrity assessment

4.5.1. Vegetation zones

Four vegetation communities were identified on the subject land (Figure 3). One of these vegetation zones could be assigned to a PCT and these are shown in Table 10. The other vegetation zones mapped within the subject land are not consistent with a PCT and have been mapped as *planted native vegetation*, *planted exotic/native* and *exotic grass* (Figure 3). A total of two vegetation integrity survey

plots were collected on the subject land consistent with the BAM (Figure 3). Descriptions of vegetation zones which met the definition of a PCT are provided in Table 10.

Table 10: Vegetation zones and vegetation integrity survey plots collected on the subject land

Vegetation Zone	PCT ID	PCT Name	Condition	Area (ha) in subject land	Patch Size	Vegetation Integrity Survey Plots required	Vegetation Integrity Survey Plots collected
1	3262	Sydney Turpentine Ironbark Forest	Good	0.41	5	1	1

4.5.2. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the subject land. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size of 5-24 ha was determined for the subject land. The actual patch size is 5 ha and includes the vegetation that is within the subject land.

Table 11: Zone 1 PCT 3262 Good Condition

3262 - Sydney Turpentine Ironbark Forest			
Vegetation formation/class	Wet Sclerophyll Forests		
Conservation status	NSW BC Act Critically Endangered: Sydney Turpentine-Ironbark Forest in the Sydney Basin EPBC Act Critically Endangered: Turpentine-Ironbark Forest of the Sydney Basin Bioregion (although this patch does not meet the EPBC condition threshold)		
Characteristic canopy trees	<i>Angophora costata</i> , <i>Eucalyptus resinifera</i> and <i>Syncarpia glomulifera</i> .		
Characteristic mid-storey	<i>Allocasuarina littoralis</i> , <i>Breynia oblongifolia</i> and <i>Pittosporum undulatum</i> .		
Characteristic groundcovers	<i>Entolasia stricta</i> and <i>Microlaena stipoides</i> .		
Exotic species / HTW cover	<i>Agapanthus</i> sp., <i>Araujia sericifera</i> , <i>Axonopus fissifolius</i> , <i>Cirsium vulgare</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Ligustrum lucidum</i> , <i>Ochna serrulata</i> , <i>Olea europaea</i> var. <i>cuspidata</i> , <i>Paspalum dilatatum</i> , <i>Senecio madagascariensis</i> , <i>Sporobolus africanus</i> , <i>Taraxacum officinale</i> – 11.4%		
Condition	Good condition		
Variation and disturbance	There was a high level of disturbance within the wider subject land. While the patch in which the BAM plot was undertaken had an assemblage of midstorey and understorey plants, some of the other patches of the PCT in the subject land lacked a midstorey and/or understorey due to maintenance/landscaping, resulting in a lower conditional state. Isolated patches present elsewhere on site may have featured one canopy species aligning them with PCT 3262.		
No. sites sampled	1		
Threatened flora species	No threatened flora species were identified during the field survey		
Fauna habitats	A single, small tree hollow (approximately 3 cm diameter) was present within the plot which may potentially serve as roosting habitat for smaller bird and microbat species. The native canopy vegetation present on the subject land could be potential marginal foraging habitat for highly mobile species such as <i>Pteropus poliocephalus</i> (Grey-headed Flying-fox). No other fauna habitat was identified within the plot.		
Composition	Structure	Function	Vegetation Integrity Score
64.4	76	45	60.4

3262 - Sydney Turpentine Ironbark Forest



4.5.3. Assessing vegetation integrity

A vegetation integrity assessment using the BAM Calculator (BAMC) was undertaken and the results are outlined in Table 12.

Table 12: Vegetation integrity scores

Vegetation Zone	PCT ID	Condition	Area (ha) in development footprint	Composition Condition Score	Structure Condition Score	Function Condition Score	Presence of Hollow bearing trees	Current vegetation integrity score
1	3262	Good	0.35	64.4	76	45	Yes	60.4

4.6. Use of local data

No local data is proposed for this assessment.

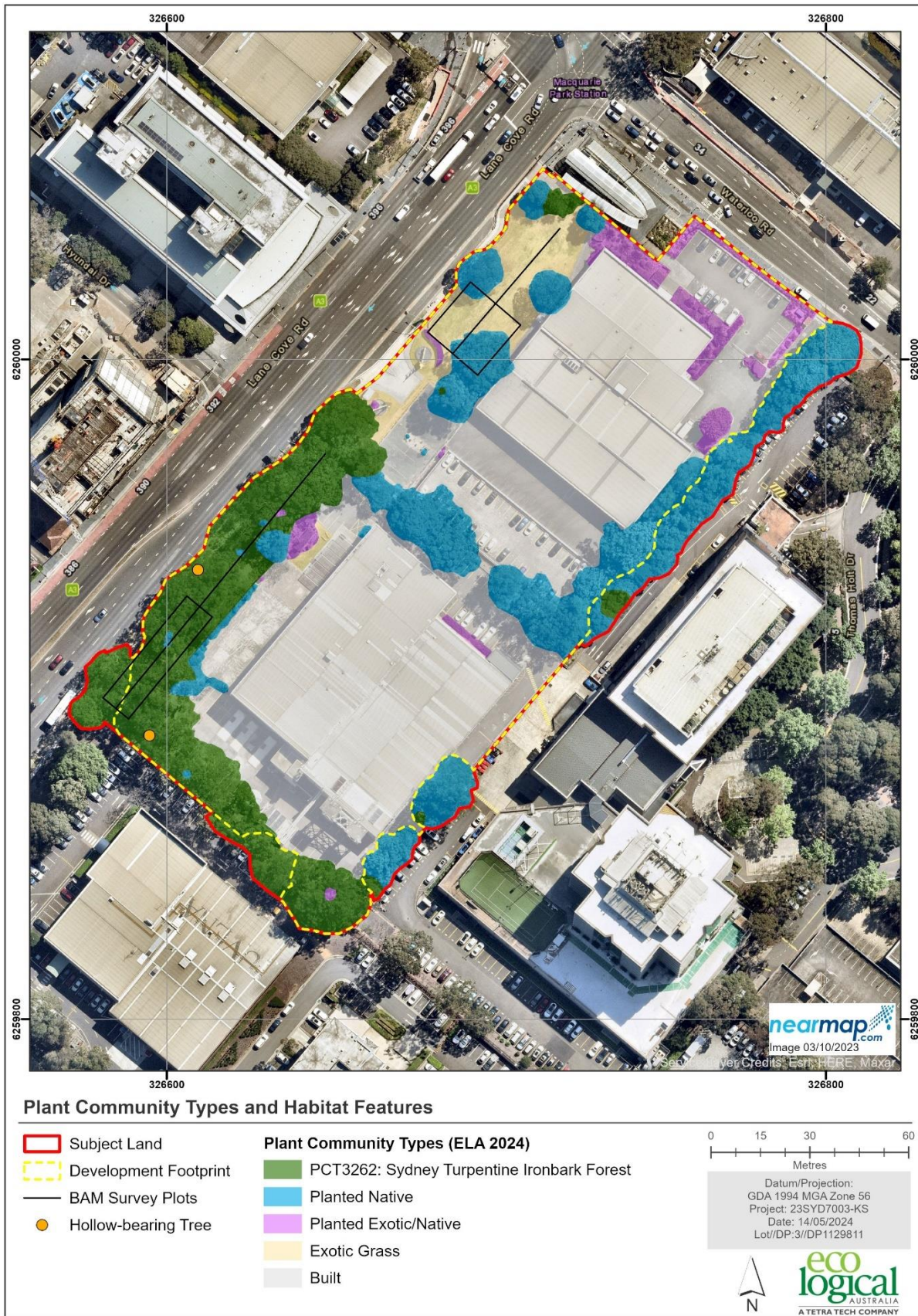


Figure 3: Plant Community Types (PCTs)

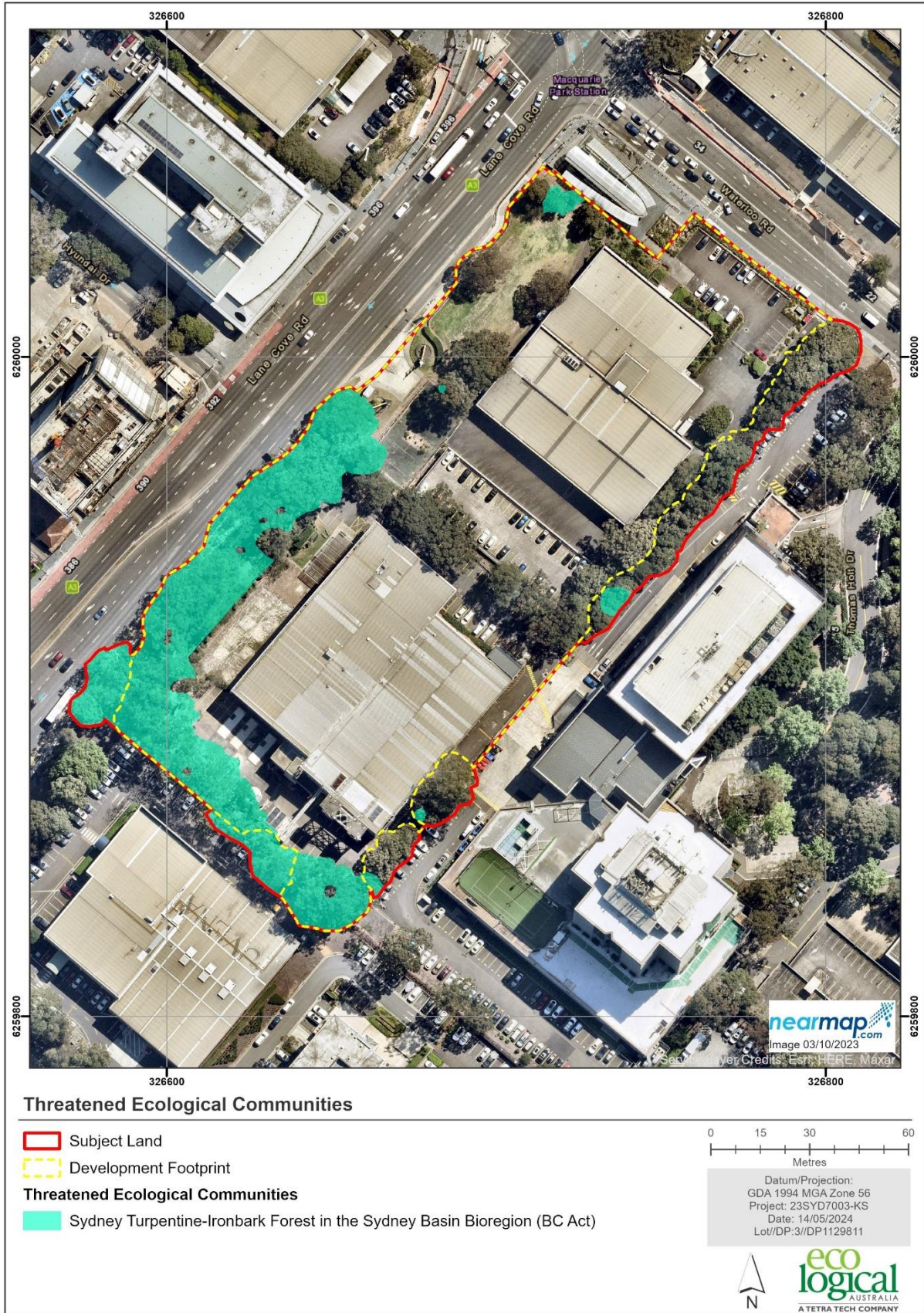


Figure 4: Threatened Ecological Communities

5. Threatened species

5.1. Ecosystem credit species

Ecosystem credit species predicted to occur within the subject land are generated by the BAMC following the input of VI data and the PCT identified within Chapter 3. Ecosystem credit species predicted to occur at the subject land, their associated habitat constraints, geographic limitations, and sensitivity to gain class is included in Table 13.

Ecosystem credit species which have been excluded from the assessment and relevant justification is included in Table 13.

Table 13: Predicted ecosystem credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Justification for inclusion / exclusion
<i>Anthochaera phrygia</i>	Regent Honeyeater (Foraging)	-	-	High Sensitivity to Gain	Critically Endangered	Critically Endangered	<u>Included</u> Potential foraging habitat present
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (Foraging)	-	-	Moderate Sensitivity to Gain	Vulnerable	Endangered	<u>Included</u> Potential foraging habitat present
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo (Foraging)	Presence of Allocasuarina and casuarina species	-	High Sensitivity to Gain	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat present
<i>Chthonicola sagittata</i>	Speckled Warbler	-	-	High sensitivity to gain	Vulnerable	Not listed	<u>Included</u> Potential foraging habitat present
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	-	-	High Sensitivity to Gain	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat present
<i>Daphoenositta chrysoptera</i>	Varied Sittella	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	-	-	High Sensitivity to Gain	Vulnerable	Endangered	<u>Included</u> Potential foraging habitat present
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	Swamps, shallow, open freshwater or saline wetlands or	-	Moderate sensitivity to gain	Endangered	Not listed	Excluded No habitat present

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Justification for inclusion / exclusion
		shallow edges of deeper wetlands within 300m of these swamps, waterbodies, shallow lakes, lake margins and estuaries within 300m of these waterbodies					
<i>Glossopsitta pusilla</i>	Little Lorikeet	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Grantiella picta</i>	Painted Honeyeater	Mistletoes present at a density of > 5 / ha	-	Moderate sensitivity to gain	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat present
<i>Haliaeetus leucogaster</i>	White-bellied Eagle (Foraging)	Sea- - Waterbodies - Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Excluded</u> No habitat present
<i>Hieraetus morphnoides</i>	Little Eagle (Foraging)	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	-	High Sensitivity to Gain	Not Listed	Vulnerable	<u>Included</u> Potential foraging habitat present

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Justification for inclusion / exclusion
<i>Ixobrychus flavicollis</i>	Black Bittern	- Waterbodies - Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Excluded</u> No habitat present
<i>Lathamus discolor</i>	Swift Parrot (Foraging)	-	-	Moderate Sensitivity to Gain	Endangered	Critically Endangered	<u>Included</u> Potential foraging habitat present
<i>Lophoictinia isura</i>	Square-tailed Kite (Foraging)	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Melanodryas cucullate cucullata</i>	South-eastern Hooded Robin	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Miniopterus australis</i>	Little Bent-winged Bat (Foraging)	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Justification for inclusion / exclusion
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Foraging)	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Pandion cristatus</i>	Eastern Osprey (Foraging)	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Petroica phoenicea</i>	Flame Robin	-	-	Moderate Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Foraging)	-	-	High Sensitivity to Gain	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat present
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present
<i>Stagonopleura guttata</i>	Diamond Firetail	-	-	Moderate Sensitivity to Gain	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat present
<i>Varanus rosenbergi</i>	Rosenberg's Goanna	-	-	High Sensitivity to Gain	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat present

5.2. Species credit species

5.2.1. Identification of species credit species

Species credit species that are at risk of SAIL and require further assessment on the subject land (i.e. candidate species), their associated habitat constraints, geographic limitations, and sensitivity to gain class is included in Table 14.

Table 14: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Listing status	Act
<i>Anthochaera phrygia</i>	Regent Honeyeater (Breeding)	As per Important Habitat Map	-	High Sensitivity to Gain	Critically Endangered	Critically Endangered	
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	- Cliffs - Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	-	Very High Sensitivity to Gain	Vulnerable	Endangered	
<i>Darwinia peduncularis</i>	<i>Darwinia peduncularis</i>	- Rocky areas - or within 50 m of rocky areas	-	High Sensitivity to Gain	Vulnerable	Not Listed	
<i>Haloragodendron lucasii</i>	<i>Haloragodendron lucasii</i>	- Seepage zone or within 100 m	-East of the Pacific Highway and South of Broken Bay	Very High Sensitivity to Gain	Endangered	Endangered	
<i>Hibbertia spanantha</i>	Julian's Hibbertia	-	-	High Sensitivity to Gain	Critically Endangered	Critically Endangered	
<i>Lathamus discolor</i>	Swift Parrot (Breeding)	-	-	Moderate Sensitivity to Gain	Endangered	Critically Endangered	
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	-	-	Very High Sensitivity to Gain	Vulnerable	Not Listed	
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	- Caves - Cave, tunnel, mine, culvert or other structure known or	Very High Sensitivity to Gain	Vulnerable	Not Listed	Very High Sensitivity to Gain	

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Listing status	Act
		suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature					
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid	-	-	High Sensitivity to Gain	Vulnerable	Endangered	
<i>Rhodamnia rubescens</i>	Scrub Turpentine	-	-	Very High Sensitivity to Gain	Critically Endangered	Critically Endangered	

5.2.2. Candidate species requiring further assessment

As this BDAR is being assessed via the streamlined (small area) assessment (BAM 2020, Appendix C), only those candidate species at risk of a serious and irreversible impact (SAII) require targeted survey. All the candidate species generated by the BAMC (Table 14) are entities at risk of a SAII. Justification for inclusion / exclusion of candidate species at risk of SAII are presented in Table 15.

Table 15: Justification for exclusion/inclusion of candidate SAII species credit species

Species	Common Name	BC listing status	Act	EPBC Listing status	Act	Justification for exclusion of species
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered		Critically Endangered		Not within Important Habitat Mapped areas.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable		Endangered		No caves, cliffs, karsts or mines mapped within 2 km of the subject land (see Figure 5).
<i>Darwinia peduncularis</i>	<i>Darwinia peduncularis</i>	Vulnerable		Not Listed		There are no rocky areas within the subject land or within 50 m of rocky areas.
<i>Haloragodendron lucasii</i>	<i>Haloragodendron lucasii</i>	Endangered		Endangered		There are no seepage zones within the subject land or within 100m of the subject land.
<i>Hibbertia spanantha</i>	<i>Julian's Hibbertia</i>	Critically Endangered		Critically Endangered		No <i>Hibbertia</i> sp. were identified in the subject land during survey.
<i>Lathamus discolor</i>	Swift Parrot (Breeding)	Endangered		Critically Endangered		Not within Important Habitat Mapped areas.
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	Vulnerable		Not Listed		There are no caves, tunnels, mines, culverts or other structures suspected to be used for breeding habitat within the subject land.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Breeding)	Vulnerable		Not Listed		There are no caves, tunnels, mines, culverts or other structures suspected to be used for breeding habitat within the subject land
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid	Vulnerable		Endangered		This species has been excluded as it is currently only known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. At each location, only a few individuals are known. There are no BioNet records for this species recorded for the last 50 years and is considered unlikely to occur at the site.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Critically Endangered		Critically Endangered		The habitat on site is generally unsuitable for this species. Additionally, this species is relatively easy to identify even in the vegetative state. No plants similar to this species were observed on site.

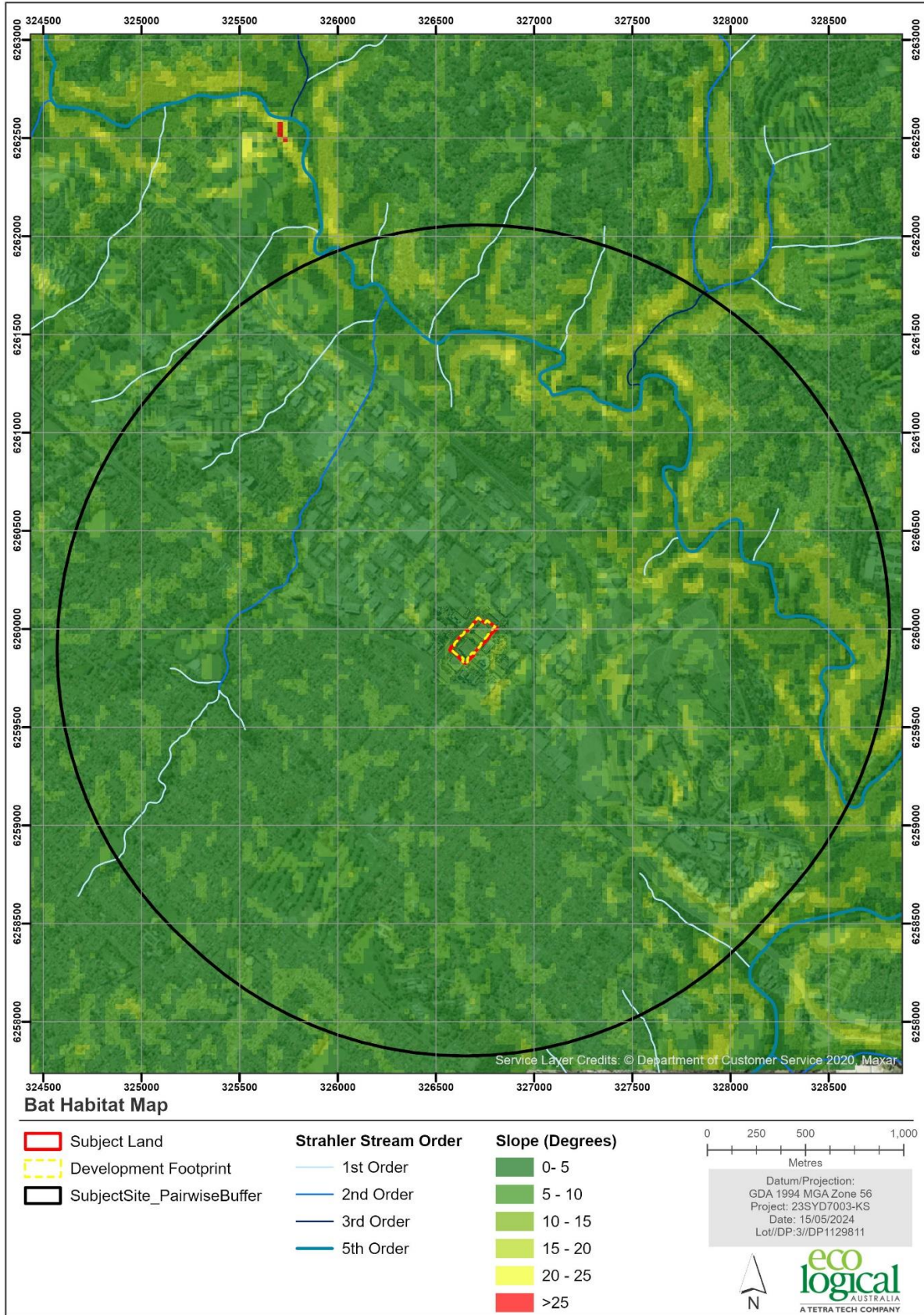


Figure 5: Bat Habitat Mapping of slope degrees in proximity to the Project Site

5.2.3. Targeted surveys

No targeted surveys were required as a part of this assessment.

5.2.4. Expert reports

No expert reports have been used in place of targeted survey for this assessment.

5.3. Identification of prescribed additional biodiversity impact entities

The subject land does not contain any additional prescribed impact entities.

5.3.1. Karst, caves, crevices, cliffs, rocks and other geological features of significance

The subject land does not contain karst, caves, crevices, cliffs, rocks and other geological significance.

5.3.2. Human-made structures and non-native vegetation

The subject land does not contain any human-made structures or non-native vegetation that is considered as potential permanent habitat for threatened entities. The building located at the northern part of the site is still used by people in a limited capacity. It is in good condition and did not have any clear openings that would allow access for fauna. The building on the southern end of the site is no longer in use by people, although still in good condition too. The building had one air vent located on the southern side of the building above a fire safety door that could potential be used as an entry point for some species of microbats, (Figure 6) although it is considered unlikely as the building appears to be only recently vacated. Some external structures may have the potential to serve as temporary refuge for threatened species, but none appear suitable as permanent habitat.

The non-native vegetation is present as maintained garden beds, with little prospect of threatened species using it for foraging or breeding due to the ongoing maintenance regime and absence of fruiting or flowering species that could provide foraging resources.

An assessment of prescribed impacts to human-made structures and non-native vegetation is provided in Table 16.

Table 16: Assessment of prescribed impacts to human-made structures and non-native vegetation

Criteria in accordance with BAM 2020 Section 6.1.2	Response
2. If human-made structures (e.g. bridges, culverts, abandoned buildings) and non-native vegetation provides habitat for threatened species, the assessor must:	
a. provide a description of the type of human-made structure or non-native vegetation habitat	The subject land contains two recently vacated buildings. Maintained garden beds.
b. prepare a list of threatened species that use these features as habitat	The following species (microbats) are known to utilise human-made structures: 1) <i>Miniopterus australis</i> (Little Bent-wing Bat) 2) <i>Miniopterus orianae oceanensis</i> (Eastern Bent-wing Bat)
c. describe how each threatened species could, or does, use the human-made structure or non-native vegetation as habitat (based on published literature and other reliable sources).	Microbat species are known to utilise the buildings as non-breeding roosting habitat. Although no survey has been conducted internally within the buildings during field survey, the buildings have been only recently vacated and are considered unlikely to contain any habitat for roosting or breeding microchiropteran bats.

Criteria in accordance with BAM 2020 Section 6.1.2	Response
	<p>Breeding and or non-breeding habitat for microbats is unlikely to occur within the buildings. Further, the above listed microbat species require caves as maternity roosts which are not located within or near the subject land.</p> <p><i>Miniopterus oriana oceanensis</i> and <i>Miniopterus australis</i> are known to form large maternity colonies in specific caves (Mills 2021, Augusteyn et al 2021) and do not utilise human-made structure as part of breeding habitat.</p> <p>The exception is one microbat species, <i>Myotis macropus</i> which may occasionally utilise buildings to shelter, however, as stated, the demountable buildings are considered highly unlikely to be used as roosting habitat for this species.</p> <p>Maintained garden beds are unlikely to provide foraging habitat for threatened species, that is significant to their survival.</p>



Figure 6: External air vent above fire safety door on southern building.

5.3.3. Habitat connectivity

An assessment of prescribed impacts to habitat connectivity is presented in Table 17.

Table 17: Assessment of prescribed impacts to habitat connectivity

Criteria in accordance with BAM 2020 Section 6.1.3	Response
<p>2. Where corridors or other areas of connectivity link habitat for threatened entities, the assessor must:</p>	
<p>a. prepare a list of threatened entities that are likely to use or are a part of the connectivity or corridor</p>	<p>Mega bats:</p> <ul style="list-style-type: none"> • <i>Pteropus poliocephalus</i> (Grey-headed Flying Fox) <p>Microbats:</p> <ul style="list-style-type: none"> • <i>Micronomus norfolcensis</i> (Eastern Coastal Free-tailed Bat) • <i>Miniopterus australis</i> (Little Bent-winged Bat) • <i>Miniopterus orianae oceanensis</i> (Large Bent-winged Bat) <p>Birds:</p> <ul style="list-style-type: none"> • <i>Lathamus discolor</i> (Swift Parrot) • <i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)
<p>b. describe the importance of the connectivity to threatened entities, particularly for maintaining movement that is crucial to the species' life cycle</p>	<p>The subject land is located within a highly urbanised landscape, with more suitable habitat occurring 1 km to the north-east of the subject land.</p> <p>It is highly unlikely that the remnant vegetation present at the subject land would serve any other purpose other than a temporary refuge for highly mobile species (e.g. birds or bats) that may be displaced from their typical flight paths or routes.</p> <p>The canopy vegetation may provide foraging habitat for the Grey-headed Flying Fox. The National Recovery Plan Grey-headed Flying Foxes 2021 states '<i>Grey-headed Flying-foxes forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night</i>'.</p> <p>The closest Nationally Important Camp is located approximately 5 km north-east of the subject land, in Gordon. Other Flying-fox Camps nearby are located at Parramatta (approximately 13 km south-west), Balgowlah (approximately 12 km east) and Granville (approximately 12 km south-west).</p> <p>The vegetation within the development footprint would likely provide a foraging resource for both of these camps. Grey-headed Flying-foxes may travel as far as 40 km from their camp to feed, therefore, whilst the vegetation within the development footprint would likely provide a foraging resource for these camps, it is unlikely that they would not solely rely on the vegetation within the development footprint as their only foraging resource.</p>

5.3.4. Water bodies, water quality and hydrological processes

No water bodies occur within the subject land.

5.3.5. Wind farm developments

This is not a wind farm development.

5.3.6. Vehicle strikes

Given the locality is already highly urbanised, vehicle strike is an existing threat to fauna. The proposed development will involve construction of internal roads but no additional threat to fauna from vehicle strike, beyond the existing levels, is likely to result.

6. Avoiding and Minimising Impacts on Biodiversity Values

The BAM requires locating and designing a project to avoid and minimise direct and indirect impacts on biodiversity values and prescribed biodiversity impacts.

6.1. Locating a project to avoid and minimise impacts on biodiversity values

6.1.1. Direct and indirect impacts

The BC Act and BAM 2020 requires proponents to avoid and minimise impacts on biodiversity values. The area of highest biodiversity value within the development is the patch of vegetation zone PCT 3262, in the south-western section of the site.

As discussed in Section 4.4, this vegetation zone corresponds with the TEC *Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion*. This vegetation community is listed as Critically Endangered under the BC Act. Approximately 0.07 ha of this remnant native vegetation would be retained at the south-western end of the subject land.

In addition to efforts to minimise impacts at the design stage, NextDC propose to implement an engineering plan to protect trees located along the eastern boundary of the development footprint, with tree protection zones implemented for each of these trees. Some of trees to be retained along the southern boundary are part of patches of Sydney Turpentine-Ironbark Forest on the subject land.

In addition to avoiding impacts to 0.07 ha of *Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion* TEC, the proposed development is avoiding and minimising impacts on biodiversity as follows:

- The majority 62% of the development footprint has been concentrated in areas where there are no biodiversity values.
- There are no impacts to breeding habitat for threatened species.
- Indirect impacts to adjacent habitat are unlikely to result from the proposed development given the adjacent land is highly disturbed primarily consisting of gardens and cleared lawn.
- Measures suggested to minimise impacts to biodiversity include supervision of vegetation removal by an ecologist to ensure any fauna present are taken into care and relocated into similar nearby habitat.

It is noted that while efforts have been made to avoid and minimise impacts to areas of high biodiversity such as the identified STIF community in the south western edge of the site, the development footprint has been dictated by the future implementation of a Council Road as part of the Ryde Development Control Plan 2014. Figure 4.1.1 of the Ryde DCP shows the future construction of Road 5 and Road 13 within the Project Site which ultimately dictates the dimensions of the Development Footprint. As discussed above, the proposed development has been able to avoid impacts to a portion of *Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion* TEC in the south western corner as well as established native vegetation along the eastern boundary along future Road 13.

The development footprint has been located in a way which avoids and minimises impacts as outlined in Table 18.

Table 18: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed and justification
Locating and designing the project in areas where there are no biodiversity values	Where possible the project has utilised areas where there are few biodiversity values. The development footprint has utilised 1.40 ha of existing built areas which contains no native vegetation values. The development footprint and has also utilised 0.12 ha of the area of exotic grassland with limited biodiversity value.
Locating and designing the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project has been located in areas where vegetation and threatened species habitat is in the poorest condition including exotic vegetation. The project will still require the removal of 0.35 ha of STIF.
Locating the project (including ancillary facilities) in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC, a highly cleared PCT or an entity at risk of a serious and irreversible impact (SAII)	There will be 0.35 ha of impact to Sydney Turpentine Ironbark Forest which is a CEEC under the NSW BC Act. The project has sought to retain a 0.06 ha area within the subject land of this CEEC. By avoiding part of this PCT, the project has partly avoided vegetation that is a listed candidate SAII. It has also avoided potential foraging habitat for threatened fauna species <i>Lathamus discolor</i> (Swift Parrot) which is listed as endangered under the BC Act and Critically Endangered under the EPBC Act. It is possible that this species could forage within the retained vegetation as there are mapped Important Area maps for Swift Parrot (DPE 2023) near to the development footprint. Swift Parrot has the highest biodiversity risk weighting at 3.0 and is also listed as candidate SAII. Residual impacts to threatened species and vegetation in high threat categories will be appropriately offset.
Locating the project outside of the buffer area around breeding habitat features such as nest trees or caves.	The project does not contain evidence of caves which could be breeding habitat for species credit species within the development footprint. There are hollow-bearing trees present on site which may be affected by the development.
Locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The project is not well connected to vegetation outside of the subject land. The project will result in an overall reduction in the extent of PCT 3262 and genetic diversity for species within the subject land. The project has been located to utilise existing cleared land where possible. There is approximately 0.84 ha (PCT 3262 and Planted native) vegetation present within the subject land. Of which, 0.62 ha will be directly removed for the development footprint. The remaining 1.61 ha is made up of planted exotic and native species, exotic grassland and built environment. The retention of the 0.23 ha of canopy (includes PCT 3262 and Planted Native canopy) will continue to provide stepping-stone habitat for highly mobile species and allow for exchange of some genetic material within the subject land and broader locality.

6.1.2. Prescribed biodiversity impacts

Prescribed biodiversity impacts will be minimised as follows:

The 0.16 ha of planted native vegetation and 0.06 ha of PCT 3262 to be retained may provide foraging habitat or shelter sites (e.g. birds nest and possum dreys) for common peri-urban fauna. Removal of vegetation should be supervised by an ecologist to ensure animal welfare should fauna be present.

Where corridors or other areas of connectivity link habitat for threatened entities was considered as a prescribed impact to biodiversity.

6.2. Designing a project to avoid and minimise impacts on biodiversity values

6.2.1. Direct and indirect impacts

The project has been designed consistent with surrounding development in the locality. Given the majority of the site does not require assessment or offsets for removal of vegetation, the project has been designed to create a residential area consistent with the surroundings, including linkage of the access road to adjacent future developments.

The development has been designed in a way which avoids and minimises impacts as outlined in Table 19.

Table 19: Designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed and justification
Locating ancillary facilities in areas that have no biodiversity values	Ancillary features will be located at the in predominantly cleared or exotic vegetation areas with limited biodiversity value. Additionally, temporary ancillary features required during construction (such as stockpiles) and will not require the removal of native vegetation or biodiversity values.
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)	<p>Impacts are confined to areas which have no biodiversity values, this includes 1.0 ha of built environment 0.12 ha of biodiversity with reduced biodiversity values (exotic grassland).</p> <p>Th remaining direct impacts to native vegetation belonging to:</p> <ul style="list-style-type: none"> • Vegetation Zone 1 (moderate condition) = 0.30 ha • Planted Native = 0.27 • Planted exotic/native = 0.09 ha <p>Only one native vegetation zone occurs within the subject land, PCT 3262-good. The vegetation integrity score for this vegetation zone is 57.6. Approximately 0.06 ha of this vegetation will be retained.</p>
Locating ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g., an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAIL)	The development footprint has retained 0.06 ha of PCT 3262. This patch is listed as a critically endangered ecological community under the BC Act and is a candidate entity at risk of a Serious and Irreversible Impact.
Actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.	<p>The proponent is proposing to retain 0.06 ha of Sydney Turpentine Ironbark Forest. It is not yet known if activities that provide on-going maintenance, such as weed management of these areas are proposed.</p> <p>The proponent may consider the inclusion of native species as part of their landscape design that align with Sydney Turpentine Ironbark Forest species; however, landscape designs have yet to be finalised.</p>

6.2.2. Locating a project to avoid and minimise prescribed biodiversity impacts

Where corridors or other areas of connectivity link habitat for threatened entities was considered as a prescribed impact to biodiversity. The development footprint has been located in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 20.

Table 20: Locating a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed and justification
Locate surface works to avoid direct impacts on the habitat features	<p>The development footprint does not comprise any identified breeding habitat in the form of caves/cliffs etc.</p> <p>There were two hollow-bearing trees identified within the subject land. These HBTs are highly unlikely to constitute breeding habitat for the list of SAI microbats as they are primarily cave breeding species. A pre-clearance survey and clearance supervision will minimise any potential impacts to species which may be using these features.</p> <p>As discussed above, impacts to 0.06 ha of a TEC have been avoided.</p>
Locating the envelope of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features, e.g., locating long wall panels away from geological features of significance or water dependent plant communities and their supporting aquifers	<p>The project will not require substantial sub-surface works that would alter ground flow or hydrological processes that affect the long-term viability of the vegetation communities or species dependent on habitat features. Urban barriers such as residential development and roads separate the subject land from adjacent vegetation communities.</p>
Locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	<p>Connectivity across the subject land is already fragmented from vegetation within the assessment area, however, connectivity exists within patches of vegetation within the subject land. The project has avoided some impacts on vegetation by retaining a patch of PCT 3262 (0.06 ha). The development site does not include any important mapped areas of habitat for threatened species. The development site is located in proximity (within 2km) to Important Areas mapped for Swift Parrot, however the development is unlikely to create a barrier to movement for Swift Parrot between areas of nearby mapped important areas.</p>

6.2.3. Prescribed biodiversity impacts

Prescribed biodiversity impacts are likely to be minimal and the measures outlined in Section 6.1.2 will ensure they are minimised

6.2.4. Designing a project to avoid and minimise prescribed biodiversity impacts

The development has been designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 21.

Table 21: Designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
	Design of project elements to minimise interactions with threatened entities	As discussed, the subject land is located within a highly urbanised environment and is surrounded by major roads. It is unlikely that there would be threatened fauna entities that frequent the subject land other than some highly mobile bird and bat species. There are no design elements proposed to avoid interactions with threatened bird or bat species.
	Maintain environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation	There are no processes that are critical to the formation and persistence of habitat features that are not associated with native vegetation within the subject land.
	Maintain hydrological processes that sustain threatened entities	No hydrological process that sustains threatened entities were recorded within the subject land.
	Controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities	Changes to stormwater or other water released from the development footprint and future development has not yet been assessed. Detailed stormwater modelling and treatment plan should be undertaken as part of the project and mitigation measures implemented to ensure stormwater quantity and quality from the future development does not impact the receiving environment.

7. Assessment of Impacts

7.1. Direct impacts

The direct impacts of the development on:

- native vegetation and threatened ecological communities are outlined in Chapter 8
- threatened species
- prescribed biodiversity impacts is outlined in Section 7.4.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 7.

Impacts to a candidate SAI ecosystem, Sydney Turpentine Ironbark Forest will occur.

Ecosystem credit species listed in Table 22, as being included, may be affected through a loss of foraging habitat as the majority of the vegetation within the subject land will be removed. Retained foraging habitat may include 0.71 ha of native vegetation (remnant PCT 849 and planted native vegetation).

Table 22: Direct impacts to native vegetation

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)
3262	<i>Sydney Turpentine Ironbark Forest</i>	Critically Endangered	N/A - the condition of the vegetation does not meet EPBC Act thresholds	0.35

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7.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 23.

Table 23: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	3262	Good	0.35	60.4	0	-60.4

7.3. Indirect impacts

The indirect impacts of the development are outlined in Table 24. Indirect impact zones are shown on Figure 8.

Table 24: Indirect impacts

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
Inadvertent impacts on adjacent habitat or vegetation	Damage during construction to existing native vegetation	PCT 3262 and habitat for common species.	Short term and during bulk earthworks.	Loss of habitat and vegetation communities.

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
	for retention including native trees within the proposed retention area. Vegetation outside the footprint.			
Reduced viability of adjacent habitat due to edge effects	Changing light and soil moisture from exposure.	PCT 3262 and habitat for common species in planted native vegetation.	Long term during construction and operation.	Changes to soil conditions and potential changes to composition.
Reduced viability of adjacent habitat due to noise, dust or light spill	Noise and dust from machinery movement. No night works proposed - light spill unlikely.	PCT 3262, and habitat for common species in planted native vegetation..	Daily during bulk earthworks. Intermittently after vegetation removal, during truck movement, dry periods or heavy winds.	Temporary loss of habitat quality.
Transport of weeds and pathogens from the site to adjacent vegetation	Spread of weeds from adjacent areas. Minor impacts as vegetation in adjacent areas predominately mulched, landscaping gardens. Exotic ground storey species already present in adjacent vegetation.	PCT 3262.	During bulk earthworks daily due to vehicle movement and dust and water movement.	Minor increases in weed cover.
Increased risk of starvation or exposure and loss of shade or shelter	Potential loss of habitat due to the removal of vegetation. Minor impact as the existing canopy is already highly isolated.	Common species.	Long term during construction and operation	Loss of individuals
Loss of breeding habitat	One hollow bearing tree with a small hollow (approx. 3 cm) 4 m above the ground is proposed for removal. Minor impact considering the small size of the hollow and locality.	Common species.	Long term during construction and operation	Loss of individuals
Trampling of threatened flora species	Negligible chance of trampling since no threatened flora was observed on the subject site.	Unlikely to be any.	During construction	Temporary crushing of plants
Inhibition of nitrogen fixation and increased soil salinity	Not likely to occur.	NA	NA	NA

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
Fertiliser drift	Not likely to occur, not part of development.	NA	NA	NA
Rubbish dumping	Rubbish dumping from construction workers, public during bulk earthworks.	PCT 3262.	Intermittently when contractors are on site	Shading of plants, potential impact to fauna including death of fauna from consuming rubbish left on site from contractors.
Wood collection	Not likely to occur as the subject land is within a highly urbanised area.	NA	NA	NA
Removal and disturbance of rocks including bush rock	Not likely to occur as no surface rock is present.	NA	NA	NA
Increase in predators	Increase presence of exotic fauna species such as feral cats and foxes is not likely to occur as a result of the development as the area is already highly urbanised.	NA	NA	NA
Increase in pest animal populations	Increased presence of exotic fauna species such as <i>Acridotheres tristis</i> (Common Myna), is not likely to occur as a result of the development since they already are present in the surrounding areas due to existing urbanisation.	NA	NA	NA
Changed fire regimes	Not likely to occur due to the urbanised nature of the subject land	NA	NA	NA
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	No specialist breeding or foraging habitats are present, hollow loss is dealt with in other indirect impact categories	NA	NA	NA
Sedimentation and contaminated and/or nutrient rich run-off	Runoff during construction resulting in changes to habitat.	Adjacent soils and groundcover vegetation.	During construction	Nutrient enrichment in retained vegetation

7.4. Prescribed biodiversity impacts

The subject land has the prescribed biodiversity impacts as outlined in Table 25.

Refer to Section 8.3 of the BAM.

Table 25: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification	Additional information
Karst, caves, crevices, cliffs, rocks and other geological features of significance	N/A – no geological features are present	N/A	N/A	N/A
Human made structures or non-native vegetation	As discussed in Section 5.3.2, two buildings, external infrastructure and garden vegetation will be demolished.	Unlikely to have impacts to any threatened species.	There was no evidence of microbats during an external inspection. A single potential entry/exit point into the southern building was observed. External infrastructure and garden vegetation unlikely to support permanent habitat.	Inspection of southern building where vent opening occurs should be undertaken prior to work to ensure no fauna are present within during construction/demolition activities. Stop-work measures should be in place in the event fauna are observed within the other buildings and an ecologist contacted for advice / further investigation. An ecologist should supervise removal of vegetation to ensure animal welfare should fauna be present.
Habitat connectivity	Vegetation present at the subject land forms an isolated patch, with more suitable habitat present to the north-east along the Lane Cove River. Only highly mobile threatened species are likely to occur within the subject land (e.g. bats and birds).	The proposal will remove foraging habitat for mobile bird and bat species. Unlikely to have significant impacts to any threatened species.	Habitat for threatened species within the subject land is marginal and is not well connected with areas of large intact foraging habitat.	N/A
Water bodies, water quality and	N/A - no water bodies are present	N/A	N/A	N/A

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification	Additional information
hydrological processes				
Wind turbine strikes on protected animals	N/A	N/A	N/A	N/A
Vehicle strikes	The locality is already highly urbanised, and vehicle strike is an existing threat to fauna. The proposed development will involve construction of internal roads which may result in additional threats to fauna from vehicle strike.	Potential increase in fauna injury and mortality.	The landscape is highly developed and vehicle strike as a result of the proposed development is unlikely, particularly as habitat for ground dwelling and arboreal fauna is relatively sparse.	Vehicle strike impacts are unlikely to increase substantially above the existing levels.

7.5. Mitigating and managing direct and indirect impacts

Measures proposed to mitigate and manage impacts at the subject land before, during and after construction are outlined in Table 26.

Table 26: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Timing works to avoid critical life cycle events such as breeding or nursing	Low.	Negligible.	Preclearance surveys should be undertaken prior to vegetation removal to identify any fauna.	Ensuring animal welfare and protection.	Prior to and during vegetation removal.	Project Ecologist.
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Low. However, preclearance surveys will confirm fauna presence.	Negligible.	Clearing protocols to manage wildlife.	Risk to wildlife reduced.	During construction.	Project Ecologist.
Installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the impacted site, e.g. nest boxes	N/A – no important habitat features are being removed as part of the proposal. As such, artificial roost structures are not required.	N/A	No critical habitat is proposed for removal. No nest boxes or other artificial structures are proposed.	-	-	-
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chain-saw, rather than heavy machinery, is preferable in situations where partial clearing is proposed.	High.	Low.	Instigate clearing protocols (installation of fencing around vegetation to be retained, no-go signage) to limit inadvertent clearing. Ensure all contractors are inducted and understand where no-go areas are	Clearing limited to only the areas approved for clearing. Foraging habitat retained in situ.	Prior to construction and during operation	Contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			Complete regular inspections of fencing to ensure they are functional and fit for purpose			
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment.	Moderate.	Low.	Erect and maintain erosion and sediment controls.	Accidental incursions minimised.	Before construction.	Contractor.
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise.	Moderate.	Low.	No noise barriers proposed as noise will be limited to the current operational areas of the site and would be temporary (during construction). Only conduct clearing and operation of machinery inside of typical work hours	Minimise noise disturbance to fauna and neighbouring communities.	During construction	Contractor
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill.	Low.	Negligible.	Consideration of directional and fauna sensitive lighting in the design of the building for use during operation. Conduct works during daylight hours.	Avoid light disturbance to nocturnal fauna.	At design and during construction and operation.	Architect, Contractor.
Adaptive dust monitoring programs to control air quality	Low.	Negligible.	Implement industry practice controls of dust at bulk earth works sites	Dust impacts on adjacent habitats and neighbouring communities is minimised.	Construction.	Contractor.

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting.	Low.	Negligible.	Preclearance surveys should be undertaken prior to vegetation removal to identify any fauna.	Ensuring animal welfare and protection.	Prior to and during construction.	Contractor.
Temporary fencing to protect significant environmental features such as riparian zones.	Low.	Negligible.	Erect and maintain construction fence.	Accidental incursions minimised.	Before and during construction.	Contractor.
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas.	Low.	Negligible.	Carry out site inductions to explain environmental significance of the subject land.	Accidental incursions minimised.	Before and during construction.	Contractor.
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented.	Moderate.	Low.	Carry out site inductions to explain environmental significance of the subject land.	Accidental incursions minimised.	Before and during construction.	Contractor.
Development control measures to regulate activity in vegetation and habitat adjacent to residential development including controls on pet ownership, rubbish disposal, wood collection, fire management and disturbance to nests and other niche habitats	Moderate.	Low.	Relevant DCP conditions apply to the site to limit vegetation clearance. Contractor to ensure site is well maintained with adequate facilities for rubbish disposal.	Reduce unnecessary clearing of vegetation post construction. Prevent litter occurring in retained vegetation on or adjacent to site.	Operation.	Council, Contractor.
Making provision for the ecological	Moderate. A small	Low.	Delineate area of retained PCT	N/A	Ongoing.	Contractor.

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the subject land.	amount of native vegetation is proposed for retention within the subject land.		to ensure protection.			

7.6. Mitigating prescribed impacts

Measures proposed to mitigate and manage prescribed biodiversity impacts at the subject land before, during and after construction are outlined in Table 23

Table 27: Mitigation measures for prescribed biodiversity impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Scheduling timing of construction activities to avoid critical life cycle events.	Moderate.	Low.	Preclearance surveys should be undertaken prior to removal of vegetation to identify any trees containing nest or possum dreys. A preclearance survey of part of the southern building where vent is located and external infrastructure within the subject land is recommended to ensure no microbat species are present prior to demolition.	Ensuring animal welfare and protection.	Prior to vegetation removal and demolition.	Project Ecologist.
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecological or licensed wildlife handler during clearing, construction and maintenance	Moderate.	Low.	An ecologist be present to supervise removal of non-native vegetation and care and relocation of fauna (if present). Stop-work measures if fauna species are	Ensuring animal welfare and protection.	During vegetation removal. Prior to and during demolition of buildings.	Project Ecologist, Site Manager.

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
activities for human made structures and non-native vegetation.			observed within buildings.			
Retaining habitat features within the subject land or relocating them to adjacent retained remnant vegetation.	Low.	Negligible.	An ecologist be present to supervise removal of non-native vegetation and care and relocation of fauna and habitat (if present). Stop-work measures if fauna species are observed within buildings.	Ensuring animal welfare and protection.	Prior and during vegetation removal and building demolition.	Project Ecologist.
Installing artificial connectivity measures to re-establish connections between habitat and favoured transport corridors.	N/A	N/A	N/A	N/A	N/A	N/A
Erecting temporary fencing to protect significant environmental features such as karst, caves, rock outcrops and water bodies.	N/A	N/A	N/A	N/A	N/A	N/A
Replacing habitat provided by human made structures and non-native vegetation with alternative habitat.	Low	Low	If microbats are present in buildings, consider preparation of compensatory habitat plan and provision of nest boxes. Follow clearance protocols for any nests or dreys encountered in the planted vegetation to be removed.	Replacement of habitat features for microbats, birds or arboreal species.	During construction.	Project Ecologist.

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			Garden vegetation removed during construction will be supplemented with the installation of landscaping areas on the northern and eastern sides of the site.			
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment.	Low.	Negligible.	Standard sediment and erosion control (SEC) measures and dust control measures should be implemented.	Contain sediments within the site to avoid entering stormwater.	Establish SEC measures prior to works commencing.	Contractor.
Staff training and site briefing to communicate environmental features to be protected and measures implemented to protect them.	High.	Low.	Train staff regarding the protection of retained vegetation within the subject land and within the indirect impact areas.	Staff aware of no-go zones and protection zones.	Prior to works commencing onsite.	Contractor.
Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on or adjacent to the subject land.	Moderate. A small amount of native vegetation is proposed for retention within the subject land.	Low.		Retention of remnant native vegetation.	Prior to and during construction and operation.	Contractor.
Development control measures that regulate the types of activities that can occur in native vegetation and habitat adjacent to residential development including prohibiting the collection of bush rocks	N/A	N/A	N/A	N/A	N/A	N/A

7.7. Adaptive management strategy

Adaptive management for uncertain biodiversity impacts (that are infrequent or difficult to measure) is not relevant or required for the proposed development

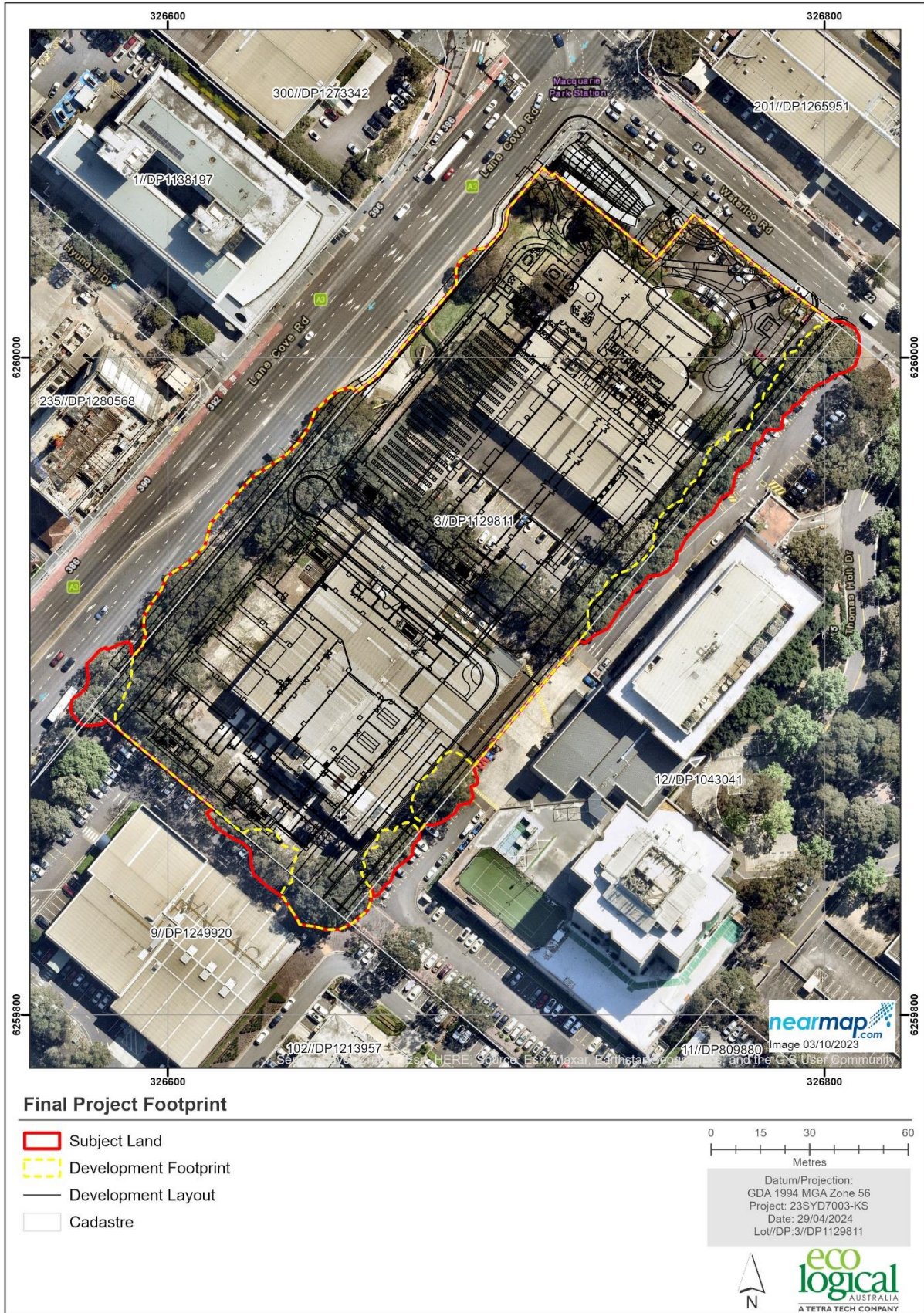


Figure 7: Final project footprint including construction and operation



Figure 8: Indirect impact zones

8. Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

8.1. Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 28. Detailed consideration of whether impacts on TECs that are serious and irreversible is included in Table 29.

Table 28: Serious and Irreversible Impacts Summary

Ecological Community/Species	Principle	Direct impact individuals / area (ha)
<i>Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion</i>	Principle 1	0.35

Table 29: Evaluation of an impact on a Sydney Turpentine-Ironbark Forest consistent with 9.1.1 of the BAM

Impact Assessment Provisions	Assessment
1. the action and measures taken to avoid the direct and indirect impact on the potential entity for an SAI	Measures taken to avoid the direct and indirect impacts to Sydney Turpentine-Ironbark Forest as addressed in Section 6 and include retention of 0.06 ha of Sydney Turpentine-Ironbark Forest adjacent in the south-western section of the subject land. Indirect impacts on retained and adjacent patches of Sydney Turpentine-Ironbark Forest TEC will be managed during construction through fencing, signage and tree protection measures.
2a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	<p>Prior to European settlement, Sydney Turpentine-Ironbark Forest was commonly found within the Sydney region on soils derived from Wianamatta Shale (BioNet 2024), covering approximately 30,339 ha (NPWS 2004). It has been estimated that there has been up to a 90 % reduction in the current geographic extent of Sydney Turpentine Ironbark Forest (BioNet, 2024).</p> <p>. The remaining total extent is estimated to be around 2,940 ha based on a larger survey area as described in the Final Determination of this CEEC.</p>
2b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by:	Sydney Turpentine-Ironbark Forest was originally cleared for agricultural development during European settlement in the inner west of Sydney before expansion of suburbs throughout the nineteenth century (DECCW 2010). Additional anthropogenic impacts including logging and burning have also had a factor in the TECs decline (DECCW 2010). In relation to the ecological function of the community:
i. change in community structure	2. the structure of the community has changed as a result of anthropogenic disturbances. Areas where large mature trees have been removed has resulted in higher densities of smaller trees more typical of a regrowth forest. In other areas these may more typically resemble woodland or open woodland communities. Areas that have had increased fire frequencies has led to simplification in the vegetation structure (NSW DCCEEW).
ii. change in species composition	
iii. disruption of ecological processes	
iv. invasion and establishment of exotic species	
v. degradation of habitat, and	
vi. fragmentation of habitat	3. the composition of the community has changed with a general reduction in diversity of native species. In areas where there have been increased fire frequencies there has been a loss of slow-maturing, fire sensitive species (NSW DCCEEW). In contrast, areas that have had an extended history of fire exclusion have resulted in an increased cover of

Impact Assessment Provisions	Assessment
	<p>mesic midstorey species, increases in the number of exotic species and lower diversity of native understorey species (NSW DCCEEW).</p> <ol style="list-style-type: none"> 4. ecological processes are the interactions between biota and abiotic components such as water cycle, mineral cycle, decomposition and nutrient cycles, reproduction / pollination and food webs. With a reduction in the extent of Sydney Turpentine Ironbark Forest into smaller isolated and fragmented patches and a reduction in biodiversity of flora and fauna, such ecological processes have been disrupted. Understanding these processes can be complex, but as an example, the loss of certain pollination vectors is likely to lead to the local extinction of some flora species. Changes to fire regimes, particularly due to the urban setting of western Sydney is another example of disruptions to ecological processes. 5. as discussed above, invasion and establishment of exotic species has become a significant problem within Sydney Turpentine-Ironbark Forest. This community is particularly vulnerable to due remnants often occurring adjacent to rural and urban areas leading to invasion of weeds from gardens and nutrients from runoff (NSW DCCEEW 2024). 6. the clearing and fragmentation of Sydney Turpentine-Ironbark Forest into smaller and more isolated patches makes the remaining of areas of Sydney Turpentine-Ironbark Forest more susceptible to habitat degradation. Degradation results from all the factors listed above including edge effects, weed invasion, disruption of ecological processes and loss of biodiversity. 7. fragmentation of Sydney Turpentine-Ironbark Forest has reduced the resilience of the community. With many of the remanent patches being in close proximity to rural and urban land, there is continued ongoing pressure of clearing for routine land management practices (NSW DCCEEW 2024).
<p>2c. evidence of restricted geographic distribution (Principle 3, clause 6.7 (2) (c) BC Regulation), based on the TECs geographic range in NSW according to the:</p> <ol style="list-style-type: none"> i. extent of occurrence ii. area of occupancy, and iii. number of threat-defined locations. 	<p>This principle does not apply to Sydney Turpentine-Ironbark Forest TEC. However, the distribution of Sydney Turpentine-Ironbark Forest TEC is restricted to the Sydney Basin Bioregion and originally occupied 30,339 ha (pre-1750) (DECCW 2010).</p> <p>The current area of occupancy is estimated at 2,495 ha (CoA 2014) and the extent of occurrence is not listed in the Final Determination or the EPBC Act Conservation or Listing Advice.</p>
<p>2d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7 (2) (d) BC Regulation).</p>	<p>This principle does not apply to Sydney Turpentine-Ironbark Forest TEC.</p>
<p>3. Where the TBDC indicated that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in subsection 9.1.1(2), the assessor must record this in the BDAR or BCAR.</p>	<p>N/A</p>
<p>4a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:</p> <ol style="list-style-type: none"> i. in hectares, and 	<ol style="list-style-type: none"> i. The total area of Sydney Turpentine-Ironbark Forest TEC affected by the proposed development is 0.35 ha. ii. Assuming that 2,940 ha of Sydney Turpentine-Ironbark Forest remains today, the Sydney Turpentine-Ironbark Forest affected by the proposed

Impact Assessment Provisions	Assessment
<p>ii. as a percentage of the current geographic extent of the TEC in NSW.</p>	<p>development represents 0.01 % of the current geographic extent of the TEC in NSW.</p>
<p>4b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:</p> <p>i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals</p> <p>ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:</p> <ul style="list-style-type: none"> • distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and • estimated maximum dispersal distance for native flora species characteristic of the TEC, and • other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development <p>iii. describing the condition of the TEC 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 extent that the proposed development is likely to contribute to further environmental degradation and disruption of biotic processes of Sydney Turpentine-Ironbark Forest is discussed below, in relation to:</p> <p>i. remaining areas of TEC within 500 m of the development footprint is 0.30 ha of vegetation previously mapped as Sydney Turpentine-Ironbark Forest, based on the SVTM (NSW DCCEEW 2022).</p> <p>ii. The existing condition of the Sydney Turpentine-Ironbark Forest TEC within the subject land is already a highly isolated patch. The vegetation is in a low condition and consists of native and planted canopy species, native midstorey and a ground cover containing a mix of native, planted native and exotic species. The area of TEC to be retained will largely remain the same and therefore the average distances between surrounding patches would remain the similar.</p> <p>ii. Dispersal of native flora species characteristic of the TEC would be severely restricted due to its isolation and location in the landscape. There would be some potential for dispersal by highly mobile species commonly observed within urban landscapes, otherwise any dispersal to other remnant patches of the TEC would be limited.</p> <p>v. The vegetation integrity score for the vegetation zone PCT 3262, which is the only vegetation zone within the subject land containing the Sydney Turpentine Ironbark Forest TEC, is 60.4. This score is derived from a composition score of 64.4, a structure score of 76 and a function score of 45. A breakdown of these scores is contained in Appendix C.</p>

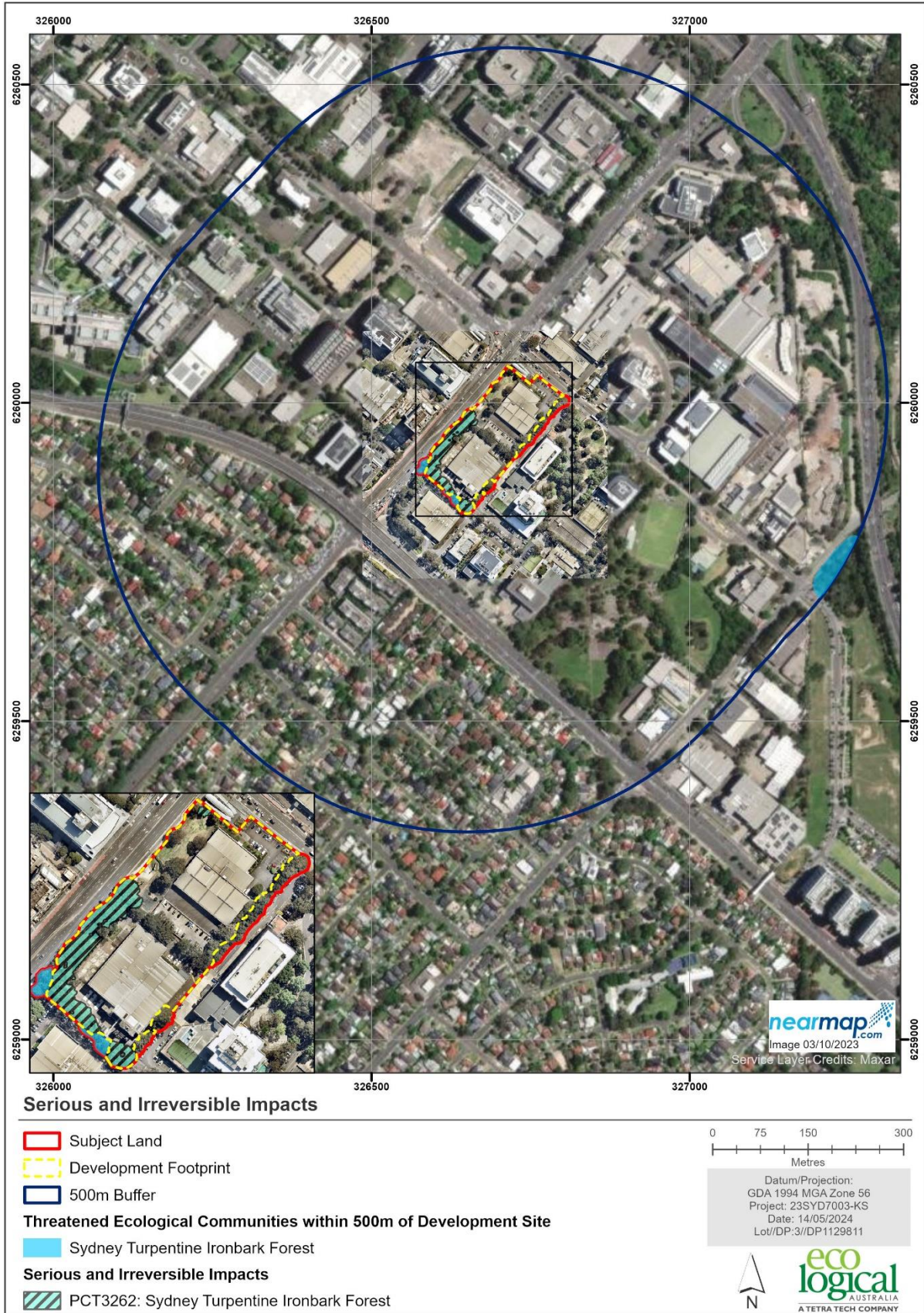


Figure 9: Serious and Irreversible Impact Assessment for Sydney Turpentine Ironbark Forest.

8.2. Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 30 and shown on Figure 10.

Table 30: Impacts to native vegetation that require offsets

Vegetation Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1	3262	<i>Sydney Turpentine Ironbark Forest</i>	Northern Hinterland Sclerophyll Forests	Wet Forests (Grassy sub-formation)	0.35

8.3. Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are outlined in Table 31 and shown on Figure 11.

Table 31: Impacts to native vegetation that do not require offsets

Vegetation Zone	PCT ID	PCT Name	Direct impact (ha)	Rationale
Planted native vegetation	-	-	0.27	The decision-making key for planted native vegetation outlined in Appendix D of BAM 2020 was reviewed and determined that the removal of planted native vegetation does not require offsets (see Section 2.2 of this BDAR)
Planted exotic/native vegetation	-	-	09	Planted native vegetation has been assessed using the planted native streamlined assessment module as described above. Exotic vegetation does not require offsets and has been considered as a prescribed impact.

8.4. Areas not requiring assessment

Areas not requiring assessment as shown in Figure 12. These areas contain hardstand surfaces and buildings where no vegetation is present.

These areas have been assessed for potential impacts to threatened species habitat as a prescribed impact.

8.5. Credit summary

The number of ecosystem credits required for the development are outlined in Table 32. A biodiversity credit report is included in Appendix E.

Table 32: Ecosystem credits required

Vegetation Zone	PCT ID	PCT Name	Credit Class	Direct impact (ha)	Credits required
1	3262	<i>Sydney Turpentine Ironbark Forest</i>	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion This includes PCT's: 3262	0.35	13

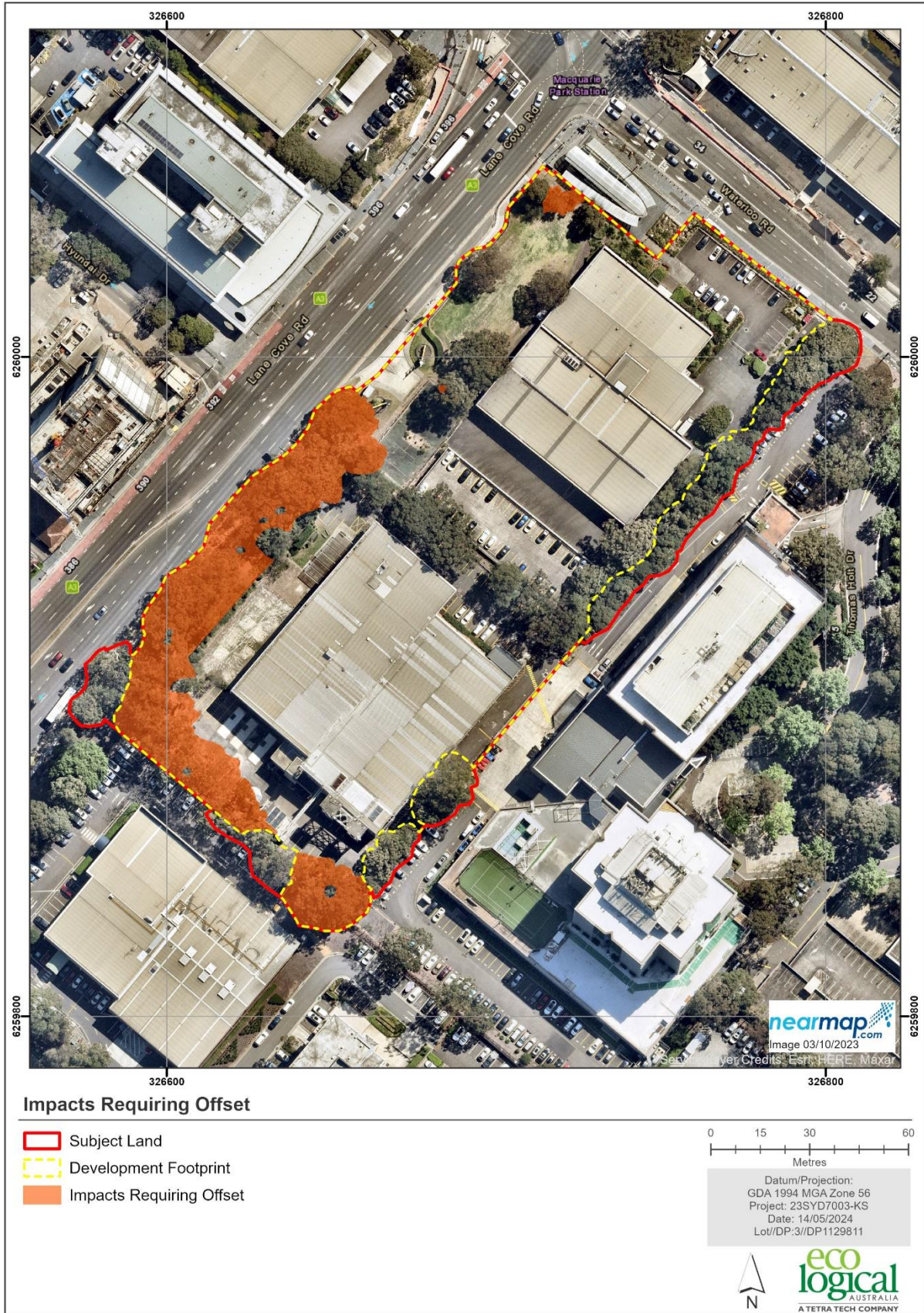


Figure 10: Impacts requiring offset

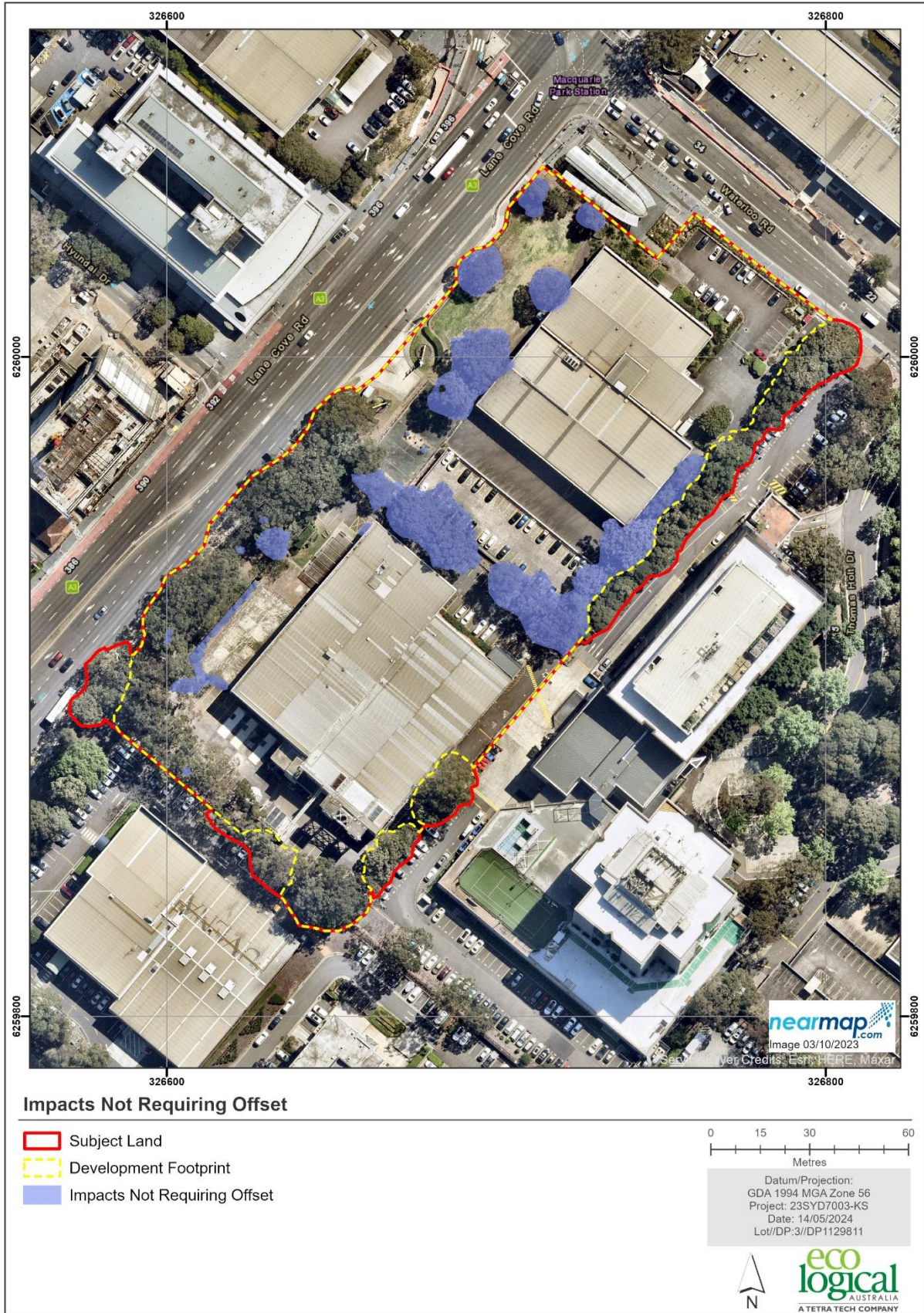


Figure 11: Impacts not requiring offset

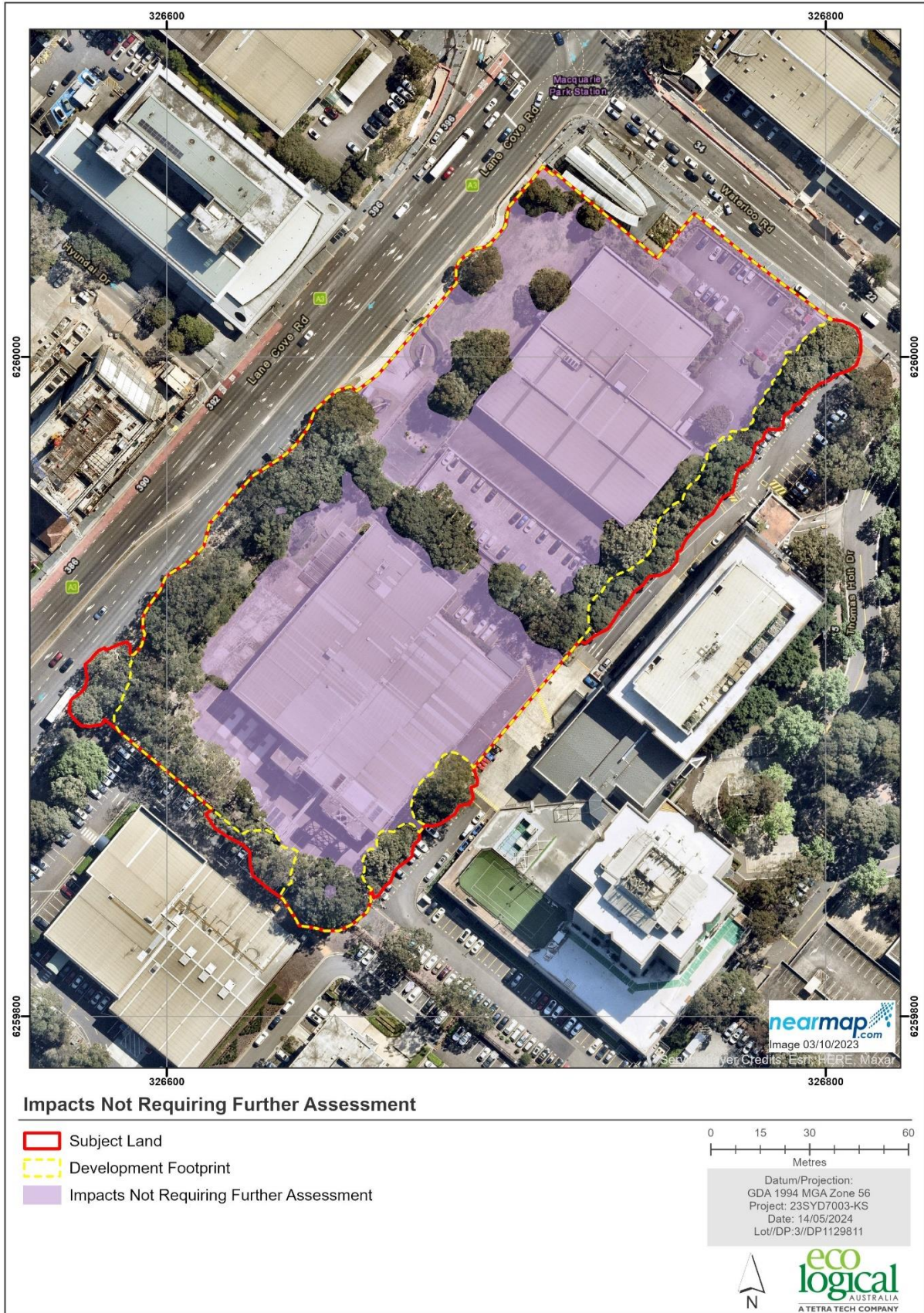


Figure 12: Areas not requiring assessment

9. Consistency with legislation and policy

Additional matter relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential Matters of National Environmental Significance (MNES) in accordance with the EPBC Act have been addressed in Section 9.1. The likelihood of occurrence table for the EPBC Act listed species is provided in Appendix D.

9.1. Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where Matters of National Environmental Significance (MNES) may be affected. Under the Act, any action which 'has, will have, or is likely to have a significant impact on a matter of MNES' is defined as a controlled action, and requires approval from the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), which is responsible for administering the EPBC Act.

The process includes undertaking an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be affected as a result of the proposed action. Significant impact guidelines that outline a number of criteria have been developed by the Commonwealth Department of Agriculture, Water and Environment (DAWE) (2013), to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

Three MNES have been assessed as a part of this assessment:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo),
- *Lathamus discolor* (Swift Parrot),
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

These assessments are presented in Appendix E.

9.1.1. Turpentine-Ironbark Forest of the Sydney Basin Bioregion

Turpentine-Ironbark Forest of the Sydney Basin Bioregion is listed as CEEC under the EPBC Act. Since European settlement, this TEC is estimated to have seen a reduction up to 90% (BioNet 2024). Within the subject land, no patches of PCT 3262 vegetation met the condition thresholds outlined in the approved listing advice (Commonwealth of Australia, 2014) due to patch sizes being less than 1 ha in size and adjacent vegetation lacking a native midstorey/understorey. Therefore, a test of significance under the EPBC Act is not required for the vegetation present within the subject land.

10. Conclusion

Eco Logical Australia (ELA) was engaged by NextDC Pty Ltd to prepare a Streamlined (small area) Biodiversity Development Assessment Report (BDAR) for 269 Lane Cove Road, Macquarie Park (subject land) within the City of Ryde local government area. The proposed development involves removal of all vegetation and existing infrastructure to develop two multi-storey industrial data centre buildings to serve as a Data Centre precinct.

The subject land (Lot 3 DP1129811) contains two buildings with two external car parks, one which is multiple levels, a disused tennis court, and a loading area at the southern part of the site. The lot contains a number of trees of varying sizes bordering around the lot and a cleared ground storey that is regularly maintained is present on the north-west of the site. A strip of trees is present between the two building, adjacent to the multi-level parking. Some remnant native vegetation is present in the southern part of the site, external to the current fence line.

Native vegetation was mapped within the subject land, consisting of the following:

- 0.41 ha of PCT 3262 *Sydney Turpentine-Ironbark Forest*.
- 0.43 ha of planted native vegetation.
- 0.09 ha of a planted mix of exotic and native vegetation.

PCT 3262 was identified in one condition state by the field survey – being good condition. The canopy species comprised of a mix of remnant and native planted, with *Angophora costata* (Sydney Red Gum) and *Syncarpia glomulifera* (Turpentine) being indicative species of this PCT. Additionally, the midstorey and understorey presented native species commonly associated with this PCT, with planted natives and exotic species also presented in these two strata. More patches of PCT 3262 were present throughout the site, however, it should be noted that the condition state of these patches would be less than that of the surveyed area due to reduced native species and less vegetation structure.

The remaining vegetation within the subject land was either planted native, planted native and exotic mix, or exotic grass.

The proposed development footprint would result in the retention of 0.06 ha of PCT 3262.

A summary of credit requirements to offset impacts to PCT 3262 is shown in the table below.

Summary of ecosystem and species credits required to offset residual impacts of the proposed development

Vegetation Zone	PCT ID	PCT Scientific Name	Condition	Direct impact area (ha)	Credits
Ecosystem credits					
1	3262	<i>Sydney Turpentine Ironbark Forest</i>	Good	0.35	13
Total				0.35	13

Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is a candidate for a Serious and Irreversible Impact (SII) and an assessment has been undertaken to assist the consent authority to decide whether a SII will result.

Potential foraging habitat for the EPBC Act list species *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Lathamus discolor* (Swift Parrot) and *Pteropus poliocephalus* (Grey-headed Flying-fox) will be affected. An assessment of significance for these species concluded that the proposed development is unlikely to cause a significant impact to Gang-gang Cockatoo, Swift Parrot or Grey-headed Flying-fox. A referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not recommended.

A preclearance survey of the vegetation to be removed and the buildings should be inspected by a qualified person ecologist is recommended to ensure that there is no evidence of fauna prior to removal.

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Appendix A Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a subject land, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Subject land	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	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 subject land and the gain in biodiversity values at a biodiversity stewardship site.
Extent of occurrence (EOO)	Measures the spatial spread of a taxon to determine the degree to which risks from threatening factors could impact an entire population, and is not intended to be an estimate of the amount of occupied or potential habitat.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the subject land. In cases where multiple populations occur in the subject land or a population occupies part of the subject land, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

Terminology	Definition
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by DPIE, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the subject land or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the subject land or stewardship site.
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Residual impact	An impact on biodiversity values after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The 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. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a subject land, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by DPIE and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a subject land, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B Vegetation Floristic Plot Data

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 STIF			Plot 2 Grassland		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Agapanthus</i> spp.		,		*			G	5	50			
<i>Allocasuarina littoralis</i>	Black She-Oak	,				Tree (TG)	M	4	1			
<i>Angophora costata</i>	Sydney Red Gum	,				Tree (TG)	U	40	10			
<i>Araujia sericifera</i>	Moth Vine	,		*	1		M	0.5	20			
<i>Axonopus fissifolius</i>	Narrow-leafed Carpet Grass	,		*	1		G	4	20			
<i>Bothriochloa macra</i>	Red Grass	,				Grass & grasslike (GG)	G	0.5	20			
<i>Breynia oblongifolia</i>	Coffee Bush	,				Shrub (SG)	M	0.2	1			
<i>Brunoniella pumilio</i>	Dwarf Blue Trumpet	,				Forb (FG)	G	1	50			
<i>Callistemon</i> spp.		,				Shrub (SG)	M	4	3			
<i>Cardamine</i> spp.		,				Forb (FG)				G	0.1	20
<i>Cayratia clematidea</i>	Native Grape	,				Other (OG)	G	0.5	10			
<i>Cenchrus clandestinus</i>	Kikuyu Grass	,		*	1					G	90	100
<i>Centella asiatica</i>	Indian Pennywort	,				Forb (FG)				G	0.1	5
<i>Cirsium vulgare</i>	Spear Thistle	,		*			G	0.1	1			
<i>Conyza</i> spp.	A Fleabane	,		*						G	0.1	1
<i>Corymbia gummifera</i>	Red Bloodwood	,				Tree (TG)	U	3	4			
<i>Cynodon dactylon</i>	Common Couch	,				Grass & grasslike (GG)	G	10	100	G	5	20
<i>Cyperus gracilis</i>	Slender Flat-sedge	,				Grass & grasslike (GG)	G	0.1	5	G	0.1	5
<i>Denhamia silvestris</i>	Narrow-leaved Orangebark	,				Shrub (SG)	M	2	10			
<i>Dianella caerulea</i> var. <i>producta</i>		,				Forb (FG)	G	4	10			
<i>Dianella revoluta</i> var. <i>revoluta</i>	A Blue Flax Lily	,				Forb (FG)	G	1	5			

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 STIF			Plot 2 Grassland		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Dichondra repens</i>	Kidney Weed	,				Forb (FG)	G	2	10	G	2	50
<i>Dietes</i> spp.		,				Forb (FG)	G	1	5			
<i>Dodonaea triquetra</i>	Large-leaf Hop-bush	,				Shrub (SG)	M	1	1			
<i>Ehrharta erecta</i>	Panic Veldtgrass	,		*	1		G	5	100	G	0.1	10
<i>Entolasia stricta</i>	Wiry Panic	,				Grass & grasslike (GG)	G	0.2	4			
<i>Eragrostis curvula</i>	African Lovegrass	,		*	1		G	1	5			
<i>Eucalyptus microcorys</i>	Tallowwood	,				Tree (TG)	U	8	1	U	25	1
<i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>		,				Tree (TG)	U	40	8			
<i>Gamochaeta</i> spp.		,		*						G	0.1	1
<i>Glycine clandestina</i>	Twining glycine	,				Other (OG)	G	1	10			
<i>Glycine tabacina</i>	Variable Glycine	,				Other (OG)	G	0.5	20			
<i>Hardenbergia violacea</i>	False Sarsaparilla	,				Other (OG)	G	1	1			
<i>Leontodon saxatilis</i>		,		*						G	0.1	5
<i>Ligustrum lucidum</i>	Large-leaved Privet	,		*	1		M	0.5	5			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	,				Grass & grasslike (GG)	G	0.5	1			
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	,		*						G	0.1	20
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	,				Grass & grasslike (GG)	G	5	50			
<i>Modiola caroliniana</i>	Red-flowered Mallow	,		*						G	0.1	10
<i>Ochna serrulata</i>	Mickey Mouse Plant	,		*	1		M	0.2	10			
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	,		*			M	2	2			
<i>Oplismenus aemulus</i>		,				Grass & grasslike (GG)	G	4	50			
<i>Oxalis</i> spp.		,				Forb (FG)	G	0.2	5	G	0.1	10
<i>Oxalis</i> spp.		,				Forb (FG)				G	0.1	5
<i>Oxalis</i> spp.		,				Forb (FG)				G	0.1	5

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 STIF			Plot 2 Grassland		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort, Brazilian Whitlow	,		*						G	0.1	10
<i>Parsonia straminea</i>	Common Silkpod	,				Other (OG)	M	5	5			
<i>Paspalum dilatatum</i>	Paspalum	,		*	1		G	0.1	10	G	0.1	20
<i>Pittosporum undulatum</i>	Sweet Pittosporum	,				Shrub (SG)	M	3	2			
<i>Pseuderanthemum variabile</i>	Pastel Flower	,				Forb (FG)	G	0.5	20			
<i>Senecio madagascariensis</i>	Fireweed	,		*	1		G	0.1	1			
<i>Solanum nigrum</i>	Black-berry Nightshade	,		*						G	0.1	1
<i>Sonchus oleraceus</i>	Common Sowthistle	,		*						G	0.1	5
<i>Sporobolus africanus</i>	Parramatta Grass	,		*			G	0.1	5			
<i>Taraxacum officinale</i>	Dandelion	,		*			G	0.1	1	G	0.1	1

Appendix C Vegetation Integrity Plot Data

PLOT 1

Eco Logical Australia – BAM Plot Data Sheet

Plot number / name	Plot 1 STIF
Project number	23SYD7003
Date (DD/MM/YY)	19/04/2024
Recorder(s)	Daniel McDonald and Hamish Pritchard
Zone (In Collector, 56, 55)	56
Easting (Unless recorded in Collector)	151.1269415 E
Northing (Unless recorded in Collector)	33.7869077 S
Plot orientation	30 N
Slope (degrees and direction)	23SYD7003

Vegetation Zone Identification

Plant Community Type (PCT) - Refer to PCT database	Sydney Turpentine Ironbark Forest
PCT Number	3262
Large Tree Benchmark	80
Vegetation Zone Identification	Zone 1
Condition (e.g. Low, Moderate, Good, Degraded, DNG etc.)	High
Habitat Features (e.g. caves, rock faces, bridges/culverts)	-
General notes	Landscaping plants present. Adapted to fit patch formation.

Growth form groups	Total number of species	Total Cover
Tree (TG)	5	95.0
Forb (FG)	7	9.7
Shrub (SG)	5	10.2
Grass & grasslike (GG)	7	20.3
Other (OG)	5	8.0

Growth form groups	Total number of species	Total Cover
Fern (EG)	0	0.0
High Threat Weeds	8	11.4

Litter sub plots	10 m	30 m	50 m	70 m	90 m	
Litter cover %	73	95	45	100	80	45
Bare ground cover % (OPTIONAL)	0					
Cryptogam cover % (OPTIONAL)	0					
Rock cover % (OPTIONAL)	0					

Stem size classes (DBHOB)	
5-9 cm	1
10-19 cm	1
20-29 cm	1
30-49 cm	1
50-79 cm	1
80 cm +	0
Number of large trees	0

Other Integrity Attributes	
Number of trees with hollows	1
Regeneration (stems <5 cm)	1
Total length fallen logs >10 cm width (m)	0

PLOT 2

Eco Logical Australia – BAM Plot Data Sheet

Plot number / name	Plot 2 Grassland
Project number	23SYD7003
Date (DD/MM/YY)	19/04/2024
Recorder(s)	Daniel McDonald and Hamish Pritchard
Zone (In Collector, 56, 55)	56
Easting (Unless recorded in Collector)	151.1280670 E
Northing (Unless recorded in Collector)	33.7859557 S
Plot orientation	30 N
Slope (degrees and direction)	15 E

Vegetation Zone Identification

Plant Community Type (PCT) - Refer to PCT database	n/a
PCT Number	n/a
Large Tree Benchmark	n/a
Vegetation Zone Identification	n/a
Condition (e.g. Low, Moderate, Good, Degraded, DNG etc.)	-
Habitat Features (e.g. caves, rock faces, bridges/culverts)	-
General notes	Maintained grass area
Fauna species	-

Plot statistics

Greyed out fields are autopopulated

Growth form groups	Total number of species	Total Cover
Tree (TG)	1	25.0
Forb (FG)	6	2.5
Shrub (SG)	0	0.0
Grass & grasslike (GG)	2	5.1
Other (OG)	0	0.0

Plot statistics		Greyed out fields are autopopulated	
Fern (EG)	0		0.0
High Threat Weeds	3		90.2

Litter sub plots		5 m	15 m	25 m	35 m	45 m
Litter cover %	1.4	0	1	5	1	0
Bare ground cover % (OPTIONAL)	0					
Cryptogam cover % (OPTIONAL)	0					
Rock cover % (OPTIONAL)	0					

Stem size classes (DBHOB)	
5-9 cm	0
10-19 cm	0
20-29 cm	0
30-49 cm	1
50-79 cm	1
80 cm +	1
Number of large trees	1

Other Integrity Attributes	
Number of trees with hollows	0
Regeneration (stems <5 cm)	0
Total length fallen logs >10 cm width (m)	0

Appendix D Likelihood of Occurrence Assessment

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the EPBC database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- 'known' = the species was or has been observed on the site
- 'likely' = a medium to high probability that a species uses the site
- 'potential' = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- 'unlikely' = a very low to low probability that a species uses the site
- 'no' = habitat within the subject land and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the subject land or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the subject land intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to State or Commonwealth legislation was not considered necessary.

The records column refers to the number of records occurring within 5 km of the subject land, as provided by the Atlas of NSW Wildlife (BioNet) and Protected Matters Search Tool database search.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
THREATENED FLORA					
<i>Acacia bynoeana</i>	Bynoe's Wattle	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	V	2	No. Not identified opportunistically during field survey.
<i>Acacia pubescens</i>	Downy Wattle	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone.	V	2	No. Not identified opportunistically during field survey.
<i>Acacia terminalis</i> subsp. <i>terminalis</i>	Sunshine Wattle	Confined to the eastern suburbs area of Sydney between Botany Bay and Port Jackson. Occurs in open coastal eucalypt woodland or forest. Usually occurs in sandy soil on creek banks, hills slopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	E	1	No. Not identified opportunistically during field survey.
<i>Allocasuarina glareicola</i>	-	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> . Common associated understorey species include <i>Melaleuca nodosa</i> , <i>Hakea dactyloides</i> , <i>Hakea sericea</i> , <i>Dillwynia tenuifolia</i> , <i>Micromyrtus minutiflora</i> , <i>Acacia elongata</i> , <i>Acacia brownei</i> , <i>Themeda australis</i> and <i>Xanthorrhoea minor</i> . Not killed outright by fire but resprouts from the rootstock. Spreads by vegetative means, such that clumps of up to 100s of stems may be a single individual.	E	0	No. Not identified opportunistically during field survey. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Asterolasia elegans</i>	-	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also likely to occur in the western part of Gosford local government area. Known from only seven populations, only one of which is wholly within a conservation reserve. Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>), Smooth-barked Apple (<i>Angophora costata</i>), Sydney Peppermint (<i>Eucalyptus piperita</i>), Forest Oak (<i>Allocasuarina torulosa</i>) and Christmas Bush (<i>Ceratopetalum gummiferum</i>).	E	0	No. No suitable habitat. No local records.
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	V	0	No. No suitable habitat. No local records.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	The leafless tongue-orchid grows singly or in small colonies in a range of habitats including wet heath and sedgeland, on grasstree plains and in woodland with scribbly gum, silvertop ash, red bloodwood and black sheoak. It often grows near the other tongue-orchids <i>C. subulata</i> and <i>C. erecta</i> . The species is found in coastal areas and nearby ranges south from the Gibraltar Range National Park in New South Wales to East Gippsland between Marlo and Genoa in Victoria.	V	0	Unlikely. Not suitable habitat. No local records.
<i>Cynanchum elegans</i>	White-flowered Wax Plant	Dry rainforest; littoral rainforest; <i>Leptospermum laevigatum</i> - <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> (Coastal Tea-tree– Coastal Banksia) coastal scrub; <i>Eucalyptus tereticornis</i> (Forest Red Gum) or <i>Corymbia maculata</i> (Spotted Gum) open forest and woodland; and <i>Melaleuca armillaris</i> (Bracelet Honeymyrtle) scrub. Restricted to eastern NSW, from Brunswick	E	0	No. No suitable habitat present. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley.			
<i>Darwinia biflora</i>	-	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include <i>Eucalyptus haemastoma</i> , <i>Corymbia gummifera</i> and/or <i>E. squamosa</i> . The vegetation structure is usually woodland, open forest or scrub-heath	V	315	No. No suitable habitat (shale ridges).
<i>Deyeuxia appressa</i>	-	Known from only two pre-1942 records from south of Bankstown and Killara respectively. No species have been collected since 1941. It is suspected that the species occurs on wet ground.	E	1	No. No suitable habitat and considered mostly extinct.
<i>Epacris sparsa</i>	-	Known only from four populations occurring in the lower Grose river area, Avoca Vale Reserve, North Richmond and Faulconbridge. The species occurs on sandy clay soils at the base of rock faces or on rock platforms in riparian flood zones. Sites are frequently subjected to high moisture and are inundated during periods of high rainfall.	V	0	No. No suitable habitat. No local records.
<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	Restricted distribution in a narrow band with the most northerly records in the the Raymond Terrace area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park. Found primarily in poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	V	4	Unlikely. No suitable habitat (Coastal heath mostly on exposed sandy ridges). Not identified opportunistically during field survey.
<i>Genoplesium baueri</i>	Bauer's Orchid	Midge Dry sclerophyll forest and moss gardens over sandstone. Has been recorded from locations between the Shoalhaven area and Pittwater and may occur as far north as Port Stephens.	E	8	Unlikely. No suitable habitat. Not identified during field survey.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Haloragodendron lucasii</i>	-	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest and grows in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels. Highly clonal, which implies the true population size may be considerably smaller than expected.	E	2	Unlikely. No suitable habitat. Not identified opportunistically during field survey.
<i>Hibbertia spanantha</i>	Julian's Hibbertia	Known from three populations occurring within proximity of one another within the Lane Cove River catchment. Most closely associated with coastal dry sclerophyll and northern hinterland wet sclerophyll forests. It prefers areas exposed to greater sunlight and limited competition from other mid and groundstorey species.	CE	6	Unlikely. Not identified opportunistically during field survey.
<i>Kunzea rupestris</i>	-	Occurs in Maroota, Sackville and Glenorie areas of Sydney as well as Kuring-gai Chase National Park. Grows in shallow, sandy, low nutrient soil in depression on sandstone rock platforms. Typically found in shrubland or heathland.	V	0	No. No suitable habitat (heath/shrubland). No local records.
<i>Lasiopetalum joyceae</i>	-	Grows in heath on sandstone. Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved.	V	0	Unlikely. No suitable habitat (heath, shaley ridgetops). No local records.
<i>Leptospermum deanei</i>	Deane's Tea-tree	Occurs in Hornsby, Warringah, Ku-ring-gai and Ryde LGAs. Woodland on lower hill slopes or near creeks. Sandy alluvial soil or sand over sandstone. Occurs in Riparian Scrub - e.g. <i>Tristaniopsis laurina</i> , <i>Baechea myrtifolia</i> ; Woodland - e.g. <i>Eucalyptus haemstoma</i> ; and Open Forest - e.g. <i>Angophora costata</i> , <i>Leptospermum trinervium</i> , <i>Banksia ericifolia</i> .	V	3	No. No suitable habitat. Not identified opportunistically during field survey.
<i>Leucopogon exolasius</i>	Woronora heath	Beard- Restricted to Woronora, Grose and Georges River, and Stokes Creek. Occurs on sandstone in woodland, with a preference for rocky hillsides along creek banks. Found in association with <i>Eucalyptus piperita</i> and <i>E.</i>	V	0	No. No suitable habitat. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		<i>sieberi</i> , and shrub species <i>Pultenaea flexilis</i> , <i>Leptospermum trinervium</i> and <i>Dillwynia retorta</i> .			
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	This species may occur in dense stands forming a narrow strip adjacent to watercourses, in association with other <i>Melaleuca</i> species or as an understorey species in wet forest. Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north.	V	0	No. No suitable habitat within subject land. No local records.
<i>Melaleuca deanei</i>	Deane's Paperbark	Known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. Irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and wetland or aquatic communities. Given its clonal nature, estimation of population size is difficult, as each "colony" may comprise of either several plants, or just one. However, at the Lake Bathurst site at least, there is some evidence of sexual propagation (i.e. by seeds). Along with its clonal (vegetative) reproduction, this species may reproduce by seeds. This species typically occurs within disturbed and often intermittently grazed sites that are dominated by grasses, sedge and/or other forbs.	V	28	No. No suitable habitat within subject land. Not identified during field survey.
<i>Micromyrtus blakelyi</i>	-	Restricted to the Hawkesbury River between Maroota and Cowan. Occurs in heathland, growing in shallow, sandy soils in sandstone rock platform depressions along ridges.	V	0	No. No suitable habitat within subject land. No local records.
<i>Persicaria elatior</i>	Knotweed	Tall Knotweed is an erect herb to 90 cm. It has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. It normally grows in damp places, especially beside streams and lakes.	V	0	No. No suitable habitat within subject land. No local records.
<i>Persoonia hirsuta</i>	Hairy Geebung	<i>Persoonia hirsuta</i> has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to	E	1	Unlikely. No suitable habitat (heathy open forest/woodland on sandstone). Not

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		the west. <i>Persoonia hirsuta</i> has a large area of occurrence, but occurs in small populations or isolated individuals, increasing the species' fragmentation in the landscape. The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone.			identified opportunistically during field survey.
<i>Persoonia mollis</i> - subsp. <i>maxima</i>		Highly restricted, known from the Hornsby Heights-Mt Colah area north of Sydney in the Sydney Basin Bioregion. Occurs in three populations (described on a catchment basis) located over an approximate north-south range of 5.75 km and east-west distance of 7.5 km. Additional locations may exist outside the current distribution. Occurs in sheltered aspects of deep gullies or on the steep upper hillsides of narrow gullies on Hawkesbury Sandstone. These habitats support relatively moist, tall forest vegetation communities, often with warm temperate rainforest influences. Associated species: Smooth Barked Apple (<i>Angophora costata</i>), Sydney Peppermint (<i>Eucalyptus piperita</i>), Red Bloodwood (<i>Corymbia gummifera</i>), Turpentine (<i>Syncarpia glomulifera</i>), Coachwood (<i>Ceratopetalum apetalum</i>) and Black Wattle (<i>Callicoma serratifolia</i>).	E	0	No. No suitable habitat within subject land. No local records.
<i>Pimelea curviflora</i> var. - <i>curviflora</i>		Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes. Flowers October to May. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.	V	11	No. No suitable habitat (Ridges, slopes, shale soils). Not identified opportunistically during field survey.
<i>Pimelea spicata</i>	Spiked Rice-flower	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). In both the Cumberland	E	0	No. Not identified opportunistically during field survey. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites.			
<i>Pomaderris brunnea</i>	Rufous Pomaderris (Brown Pomaderris)	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	V	0	Unlikely. Outside known distribution. Not identified during field survey. No local records.
<i>Prostanthera densa</i>	Villous Mintbush	Occurs in restricted localities along the east coast from Currarong to Jervis Bay. The species grows in sclerophyll forest and shrubland on coastal headlands or near coastal ranges, predominately on sandstone.	V	0	No. Outside known distribution. No suitable habitat within subject land. No local records.
<i>Pterostylis saxicola</i>	Sydney Greenhood Plains	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been recorded for this species. However, flowering occurs from October to December and may vary due to climatic conditions. The above ground parts of the plant wither and die following seed dispersal and the plant persists as a tuberoid until the next year. Typically occurs as scattered individuals or in small groups.	E	0	No. No suitable habitat (shelves above cliff lines). No local records.
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	An underground orchid with a whitish, fleshy underground stem to 15 cm long and 15 mm diameter (DECC 2007). Occurs from south-east	E	0	Unlikely.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore, usually located only when the soil is disturbed.			No local records in the last 50 years It is currently only known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. At each location, only a few individuals are known.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	CE	3	No. No suitable habitat. Not identified opportunistically during field survey.
<i>Rhodomyrtus psidioides</i>	Native Guava	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	CE	0	No. No suitable habitat. No local records.
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Found in subtropical and littoral rainforest on gravels, sands, silts and clays. Occurs only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	V	26	No. No suitable habitat. Not identified opportunistically during field survey.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Thesium australe</i>	Austral Toadflax	In eastern NSW, this species is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. It grows in grassland on coastal headlands or grassland and grassy woodland away from the coast.	V	0	Unlikely. No suitable habitat. No local records.

THREATENED ECOLOGICAL COMMUNITIES

Blue Gum High Forest of the Sydney Basin Bioregion	Occurs on the north shore and northern suburbs of Sydney. Tall, open forest (wet sclerophyll). It occurs mainly in areas with deep clay soil derived from shale, generally at altitudes greater than 100 m above sea level, and that have an annual rainfall of more than 1050 mm.	CE	-	No – not identified in the subject land during survey
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	The Castlereagh Scribbly Gum and Agnes Banks Woodlands ecological community is typically a low woodland, with canopy species reaching an average 15 m in height, but with some trees growing to around 20 m. The ecological community's understorey has a prominent and diverse mid-layer of sclerophyll shrubs. It typically has a patchy ground cover of sedges and grasses. However, in areas of poorly drained soil there may be less species diversity in the mid layer and the ground layer may contain a high diversity of sedges and grasses. The isolation of the alluvial deposits in the Hawkesbury-Nepean river valley and differences in the soil characteristics have led to the development of differences in species composition and abundance across the range of the ecological community.	E	-	No – not identified in the subject land during survey

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
Coast Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland		Occurs from central Queensland to southern NSW. Occurs in coastal catchments, mostly at elevations of less than 20 m above sea level typically within 30 km of the coast. Found on unconsolidated sediments, including alluvium deposits, or peaty soils. typically found where groundwater is saline or brackish but can occur in areas where groundwater is relatively fresh.	E	-	No – not identified in the subject land during survey
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland		Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by melaleucas and/or <i>Eucalyptus robusta</i> . Occurs east of the Great Dividing Range from central Queensland to southern NSW. Typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dunes. Most commonly occurs below 20 m above sea level on hydric soils that may comprise of sand, silt, clays and organic matter.	E	-	No – not identified in the subject land during survey
Coastal Upland Swamps in the Sydney Basin Bioregion		Coastal Upland Swamps occur primarily on impermeable sandstone plateaux with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture. Generally associated with soils that are acidic and vary from yellow to grey mineral sandy loams with a shallow organic horizon to highly organic spongy black peats with pallid subsoils. The vegetation of the Coastal Upland Swamp may include tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgeland and fernlands.	E	-	No – not identified in the subject land during survey

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion		Occurs in western Sydney, and the extent of intact remnants is now reduced to 1011 hectares, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain. Ranges from open forest to low woodland, with a canopy dominated by Broad-leaved Ironbark (<i>Eucalyptus fibrosa</i>) and Paperbark (<i>Melaleuca decora</i>). The canopy may also include other eucalypts such as Woollybutt (<i>E. longifolia</i>). The dense shrubby understorey consists of Prickly-leaved Paperbark (<i>Melaleuca nodosa</i>) and Peach Heath (<i>Lissanthe strigosa</i>), with a range of 'pea' flower shrubs, such as Dillwynia tenuifolia, Hairy Bush-pea (<i>Pultenaea villosa</i>) and Gorse Bitter Pea (<i>Daviesia ulicifolia</i>) (can be locally abundant). The sparse ground layer contains a range of grasses and herbs. Has a very restricted natural distribution and mainly occurs on clay soils derived from the deposits of ancient river systems (alluvium), or on shale soils of the Wianamatta Shales. Can intergrade into Shale-Gravel Transition Forest (where the alluvium is shallow), Castlereagh Swamp Woodland (in moist depressions) and Castlereagh Scribbly Gum Woodland (on sandier soils).	E	-	No – not identified in the subject land during survey
Eastern Suburbs Banksia Scrub of the Sydney Region		Community on nutrient poor sand deposits in the eastern and south eastern suburbs of Sydney. It has a structural form predominately of sclerophyllous heath or scrub occasionally with small areas of woodland or low forest.	CE	-	No – not identified in the subject land during survey

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		This EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include <i>Eucalyptus tereticornis</i> (forest red gum), <i>E. amplifolia</i> (cabbage gum), <i>Angophora floribunda</i> (rough-barked apple) and <i>A. subvelutina</i> (broad-leaved apple). <i>Eucalyptus baueriana</i> (blue box), <i>E. botryoides</i> (bangalay) and <i>E. elata</i> (river peppermint) may be common south from Sydney, and <i>E. ovata</i> (swamp gum) occurs on the far south coast.	CE	-	No – not identified in the subject land during survey
Shale Sandstone Transition Forest of the Sydney Basin Bioregion		Occurs on areas transitional between the clay soils derived from Wianamatta Shale and the sandy soils derived from Hawkesbury Sandstone on the margins of the Cumberland Plain. Occurs or has occurred in the Bankstown, Baulkham Hills, Blue Mountains, Campbelltown, Hawkesbury, Liverpool, Parramatta, Penrith, and Wollondilly Local Government Areas (LGAs). The floristic composition of the community includes species otherwise characteristic of, or occurring in, either sandstone or shale habitats. The structure of the community is forest or woodland.	CE	-	No – not identified in the subject land during survey
Turpentine-Ironbark Forest of the Sydney Basin Bioregion		Open forest, with dominant canopy trees including Turpentine (<i>Syncarpia glomulifera</i>), Grey Gum (<i>Eucalyptus punctata</i>), Grey Ironbark (<i>E. paniculata</i>) and Thin-leaved Stringybark (<i>E. eugenoides</i>). In areas of high rainfall (over 1050 mm per annum) Sydney Blue Gum (<i>E. saligna</i>) is more dominant. The shrub stratum is usually sparse and may contain mesic species such as Sweet Pittosporum (<i>Pittosporum undulatum</i>) and Elderberry Panax (<i>Polyscias sambucifolia</i>). Occurs close to the shale/sandstone boundary on the more fertile shale influenced soils, in higher rainfall areas on the higher altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus. A transitional community, between Cumberland Plain Woodland in drier areas and Blue Gum High Forest on adjacent higher rainfall ridges.	CE	-	No. Identified on the subject land during field survey but does not meet the threshold conditions under the Act.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
Western Sydney Dry Rainforest and Moist Woodland on Shale		The Western Sydney Dry Rainforest and Moist Woodland on Shale ecological community is a type of dry rainforest that grades into moist woodland. Restricted to hilly country where it occurs on the sheltered lower slopes and in gullies. Generally found at higher elevation, in areas receiving higher rainfall than much of the Cumberland Plain Woodland. Occurs on clay soils derived from Wianamatta shale. Rainforest plants within this vegetation are fire sensitive and dependent on the sheltered aspect and density of vegetation for protection.	CE	-	No – not identified in the subject land during survey

AMPHIBIA

<i>Heleioporus australiacus</i>	Giant Burrowing Frog	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria. The southern of its two distinct populations occurs from north of Narooma through to Walhalla, Victoria. It is found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams.	V	1	Unlikely. No suitable habitat within the subject land (streams).
<i>Litoria aurea</i>	Green and Golden Bell Frog	Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides,	V	5	Unlikely. No suitable habitat within subject land (wetlands).

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		particularly those containing bullrushes (<i>Typha spp.</i>) or spikerushes (<i>Eleocharis spp.</i>).			
<i>Mixophyes balbus</i>	Stuttering Frog	Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	V	0	Unlikely. No suitable habitat within the subject land (rainforest, thick understorey vegetation). No local records.
REPTILIA					
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney.	E	0	No. No suitable habitat. No local records.
DIURNAL BIRDS					
<i>Anthochaera phrygia</i>	Regent Honeyeater	The Regent Honeyeater inhabits temperate woodlands and open forests of the inland slopes of south-east Australia, particularly Box-Ironbark woodland, and riparian forests of <i>Casuarina cunninghamiana</i> (River Sheoak). These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. This species makes nomadic movements, following winter flowering Eucalypt species. Two of three known key breeding areas are in NSW: the Capertee Valley and the Bundarra-Barraba region. The other breeding area is in Chiltern, Victoria. They breed between July and January and usually nest in horizontal branches or forks in tall mature <i>Eucalyptus</i> spp. and <i>Casuarina/Allocasuarina</i> spp.	CE	2	Unlikely. No suitable mature high canopy cover.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Ardenna grisea</i>	Sooty Shreawater	Pelagic species. Breeds on islands off NSW from Montague Island to Broughton Island. Present off eastern NSW mainly October-February. Islands, offshore.	V	0	No. No suitable habitat. No local records.
<i>Arenaria interpres</i>	Ruddy Turnstone	Summer migrant. Tidal reefs and pools; pebbly, shelly and sandy shores; mudflats; inland shallow waters; sewage ponds, saltfields; ploughed ground.	V	0	No. No suitable habitat. No local records.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Found over most of NSW, this species' habitat consists of permanent freshwater wetlands, with tall, dense vegetation, particularly <i>Typha</i> spp. (Bulrushes).	E	0	No. No suitable habitat. No local records.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Summer migrant. Widespread in most regions of NSW, especially in coastal areas. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	V	0	No. No suitable habitat. No local records.
<i>Calidris canutus</i>	Red Knot	Summer migrant. In NSW, widespread in suitable habitat along the coast. Intertidal mudflats, sandflats sheltered sandy beaches, estuaries, bays, inlets, lagoons, harbours, sandy ocean beaches, rock platforms, coral reefs, terrestrial saline wetlands near the coast, sewage ponds and saltworks. Rarely inland lakes or swamps.	V	0	No. No suitable habitat. No local records.
<i>Calidris ferruginea</i>	Curlew Sandpiper	Summer migrant. Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	CE	3	No. No suitable habitat.
<i>Calidris tenuirostris</i>	Great Knot	Summer migrant. Occurs around all of Australia on the coastline. Preferred habitat consists of sheltered coastal habitats with large intertidal mudflats or sandflats.	V	0	No. No suitable habitat. No local records.
<i>Collocephalon fimbriatum</i>	Gang-gang Cockatoo	In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	E	84	Potential. Marginal suitable foraging habitat present within the subject land.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black Cockatoo	Open forest and woodlands of the coast and the Great Dividing Range where stands of <i>Allocasuarina</i> (e.g. Scrub She-oak) or <i>Casuarina</i> (e.g. Swamp Oak) trees occur.	V	7	Unlikely. Marginal foraging habitat present within the subject land.
<i>Charadrius leschenaultii</i>	Greater Sand Plover	The Greater Sand-plover breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly, or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.	V	0	No. No suitable habitat. No local records.
<i>Charadrius mongolus</i>	Lesser Sand Plover	Summer migrant. Widespread in coastal regions. Inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops.	E	0	No. No suitable habitat. No local records.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Occupy dry open Eucalypt forests and woodlands. Optimal habitat has an open structure at ground level for foraging. Absent from heavily degraded sites.	V	3	Unlikely. Marginal suitable foraging habitat present within the subject land. However, location is within an urban area and the species avoids heavily degraded sites.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	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	E	0	No. No suitable habitat. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone.			
<i>Erythroriorchis radiatus</i>	Red Goshawk	In NSW, extends to ~30°S. Recent records confined to the Northern Rivers region north of the Clarence River. Open woodland and forest, often along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and coastal riparian Eucalyptus Forest.	E	0	No. No suitable habitat. No local records.
<i>Falco hypoleucos</i>	Grey Falcon	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. It is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	V	0	No. No suitable habitat. No local records.
<i>Gallinago hardwickii</i>	Latham's Snipe	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	V	0	No. No suitable habitat. No local records.
<i>Grantiella picta</i>	Painted Honeyeater	This species is nomadic and occurs predominantly on the inland slopes of the Great Dividing Range. It inhabits <i>Acacia pendula</i> (Boree/Weeping Myall), <i>A. harpophylla</i> (Brigalow) and Box-Gum Woodlands and Box-Ironbark Forests. It is a specialist feeder on the fruits of mistletoes growing on woodland Eucalypts and Acacias, preferring mistletoes of the genus <i>Amyema</i> . Nesting occurs from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping <i>Eucalyptus</i> spp., <i>Allocasuarina</i> and <i>Casuarina</i> spp. (She-oaks), <i>Melaleuca</i> sp. (Paperbark) or Mistletoe branches.	V	0	No. No suitable habitat. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Hirundapus caudactus</i>	White-throated Needletail	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland. Breeds in wooded lowlands and sparsely vegetated hills.	V	48	Unlikely. This highly mobile species may occasionally fly over the subject land on feeding forays, however, no breeding habitat recorded in the development footprint.
<i>Lathamus discolor</i>	Swift Parrot	This species breeds in Tasmania during Spring and Summer and migrates to the Australian south-east mainland between March and October. On the mainland they occur where Eucalypts are flowering profusely, or where there are abundant lerp infestations. Favoured feed trees include winter flowering species such as <i>Eucalyptus robusta</i> (Swamp Mahogany), <i>Corymbia Maculata</i> (Spotted Gum), <i>C. gummifera</i> (Red Bloodwood), <i>E. sideroxylon</i> (Mugga Ironbark), and <i>E. albens</i> (White Box).	CE	15	Potential. Marginal suitable foraging habitat present within the subject land.
<i>Limosa lapponica baueri</i>	Nunivak Godwit	Bar-tailed			
		The Bar-tailed Godwit is a migratory wader which undertakes the largest non-stop flight of any bird. Birds arrive in New South Wales between August and October and then leave between February and April, with a small number of individuals overwintering. The subspecies is most frequently recorded along major coastal river estuaries and sheltered embayments, particularly the Tweed, Richmond, Clarence, Macleay, Hastings, Hunter and Shoalhaven river estuaries, Port Stephens and Botany Bay. It is a rare visitor to wetlands away from the coast with scattered records as far west as along the Darling River and the Riverina. It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas.	V	0	No. Preferred habitat not identified within development footprint. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Limosa limosa</i>	Black-tailed Godwit	Summer migrant. Found throughout Australia although prefers coastal regions. Commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats	E	3	Preferred habitat not identified within development footprint.
<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i> . Open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	E	0	Unlikely. Marginal foraging habitat present within subject land. However, no local records.
<i>Neophema chrysostoma</i>	Blue-winged Parrot	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	V	0	No. No suitable habitat. No local records.
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern curlew	In NSW, the Eastern Curlew has a primarily coastal distribution. It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	CE	0	No. No suitable habitat. No local records.
<i>Pycnoptilus floccosus</i>	Pilotbird	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 preferred habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris.	V	0	No. No suitable habitat. No local records.
<i>Rostratula australis</i>	Australian Painted Snipe	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams, and nearby marshy areas.	E	0	No. No suitable habitat. No local records.
<i>Stagonopeura guttata</i>	Diamond Firetail	Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and	V	0	Unlikely.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		the North West Plains and Riverina, and less commonly found in coastal areas and further inland. Grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.			Marginal foraging habitat present within subject land. However, no local records.
MAMMALS (EXCLUDING BATS)					
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll (SE mainland population)	The Spotted-tailed Quoll has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. It uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. It is mostly nocturnal and spends most of the time on the ground, although is also an excellent climber and will hunt in tree hollows and prey on roosting birds.	E	3	No. Marginal potential suitable habitat. No habitat connectivity.
<i>Isoodon obesulus</i>	Southern Brown Bandicoot (eastern)	Southern Brown Bandicoots are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nests may be located under Grass trees <i>Xanthorrhoea</i> spp., blackberry bushes and other shrubs, or in rabbit burrows.	E	0	No. No suitable habitat. No local records.
<i>Notamacropus parma</i>	Parma Wallaby	The species once occurred in north-eastern NSW from the Queensland boarder to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Wet sclerophyll forest with a thick, shrubby understorey and nearby grassy patches, or dry sclerophyll forests with a dense understorey.	V	0	No. Outside of known distribution. No suitable habitat. No habitat connectivity.
<i>Petauroides volans</i>	Greater Glider	The Greater Glider occurs in Eucalypt forests along the ranges and coastal plains of eastern Australia, feeding almost exclusively on the young leaves and flower buds of select Eucalypt species. It shelters in tree hollows, with	V	1	No. No suitable habitat. No habitat connectivity.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		a particular preference for large hollows in large, old trees. Individuals occupy relatively small home ranges (1-3 ha).			
<i>Petaurus australis</i>	Yellow-bellied Glider (south-eastern)	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. It is restricted to tall mature forests, preferring productive tall open sclerophyll forests with a mosaic of tree species including some that flower in winter. Large hollows (>25 cm) within mature trees are required for shelter, nesting and breeding. The species feeds primarily on plant and insect exudates. Individuals are very mobile, occupying large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food.	V	1	No. No suitable habitat. No habitat connectivity.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	In NSW, the Brush-tailed Rock-wallaby occurs from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. It inhabits rocky escarpments, outcrops and cliffs, with a preference for complex structures with fissures, caves and ledges.	V	0	No. No suitable habitat (rocky escarpments, outcrops and cliffs. No local records.
<i>Phascolarctos cinereus</i>	Koala	In NSW, the Koala mainly occurs on the central and north coasts, with some populations in the west of the Great Dividing Range. It is associated with both wet and dry Eucalypt forest and woodland, feeding on the foliage of more than 70 Eucalypt species and 30 non-Eucalypt species, but in any one area will select preferred browse species.	E	6	Unlikely. Marginal potential foraging habitat. No habitat connectivity.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	A small burrowing native rodent with a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha and the species peaks in abundance during early to mid-stages of vegetation succession typically induced by fire.	V	0	No. No suitable habitat. No local records.

MAMMALS (BATS)

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country. Roosts in caves, rock overhangings and disused mine shafts, and is associated with rock outcrops and cliff faces. Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.	V	2	Unlikely. No suitable roosting habitat (caves, rock outcrops, cliffs).
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	This species is found along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. It inhabits subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	V	1414	Potential. Marginal foraging habitat present on the subject land. Vegetation suitable for roosting is limited and isolated. Closest Nationally Important camp approximately 5 km to the NE.
GASTROPODS					
<i>Pommerhelix duralensis</i>	Dural Land Snail	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. There is currently a degree of uncertainty about the distribution and identity of the snails in this and related species. <i>Pommerhelix duralensis</i> in the strict sense is found in an area of north-western Sydney between Rouse Hill - Cattai and Wiseman's Ferry, west from Berowra Creek. 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 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. Migration and dispersal are limited, with overnight straight-line distances of under 1 metre identified in the literature and studies. The species is active from	E	2	No. No suitable habitat.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
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approximately one hour after dusk until dawn and no confirmed diurnal activity is reported.

Appendix E Assessment of Significance (EPBC Act)

This assessment has been prepared in accordance with the EPBC Act Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DAWE 2013). These guidelines have been established to assist proponents to determine whether a proposed action is likely to result in a significant impact on a matter of national environmental significance.

E1 *Callocephalon fimbriatum* (Gang-gang Cockatoo)

Gang-gang cockatoo is listed as endangered under the EPBC Act. The description and habitat associations of this species are presented in Appendix D. This species was not observed during the field survey.

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	No breeding habitat (medium to large tree hollows) was present within the subject land. The remnant vegetation is an isolated patch within an urban environment. The proposed development would affect 0.84 ha of potential foraging habitat on the subject land. Native trees are to be retained on site, with a large corridor of remnant vegetation present to the north-east of the subject land. Given the proximity of native vegetation and the fact that the Gang-gang Cockatoo is a highly mobile species, the proposed development would not lead to the long-term decrease in the size of an important population of the Gang-gang Cockatoo.
2)	reduce the area of occupancy of an important population	The proposed action would affect 0.84 ha of potential foraging habitat. The subject land does not contain breeding habitat. subject land. The proposed development would reduce the area of occupancy of this species by 0.84 ha.
3)	fragment an existing important population into two or more populations	Given the Gang-gang Cockatoo is highly mobile, and the development footprint vegetation is isolated in an urban environment, the proposed development will not fragment an existing population into two or more populations.
4)	adversely affect habitat critical to the survival of a species	The proposed development will affect 0.84 ha of native vegetation which may represent foraging habitat. Given that the Gang-gang Cockatoo is a highly mobile species, that the vegetation present within the subject land footprint is isolated in an urban environment, and that a large corridor of vegetation is present to the north-east of the subject land, the proposed development would not affect habitat critical to the survival of the species.
5)	disrupt the breeding cycle of an important population	No breeding habitat (medium to large tree hollows) would be affected by the proposed development.

Criterion	Question	Response
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed development will remove 0.84 ha of native vegetation that may represent foraging habitat for the Gang-gang Cockatoo. Given that the development footprint is isolated in an urban environment and that a large corridor is present to the north-east of the subject land, it is unlikely that the proposed development would cause a decline in the Gang-gang Cockatoo.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Given the site is already in an urban environment, the proposed development is unlikely to result in the establishment of invasive species that are harmful to the Gang-gang Cockatoo.
8)	introduce disease that may cause the species to decline, or	It is unlikely the proposed action would introduce disease that could cause decline to the Gang-gang Cockatoo.
9)	interfere substantially with the recovery of the species.	The proposed development would remove potential foraging habitat for the Gang-gang Cockatoo. No breeding habitat would be affected by the proposed development. Given that only 0.84 ha of native vegetation is to be removed, and that the subject land is isolated in an urban environment, it is unlikely that the proposed development would interfere with the recovery of the Gang-gang Cockatoo.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed development is unlikely to have a significant impact on the Gang-gang Cockatoo for the following reasons:</p> <ul style="list-style-type: none"> • No breeding habitat would be removed by the proposed development. • The subject land vegetation is isolated in an urbanised environment. • The species is highly mobile, and a large corridor of vegetation is present to the north-east of the subject land.

E2 *Lathamus discolor* (Swift Parrot)

Swift Parrot is listed as critically endangered under the EPBC Act. The description and habitat associations of this species are presented in Appendix D. This species was not observed during the field survey.

Criterion	Question	Response
	An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
1)	lead to a long-term decrease in the size of an important population of a species	The remnant vegetation is an isolated patch within an urban environment. The proposed development would affect 0.84 ha of potential foraging habitat on the subject land. Native remnant and planted trees are to be retained on site, with a large corridor of remnant vegetation present to the north-east of the subject land. Although the species can adapt to utilise a variety of habitats, the prolonged use of planted native vegetation and co-existence with aggressive species that tend to inhabit disturbed areas may be energetically expensive and reduce overall fitness and survival of the species (Saunders and Tzaros, 2011). Given the proximity of native vegetation and the fact that the Swift Parrot is a highly mobile species, the proposed development would not lead to the long-term decrease in the size of an important population of the Swift Parrot.
2)	reduce the area of occupancy of an important population	The proposed action would affect 0.84 ha of potential foraging habitat. The subject land does not contain breeding habitat. Given the fact that the subject land vegetation is isolated within an urban environment, the proposed development would not reduce the area of occupancy for the Swift Parrot.
3)	fragment an existing important population into two or more populations	Given the Swift Parrot is highly mobile, and the subject land vegetation is isolated in an urban environment, the proposed development will not fragment an existing population into two or more populations.
4)	adversely affect habitat critical to the survival of a species	The proposed development will affect 0.84 ha of native vegetation which may represent foraging habitat. Given that the Swift Parrot is a highly mobile species, that the vegetation present within the subject land is isolated in an urban environment, and that a large corridor of vegetation is present to the north-east of the subject land, the proposed development would not affect habitat critical to the survival of the species.
5)	disrupt the breeding cycle of an important population	No breeding habitat would be affected by the proposed development.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed development will remove 0.84 ha of native vegetation that may represent foraging habitat for the Swift Parrot. Given that the subject land is isolated in an urban environment and that a large corridor is present to the north-east of the subject land, it is unlikely that the proposed development would cause a decline in the Swift Parrot.

Criterion	Question	Response
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Given the site is already in an urban environment, the proposed development is unlikely to result in the establishment of invasive species that are harmful to the Swift Parrot.
8)	introduce disease that may cause the species to decline, or	It is unlikely the proposed action would introduce disease that could cause decline to the Swift Parrot. It is not expected that any construction methods would be used that would introduce a new disease. Psittacine Beak and Feather Disease may cause the species to decline. This spread through food sharing, excrement, feather and skin particles. The proposed action while this may have the potential to reduce potential foraging habitat for this species, it is unlikely to introduce a disease that may cause the species to decline
9)	interfere substantially with the recovery of the species.	The proposed development would remove potential foraging habitat for the Swift Parrot. No breeding habitat would be affected by the proposed development. Given that only 0.84 ha of native vegetation is to be removed, and that the subject land is isolated in an urban environment, it is unlikely that the proposed development would interfere with the recovery of the Swift Parrot.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed development is unlikely to have a significant impact on the Swift Parrot for the following reasons:</p> <ul style="list-style-type: none"> • No breeding habitat would be removed by the proposed development. • The subject land vegetation is isolated in an urbanised environment, with much of the vegetation consisting of planted natives which are generally avoided for remnant native by the species (Saunders and Tzaros, 2011). • The species is highly mobile, and a large corridor of vegetation is present to the north-east of the subject land.

E3 *Pteropus poliocephalus* (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as vulnerable under the EPBC Act. The description and habitat associations of this species are presented in Appendix D. This species was not observed during field survey. No camps will be affected by the proposed development. The closest Nationally Important Camp is located approximately 5 km north-east of the subject land, in Gordon. Other Flying-fox Camps nearby are located at Parramatta (approximately 13 km south-west), Balgowlah (approximately 12 km east) and Granville (approximately 12 km south-west).

Criterion	Question	Response
	An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
1)	lead to a long-term decrease in the size of an important population of a species	No roosting habitat (camps) will be affected by the proposed action. The proposed development would affect 0.71 ha of potential foraging habitat for the Grey-headed Flying-fox. The Grey-headed Flying-fox is recorded as travelling long distances (up to 20 km) on feeding forays. Given that the subject land is isolated in an urban area and the marginal size of potential foraging habitat, the removal of this vegetation would not lead to the long-term decrease in the size of an important population of Grey-headed Flying-fox. The closest Nationally Important Grey-headed Flying-fox camp is located approximately 5 km away to the north-east.
2)	reduce the area of occupancy of an important population	The proposed action would affect 0.71 ha of potential foraging habitat for this species. The Grey-headed Flying-fox is not known to occupy the subject land in the form of a camp but may occasionally forage within the subject land, the nearest Nationally Important camp is located 5 km away to the north-east. The Grey-headed Flying-fox is recorded as travelling long distances on feeding forays and could utilise similar foraging habitat outside of the development footprint.
3)	fragment an existing important population into two or more populations	According to the National Recovery Plan for the Grey-headed Flying-fox 2021, "the Grey-headed Flying-fox is considered to be a single, mobile population with individuals distributed across Queensland, New South Wales, Victoria, South Australia, Tasmania and the ACT." The proposed action would not fragment an existing important population into two or more populations. The nearest Nationally Important camp is 5 km away to the north-east. There is potential foraging habitat available to the north-east from the subject land, therefore the removal of 0.71 ha would not fragment habitat for the nearest camp.
4)	adversely affect habitat critical to the survival of a species	The National Recovery Plan for the Grey-headed Flying-fox 2021 identifies 'a continuous temporal sequence of productive foraging habitats, linked by migration corridors or stopover habitats, and suitable roosting habitat within nightly commuting distance of foraging areas' as habitat critical to the survival of the species.

Criterion	Question	Response
		The proposed action would affect 0.71 of native vegetation, which may represent habitat critical survival to this species. However, this impact is considered unlikely to have an adverse effect given that the species is recorded as travelling long distances (20 km) on feeding forays and potential habitat is present to the north-east of the subject land, and the vegetation is an isolated patch in an urban environment development footprint.
5)	disrupt the breeding cycle of an important population	The proposed action would not disrupt the breeding cycle of the Grey-headed Flying-fox given that no camps would be affected by the development.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action would remove 0.71 ha of potential foraging habitat for the Grey-headed Flying-fox. It is unlikely that the extent of this vegetation removal would cause the species to decline because the subject land is isolated in an urban environment and potential habitat is available to the north-east.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox.
8)	introduce disease that may cause the species to decline, or	Grey-headed Flying-fox are reservoirs for the Australian bat lyssavirus, Hendra Virus and Menangle virus which can cause clinical disease and mortality in Grey-headed Flying-fox. The risk of disease transmission is extremely low and rare; therefore the proposed action would not increase the incidence of this disease.
9)	interfere substantially with the recovery of the species.	The proposed action would remove potential foraging habitat for this species. However, this would not interfere substantially with recovery objectives listed in the National Recovery Plan for the Grey-headed Flying-fox 2021. The proposed action would not affect any camps and suitable foraging habitat is available adjacent to the subject land.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed action is unlikely to have a significant impact on the Grey-headed Flying-fox for the following reasons:</p> <ul style="list-style-type: none"> • No camps would be removed by the proposed action. • Potential foraging habitat within the subject land is marginal (0.71 ha) and isolated within an urban environment. • Potential foraging habitat would still be available within 20 km of the nearest Nationally Important camp.

Appendix F Biodiversity credit report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048139/BAAS22003/24/00048140	Macquarie Park BDAR	14/03/2024
Assessor Name	Report Created	BAM Data version *
Alexandra Gorey	17/05/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS22003	Open	To be finalised
Assessment Revision	Assessment Type	
2	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
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Sydney Turpentine Ironbark Forest												
1	3262_Good	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	60.4	60.4	0.35	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	13
											Subtotal	13
											Total	13

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 SAll	Species credits



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048139/BAAS22003/24/00048140	Macquarie Park BDAR	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Alexandra Gorey	BAAS22003	67
Proponent Names	Report Created	BAM Case Status
	17/05/2024	Open
Assessment Revision	Assessment Type	Date Finalised
2	Major Projects	To be finalised

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3262-Sydney Turpentine Ironbark Forest
Species		
Nil		

Additional Information for Approval

Assessment Id	Proposal Name
00048139/BAAS22003/24/00048140	Macquarie Park BDAR

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Ephippiorhynchus asiaticus / Black-necked Stork

Grantiella picta / Painted Honeyeater

Ixobrychus flavicollis / Black Bittern

Haliaeetus leucogaster / White-bellied Sea-Eagle

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3262-Sydney Turpentine Ironbark Forest	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	0.4	13	0	13

BAM Biodiversity Credit Report (Like for like)

3262-Sydney Turpentine Ironbark Forest	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion This includes PCT's: 3262	-	3262_Good	Yes	13	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options



BAM Biodiversity Credit Report (Like for like)

Assessment Id

00048139/BAAS22003/24/00048140

Proposal Name

Macquarie Park BDAR

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Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048139/BAAS22003/24/00048140	Macquarie Park BDAR	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Alexandra Gorey	BAAS22003	67
Proponent Name(s)	Report Created	BAM Case Status
	17/05/2024	Open
Assessment Revision	Assessment Type	Date Finalised
2	Major Projects	To be finalised

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3262-Sydney Turpentine Ironbark Forest
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

BAM Biodiversity Credit Report (Variations)

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Ephippiorhynchus asiaticus / Black-necked Stork
Grantiella picta / Painted Honeyeater
Ixobrychus flavicollis / Black Bittern
Haliaeetus leucogaster / White-bellied Sea-Eagle

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3262-Sydney Turpentine Ironbark Forest	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	0.4	13	0	13.00

3262-Sydney Turpentine Ironbark Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion This includes PCT's: 3262	-	3262_Good	Yes	13	Cumberland,Burraborang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data



BAM Biodiversity Credit Report (Variations)

Credit Retirement Options Like-for-like options

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048139/BAAS22003/24/00048140	Macquarie Park BDAR	14/03/2024
Assessor Name	Report Created	BAM Data version *
Alexandra Gorey	17/05/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS22003	Major Projects	Open
Assessment Revision		Date Finalised
2		To be finalised

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

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

Common Name	Scientific Name	Vegetation Types(s)
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3262-Sydney Turpentine Ironbark Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3262-Sydney Turpentine Ironbark Forest
Diamond Firetail	Stagonopleura guttata	3262-Sydney Turpentine Ironbark Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3262-Sydney Turpentine Ironbark Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3262-Sydney Turpentine Ironbark Forest
Eastern Osprey	Pandion cristatus	3262-Sydney Turpentine Ironbark Forest
Flame Robin	Petroica phoenicea	3262-Sydney Turpentine Ironbark Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3262-Sydney Turpentine Ironbark Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3262-Sydney Turpentine Ironbark Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3262-Sydney Turpentine Ironbark Forest

Little Bent-winged Bat	<i>Miniopterus australis</i>	3262-Sydney Turpentine Ironbark Forest
Little Eagle	<i>Hieraetus morphnoides</i>	3262-Sydney Turpentine Ironbark Forest
Little Lorikeet	<i>Glossopsitta pusilla</i>	3262-Sydney Turpentine Ironbark Forest
Regent Honeyeater	<i>Anthochaera phrygia</i>	3262-Sydney Turpentine Ironbark Forest
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	3262-Sydney Turpentine Ironbark Forest
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	3262-Sydney Turpentine Ironbark Forest
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	3262-Sydney Turpentine Ironbark Forest
Speckled Warbler	<i>Chthonicola sagittata</i>	3262-Sydney Turpentine Ironbark Forest
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	3262-Sydney Turpentine Ironbark Forest
Square-tailed Kite	<i>Lophoictinia isura</i>	3262-Sydney Turpentine Ironbark Forest
Swift Parrot	<i>Lathamus discolor</i>	3262-Sydney Turpentine Ironbark Forest
Varied Sittella	<i>Daphoenositta chrysoptera</i>	3262-Sydney Turpentine Ironbark Forest
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	3262-Sydney Turpentine Ironbark Forest
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	3262-Sydney Turpentine Ironbark Forest

Threatened species Manually Added

None added

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

Common Name	Scientific Name	Plant Community Type(s)
Black Bittern	<i>Ixobrychus flavicollis</i>	3262-Sydney Turpentine Ironbark Forest
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	3262-Sydney Turpentine Ironbark Forest
Painted Honeyeater	<i>Grantiella picta</i>	3262-Sydney Turpentine Ironbark Forest
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	3262-Sydney Turpentine Ironbark Forest

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

Refer to BAR for detailed justification



BAM Predicted Species Report

Common Name	Scientific Name	Justification in the BAM-C
Black Bittern	<i>Ixobrychus flavicollis</i>	Habitat constraints
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Habitat constraints
Painted Honeyeater	<i>Grantiella picta</i>	Habitat constraints
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Habitat constraints

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00048139/BAAS22003/24/00048140	Macquarie Park BDAR	14/03/2024
Assessor Name	Report Created	BAM Data version *
Alexandra Gorey	17/05/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS22003	Major Projects	Open
Assessment Revision	Date Finalised	
2	To be finalised	

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

List of Species Requiring Survey

Name	Presence	Survey Months
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Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Refer to BAR
Bush Stone-curlew	Burhinus grallarius	Refer to BAR
Cumberland Plain Land Snail	Meridolum corneovirens	Refer to BAR
Darwinia peduncularis	Darwinia peduncularis	Refer to BAR
Downy Wattle	Acacia pubescens	Refer to BAR
Dural Land Snail	Pommerhelix duralensis	Refer to BAR
Eastern Australian Underground Orchid	Rhizanthella slateri	Refer to BAR
Eastern Osprey	Pandion cristatus	Refer to BAR
Eastern Pygmy-possum	Cercartetus nanus	Refer to BAR

Epacris purpurascens var. purpurascens	Epacris purpurascens var. purpurascens	Refer to BAR
Gang-gang Cockatoo	Callocephalon fimbriatum	Refer to BAR
Gosford Wattle, Hurstville and Kogarah Local Government Areas	Acacia prominens - endangered population	Geographic limitations
Green and Golden Bell Frog	Litoria aurea	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Haloragodendron lucasii	Haloragodendron lucasii	Geographic limitations
Hibbertia puberula	Hibbertia puberula	Refer to BAR
Julian's Hibbertia	Hibbertia spanantha	Refer to BAR
Koala	Phascolarctos cinereus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Lasiopetalum joyceae	Lasiopetalum joyceae	Refer to BAR
Leucopogon fletcheri subsp. fletcheri	Leucopogon fletcheri subsp. fletcheri	Refer to BAR
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Little Eagle	Hieraetus morphnoides	Refer to BAR
Long-nosed Bandicoot population in inner western Sydney	Perameles nasuta - endangered population	Geographic limitations
Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Marsdenia viridiflora subsp. viridiflora - endangered population	Geographic limitations
Masked Owl	Tyto novaehollandiae	Refer to BAR
Netted Bottle Brush	Callistemon linearifolius	Refer to BAR
P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	Pomaderris prunifolia - endangered population	Geographic limitations
Powerful Owl	Ninox strenua	Refer to BAR
Red-crowned Toadlet	Pseudophryne australis	Refer to BAR

BAM Candidate Species Report

Regent Honeyeater	<i>Anthochaera phrygia</i>	Habitat constraints
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Species is vagrant
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	Refer to BAR
Southern Myotis	<i>Myotis macropus</i>	Refer to BAR
Square-tailed Kite	<i>Lophoictinia isura</i>	Refer to BAR
Squirrel Glider	<i>Petaurus norfolcensis</i>	Refer to BAR
Swift Parrot	<i>Lathamus discolor</i>	Habitat constraints
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Refer to BAR

Appendix G CVs

See next page.

Dr Daniel McDonald **PRINCIPAL ECOLOGIST AND SENIOR ARBORIST**

Daniel is an ecologist with over 25 years of experience in both ecological and arboricultural consulting and research sectors. He is Principal Ecologist and Senior Arborist in Eco Logical Australia's Sydney Office.

Daniel has post-graduate qualifications in plant science and extensive experience in plant surveys, particularly within the general Central Coast, Sydney, Wollongong and Blue Mountains regions. He has worked widely across NSW and has experience in rainforests, both dry and wet sclerophyll forests, grassy woodlands, grasslands, heathlands, alpine areas, forested, freshwater and saline wetlands and in semi-arid and arid vegetation.

His work has focused on biodiversity impact assessment and experience in negotiations both with clients and government consent authorities.

His arboricultural work includes both tree impact assessment and the risks associated with trees.

Daniel has an ongoing interest in population biology of both plants and animals.

QUALIFICATIONS

PhD (Plant genetics and plant reproductive biology), The University of Sydney

Diploma of Arboriculture (AQF5), Ryde TAFE

M.Agr (Genetics, plant and fungal biology), The University of Sydney

B. Sc. Agr, The University of Sydney

Cert IV (Spatial Information Systems – GIS), National Environment Centre, TAFE NSW

Accredited Biobanking Assessor (0075)

Accredited BAM Assessor (BAAS17056)

Quantified Tree Risk Assessment (QTRA) registered user No. 4107

Senior First Aid (remote areas)

Work Health and Safety General Construction Induction (SafeWork NSW) White card

National Licence To Perform High Risk Work (SafeWork NSW) (Classes and Description: WP = Boom Type Elevating Work Platform)

Rail Industry Worker Card (Australian Railway Association) – Similar to a RISI card

PROJECT EXPERIENCE

Negotiation on behalf of clients with organisations including: DPIE (Department of Planning, Industry and Environment, previously OEH), NSW National Parks & Wildlife Service (part of DPIE), NSW Department of Planning, NSW Office of Water, NSW Fisheries, NSW CMAs (now Local Land Services), the Commonwealth and local governments. The aim of the negotiations is to secure an outcome for the client while securing a neutral or net benefit to the local and regional biodiversity.

Expert witness work for both ecological matters and arboricultural matters.

Project sizes: small up to \$800 million.

Project types: commercial & industrial, linear infrastructure – powerlines, roads, telecommunication and pipelines, residential dwelling through to high rise, retirement villages, campsites, agricultural areas, sporting areas, subdivisions and land rezoning, waste management centres, mining, surveys of areas to be considered for biodiversity conservation.

Report types completed include: Biodiversity Development Assessment Reports (BDARs), Flora, Fauna and Vegetation Impact Assessments, Vegetation Management Plans, Arboricultural Reports, Specialist Flora, Fauna or Vegetation Assessments, REFs, SEEs, Environmental Work Plans, Biodiversity Plans, Biobanking Assessments, Basic Bushfire Assessments, Biodiversity Assessments for inclusion in the reserve system and Landscape Plans, Background development work for BSSARs (Biodiversity StewardShip Assessment Report).

Stacey Wilson SENIOR ECOLOGIST

Stacey is a Senior Ecologist, and project manager with over 7 years' experience. Stacey is involved in a large range of projects and survey types which involve all aspects of ecological consultancy. This includes the coordination, planning and leading field surveys. It also involves data collation, technical reporting, and client liaison.

Stacey has in-depth technical knowledge of the Biodiversity Offset Scheme (BOS), in which she has completed ecological impact assessments and Stewardship Agreements under the Biodiversity Assessment Method (BAM). Stacey has completed the BAM training course and is an Accredited Assessor under the *NSW Biodiversity Conservation Act 2016* (BC Act).

Stacey is highly adept in planning for and undertaking threatened flora and fauna species surveys. She has a thorough understanding of the survey requirements and timing related to a range of threatened faunal groups. Stacey's other specialties include vegetation mapping of NSW Plant Community Types, particularly in the Sydney Basin, however, has had experience across a range of vegetation communities across NSW and the ACT.

When providing advice to clients on complex and difficult projects, Stacey is excellent at communicating the need to comply with environmental approvals under NSW State legislation and assessments under the Commonwealth *Environment and Protection Biodiversity Conservation Act 1999* (EPBC Act).

Stacey is actively involved in the mentoring of junior and graduate ecologists. Through Stacey's mentoring role, she advises the best field techniques to ensure accurate and meticulous data collection. As well as best practices for data hygiene and field equipment usage. Stacey's role also includes supporting junior staff to develop their technical writing skills and to provide project advice.

Stacey is passionate in applying her strong technical field skills into large-scale projects for biodiversity assessments across varied environments.

EDUCATION

- Master of Environment (Specialising in Environmental Science) – Macquarie University 2015
- Bachelor of Biodiversity and Conservation – Macquarie University 2013
- Certificate III Conservation Land Management – Ryde TAFE 2015

QUALIFICATIONS

- BAM Accredited Assessor (BAAS#22030) under the *NSW Biodiversity Conservation Act 2016*
- Drive and Recover a 4WD Vehicle (SISODRV302A)
- Work Safely in the Construction Industry (CPCCOHS1001A) (White Card)
- Open Water Diver (PADI)

PROJECT EXPERIENCE

TARGETED THREATENED SPECIES SURVEYS

- **Targeted threatened species surveys**
- Conducted bird survey census in Mallee country of NSW with a focus on identification of birds belonging to the Endangered Mallee Bird Community including 20-minute area searches and 500 m transects.
- Undertook area bird census survey to inform the Biodiversity Development Assessment Report and Wildlife Hazard Report for Badgerys Creek NSW.
- Planned, co-ordinated and lead ecologist undertaking threatened bird census, nocturnal owl survey, threatened frog survey, spotlighting nocturnal mammals and remote camera deployment for Berrigan Wind Farm Survey.
- Lead team of nine staff over 15 nights to conduct targeted nocturnal survey stag watches for threatened owl species.
- Co-ordinated a 130 baited, remote camera survey for nocturnal mammals targeting Brush-tailed Phascogale, eastern Pygmy Possum and Squirrel Glider for proposed Maroota Sand State Significant Development.
- Conducted a habitat assessment for threatened microbat species, and used targeted survey methods including Harp trapping, stag watches and Anabat deployment at Mooney Mooney Island NSW.
- Collected hollow-bearing tree data and undertook area bird census surveys, for Swift Parrot and Regent Honeyeater, to inform Planning Proposal at Werrington NSW.
- Involved in targeted spotlighting survey for Crowned Gecko and Southern Hairy-nosed Wombat at Euston NSW.
- Undertook regularised grid-based Koala Spot Assessment Technique at Lawson NSW.
- Supervised the use of Koala detection dogs over four days with successful detection at East Kurrajong NSW.
- Lead nocturnal surveys for numerous threatened fauna species including owls, nocturnal mammals, frogs, and snails for inclusion in the Cumberland Plain Strategic Biodiversity Certification Assessment and Cumberland Plain Conservation Plan between Castlereagh and Llandilo NSW.
- Targeted survey for a range of threatened flora, including cryptic orchids across a range of environments in NSW.
- Undertook eight days of targeted parallel transects for threatened flora species, *Tetratheca glandulosa* at Maroota NSW using the BAM guidelines for threatened plant surveys.
- Completed targeted Green and Golden Bell Frog surveys for a number of Biodiversity Development Assessment Reports at Riverstone, Schofields, Box Hill, and Gables NSW.
- Extensive use of remote cameras, hair tubes, pitfall traps, Elliot traps, and use of echolocation detectors (Anabats and Song Meters).
- HumeLink transmission line corridor biodiversity assessment, regional NSW. Role: undertook threatened flora surveys across three survey seasons, targeting over 40 species across over a 500 km corridor. In addition, completed vegetation validation and collected BAM plot data between Wagga Wagga, Tumbarumba, Tumut, Gundagai, and Goulburn NSW.

VEGETATION SURVEY AND BIODIVERSITY ASSESSMENT METHOD

- Vegetation validation and identification of PCTs, including understanding the relationship of Plant Community Types to Threatened Ecological Communities under the BC Act and EPBC Act for ecological constraints reporting.
- Carrying out Biodiversity Assessment Method (BAM) and BioBanking Assessment Method (BBAM) plots for Biobank and Stewardship sites, carrying out BAM vegetation integrity plots (BAM plots) for Biodiversity Certification Assessment Report (BCAR) and subject lands.
- Prepared numerous impact assessments including Flora and Fauna Assessment (e.g., s7.3 BC Act Tests of Significance), preparation of BDARs, preparation of BCARs, preparation of assessments for Part 5 EP&A Act activities.
- Produced vegetation mapping, weed density assessments, threatened species habitat assessments and identification of management actions to inform Stewardship Site feasibility assessments.
- Project manager for a number of Biodiversity Stewardship Agreements (BSAs) and is involved with all aspects of the BSA process. Including, vegetation plot collection, threatened species surveys, preparation of Biodiversity Stewardship Site Assessment Reports (BSSARs). This role also includes liaison between the client and State Government regulators.
- Supervised and undertook targeted threatened flora and fauna surveys, vegetation validation and BAM plots for the Berrigan Wind Farm over winter and spring survey seasons.

VEGETATION AND BIODIVERSITY MANAGEMENT PLANS

- Assessed land for rehabilitation potential, delineated management zones and prepared reports, detailing management actions for Vegetation Management Plans (VMPs) across numerous sites in NSW.
- Prepared Biodiversity Management Plans, detailing the pre-construction actions to be undertaken to minimise biodiversity impacts to flora and fauna, including pre-clearance surveys, species relocation plans, habitat relocation and post clearance monitoring.
- Assessed condition of vegetation communities, recorded weed densities and prepared reporting for the update to the M2 Vegetation Management Plan.

ECOLOGICAL MONITORING

- Stacey has a key role over 6 years as the project manager for post-mine rehabilitation monitoring for Tahmoor Coal. Stacey undertakes the annual field monitoring and preparation of reports which involves the collation, and analysis of large datasets against closure criteria.
- Undertook monitoring plot survey to inform vegetation baseline monitoring for the Leewood Irrigation Scheme.

Hamish Pritchard **ECOLOGIST**

Hamish is an Ecologist who has recently joined our Sydney team. Hamish has developed a range of skills from his previous professional experience including targeted threatened species surveys, ecological surveys, weed management, surface and ground water sampling, and soil sampling.

A graduate of University of Wollongong with a Bachelor of Conservation Biology degree, Hamish is looking to further improve his skill set and experience in the ecology space with ELA.

QUALIFICATIONS

- Bachelor of Conservation Biology (Honours), University of Wollongong
- Provide Cardiopulmonary Resuscitation (HLTAID001)
- Provide Basic Emergency Life Support (HLTAID002)
- Provide First Aid (HLTAID003)
- Provide First Aid in Remote Situations (HLTAID005)
- Drive and Recover a 4wd Vehicle (SISODRV302A)
- Surface Coal Mine Safety (RIISS00034)
- Prepare and Apply Chemicals (AHCCHM303)
- Transport and Store Chemicals (AHCCHM304)
- National WHS General Construction Induction Training (White Card)
- Venomous Snake Handling and Awareness Training
- PADI Open Water Diver

PROJECT EXPERIENCE

- SWBTA ASMTI: Laing O'Rourke (2021-2023) – threatened species surveys, ecological surveys, pre-clearance surveys, fauna spotter catcher services including for dewatering works, weed surveys, surface water sampling, groundwater sampling, soil sampling, bore hole installation, environmental management plan reviews, environmental auditing.
- Fitzroy river and tributaries surveys: Fitzroy Basin Association (2021-2023) – fish surveys, macroinvertebrate sampling, environmental DNA sampling, riparian vegetation surveys, surface water sampling.
- Rockhampton Ring Road proposal: Transport and Main Roads (2022) – ecological surveys, pre-clearance surveys, fauna spotter catcher services, weed surveys.
- Mount Mackenzie mine proposal: Mount Mackenzie Mines (2021) – targeted threatened species surveys, flora surveys, weed surveys.
- Compliance surveys: Rockhampton Regional Council (2022-2023) – surface water sampling, groundwater sampling, soil sampling, waste auditing.
- Mine site work: QMAG (2021-2023) – pre-clearance surveys, fauna spotter catcher services, weed management.
- Wet weather overflow abatement program: Sydney Water (2019-2021) – macroinvertebrate sampling and identification, environmental DNA sampling, riparian vegetation surveys, polar organic chemical integrative sampler installation and collection, surface water sampling.

