

Western Sydney University, Milperra Masterplan

Biodiversity Development Assessment Report

Mirvac Residential (NSW) Developments Pty Ltd

10 June 2026

Final

cumberland
ecology

PART OF  SLR

Report No. 23021RP7

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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2	7/05/2026	AM, GK	Final following RFI
3	9/06/2026	AM, CEP	Final with additional avoidance

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Glossary

Term / Abbreviation	Definition
APZ	Asset Protection Zone
Assessment area	Area of land within a 1500 m buffer around the outer boundary of the subject land
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BC Regulation	NSW <i>Biodiversity Conservation Regulation 2017</i>
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	NSW <i>Biosecurity Act 2015</i>
BOS	Biodiversity Offset Scheme
CEEC	Critically Endangered Ecological Community
Conservation area	The area zoned C2 – Environmental Conservation
Council	Canterbury-Bankstown City Council
DA	Development Application
DBH	Diameter at Breast Height
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan (Canterbury-Bankstown DCP 2023)
EHG	Environment and Heritage Group (of NSW DCCEEW)
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FSR	Floor Space Ratio
GIS	Geographic Information System
GPS	Global Positioning Software
ha	Hectares
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environment Plan (Canterbury-Bankstown LEP 2023)
LGA	Local Government Area (Canterbury-Bankstown)
NSW DCCEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
SSDA	State Significant Development Application
SEARs	Secretary's Environmental Assessment Requirements
Study area	The land surveyed as part of the project
Subject land	The land proposed as a development site (see Figure 2)

Term / Abbreviation	Definition
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
the 'Applicant'	Mirvac Residential (NSW) Developments Pty Ltd
the 'Plan'	<i>Canterbury-Bankstown Biodiversity Strategic Plan 2015-2025</i>
the 'Project'	The redevelopment of the WSU Milperra Campus
VI	Vegetation Integrity
WSU	Western Sydney University
WSU Milperra Campus	The land subject to Clause 11.13 of the Canterbury Bankstown DCP

Declarations

Certification under clause 6.16 *Biodiversity Conservation Act 2026* and declared Conflicts of Interest

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

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest. This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature: 

Date: 18/03/2025

BAM Assessor Accreditation no: BAAS19052

Authors and Contributors

This report, and associated field surveys and Geographic Information Systems (GIS) mapping, was prepared with the assistance of additional personnel as outlined in **Table 1**.

Table 1 Personnel

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
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1. Introduction

SLR Consulting (previous Cumberland Ecology) was commissioned by Mirvac Residential (NSW) Pty Ltd (the Applicant) to prepare a Biodiversity Development Assessment Report (BDAR) in support of a State Significant Development Application (SSDA) for submission to the Department of Planning, Housing and Infrastructure (the Department) for a staged residential development at 2 and 2A Bullecourt Avenue, Milperra. It is currently owned by Western Sydney University and is located within the Canterbury Bankstown Local Government Area (LGA) at 2 and 2A Bullecourt Avenue, Milperra, being legally described as Lot 2 in DP1291984 and Lot 1 in DP101147 (the 'WSU Milperra Campus').

The redevelopment of the WSU Milperra Campus (hereafter referred to as the 'project') is proposed to be conducted in stages in accordance with the project's masterplan (**Figure 1**). Since the demolition of the university buildings on within the WSU Milperra Campus, it currently comprises:

- An existing at-grade car park (within Zone 4) to be repurposed as parking and hardstand area for the temporary sales office (DA currently under assessment);
- An existing at-grade car park (generally within the location of the future Road 2B);
- At-grade roads;
- Outdoor recreation spaces including a large oval to the south;
- The Western Sydney University Early Learning Centre (Child-care centre); and
- Vegetation of varying significance, including Cumberland Plain Woodland.

The Applicant had previously requested that the ecological assessments be conducted in stages, in accordance with the masterplan. However, in consultation with Canterbury-Bankstown Council (Council), it was determined that a staged assessment approach to the project would not be accepted, and that a Masterplan Development Application (DA) would need to be submitted for the entire project. This BDAR will form part of the required Environmental Impact Statement (EIS) to support an application for a State Significant Development (SSD) under Part 4, Division 4.7 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1. Response to Submissions

The SSDA was submitted on 16 December 2025. The Department reviewed the package, and issued a Response to Submissions on 2 February 2026, which included a number of items relating to biodiversity. These items have been replicated in **Table 2** below with their locations in the BDAR.

Table 2 Response to submissions table

Item	Location in BDAR
The Department Preliminary Assessment Comments	
An updated BDAR addressing the comments raised by Council and the Conservation Programs, Heritage and Regulation Group, including but not limited to showing avoidance measures outside of the retention of the conservation zoned land.	This BDAR

Item	Location in BDAR
Council Submission Comments	
All land zoned C2 – Environmental Conservation must be retained, protected and managed under a Vegetation Management Plan as required by Chapter 11.13 of the Canterbury-Bankstown Development Control Plan 2023.	VMP for project (our reference: 23021RP5)
The C2 - Environmental Conservation zoned land cannot be used as justification for avoidance of impacts as this was a requirement of the rezoning and the development proposed is not permissible on this land. The accredited assessor from Cumberland Ecology (now SLR) has confirmed that retention of the C2 land cannot be used as avoidance as this would be considered 'double dipping' and that avoidance must be demonstrated elsewhere on the subject land in accordance with section 6.4 of the Biodiversity Conservation Act 2016 (BC Act).	Section 7.2.2
Cumberland Plain Woodland must be retained within the proposed subdivision. This includes retaining Cumberland Plain Woodland within proposed lots, road corridors and recreational land. This currently has not been demonstrated and as such, reasonable avoidance in accordance with section 6.4 of the BC Act of impacts has not been demonstrated.	Section 7.2.2
Figure 5 (Layout of the project) in the Biodiversity Development Assessment Report (BDAR) proposes the removal of vegetation outside of the subject land that has not been mapped or considered in the BDAR. This vegetation is located outside of the southern boundary of the subject land adjacent to the M5. Given the location of this vegetation outside of the subject land, impacts to this vegetation could be avoided through design refinements.	Figure 13 shows removal of this vegetation. Additional wording in Section 8.4.2
The BDAR attempts to justify avoidance on the basis that the north-eastern portion of the site zoned C2 – Environmental Conservation was excluded from development at the rezoning stage. Council notes that the Accredited Assessor has previously been advised and agreed that the C2 zone cannot be considered avoidance for this proposal, as the protection of this land was a requirement of the rezoning and its use for residential development is prohibited.	The avoidance of C2 zoned land has been included as it speaks to the history of the project, however further avoidance is provided in Section 7.2.2
Despite the above, the BDAR continues to present the C2 Environmental Conservation zone as an area of avoidance. This approach is inconsistent with the Biodiversity Assessment Method (BAM) and the Biodiversity Conservation Act 2016 (BC Act). The BDAR must be revised to: - Clearly identify the C2 zoned land, - Exclude this land from being treated as avoidance, and - Ensure no additional impacts are proposed within this zone.	- Figure 4 - As above, and Section 7.2.2 - Section 8.6
Council also notes that the current proposal includes impacts to land zoned C2 – Environmental Conservation, which are not permissible. These impacts must be removed from the proposal.	Section 8.6
With the C2 zoned land excluded, the BDAR must then identify the areas of Cumberland Plain Woodland proposed for retention and removal.	Section 7.2.2, Figure 20
No genuine attempt has been made to retain vegetation within the proposed subdivision. Vegetation shown for retention within the RE1 – Public Recreation	Section 7.2.2

Item	Location in BDAR
zone is limited to planted native vegetation and does not comprise Cumberland Plain Woodland. Accordingly, reasonable avoidance has not been demonstrated.	
Council rejects the argument put forward in the BDAR that the R1 – General Residential zoning justifies the removal of vegetation, including Cumberland Plain Woodland. The provisions of the BC Act prevail over Part 4 of the Environmental Planning and Assessment Act 1979 to the extent of any inconsistency. As such, the zoning of the site cannot override the requirement to demonstrate reasonable avoidance under the BAM and BC Act. This has been tested in the Land and Environment Court (Planners North v Ballina Shire Council [2021] NSWLEC 120 (Planners North))	Removed from BDAR
It is clear from the plans provided that much of the vegetation proposed for removal could be retained under the current design and further design amendments could allow for the retention of further vegetation. These are considered avoidable impacts	Section 7.2.2 and Section 7.2.3.1

It should be noted that the majority of Council's comments are replicated from the pre-DA advice letter that was received in September 2025, and these items were addressed in the BDAR that was submitted as part of the package in December 2025. **Table 2** above should provide further clarification on these items.

1.2. Requirement for BDAR

Under the BC Act, all development requiring development consent under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) that is likely to significantly affect threatened species, as set out in Clause 7.2 of the *Biodiversity Conservation Act 2016* (BC Act) and Section 7.1 to 7.3 of the *NSW Biodiversity Conservation Regulation 2017* (BC Regulation), must be assessed using the Biodiversity Assessment Method (BAM) with the results presented in a BDAR. The project has been determined to have an impact on land mapped on the Biodiversity Values Map (BV Map) and therefore this BDAR has been prepared.

Biodiversity values are defined as follows:

Under Section 1.5 of the BC Act, Biodiversity Values are defined as;

- *"For the purposes of this Act, biodiversity values are the following biodiversity values:*
 - *vegetation integrity—being the degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state,*
 - *habitat suitability—being the degree to which the habitat needs of threatened species are present at a particular site,*
 - *biodiversity values, or biodiversity-related values, prescribed by the regulations."*
- *Under Section 1.4 of the Biodiversity Conservation regulation, the following are prescribed as additional biodiversity values:*

- *threatened species abundance—being the occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site,*
- *vegetation abundance—being the occurrence and abundance of vegetation at a particular site,*
- *habitat connectivity—being the degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range,*
- *threatened species movement—being the degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle,*
- *flight path integrity—being the degree to which the flight paths of protected animals over a particular site are free from interference,*
- *water sustainability—being the degree to which water quality, water bodies and hydrological processes sustain threatened species.*

The ecological assessments that have been undertaken within the WSU Milperra Campus to date have determined that there is biodiversity values present, and there is potential for these values to be impacted by the project, and therefore a BDAR is required for the Masterplan SSDA.

Parts of the subject land consist of native vegetation (trees and shrubs) of planted origin. This includes the scattered trees planted within the gardens among buildings and trees along the boundary of the subject land. Under the BAM, impacts on planted native vegetation as part of a development can be assessed using the 'Streamlined Assessment Module – Planted native vegetation' as set out in Appendix D of the BAM. Accordingly, the impacts on the planted native vegetation within the WSU Milperra Campus have therefore been assessed using the streamlined assessment module for planted native vegetation in accordance with Appendix D of the BAM.

1.2.1. Planning Secretary's Environmental Assessment Requirements

As the Project comprises an SSD, an Environmental Impact Statement (EIS) is required. The EIS must meet the minimum form and content requirements as prescribed by Part 8 of the *Environmental Planning and Assessment Regulation 2021* and the State Significant Development Guidelines. Specific requirements for what is to be included in the EIS are detailed in the Planning Secretary's Environmental Assessment Requirements (SEARs) dated 30 October 2025. Item 11 of the SEARs details assessment requirements for biodiversity, which are reproduced below:

Unless a waiver has been granted, provide a Biodiversity Development Assessment Report (BDAR) that assesses any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020.

OR

If the development is on biodiversity certified land, provide information to identify the site (using associated mapping) and demonstrate the proposed development is consistent with the relevant biodiversity measure conferred by the biodiversity certification.

The subject land is not on biodiversity certified land and a BDAR waiver has not been granted and is not proposed to be submitted. As such a BDAR is required.

1.3. Purpose

The purpose of this BDAR is to document the findings of an assessment undertaken for the project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM. Specifically, the objectives of this BDAR are to:

- Identify the landscape features and site context (native vegetation cover) within the subject land (all areas impacted by the project) and assessment area;
- Assess native vegetation extent, plant community types (PCTs), threatened ecological communities (TECs) and vegetation integrity (site condition) within the subject land;
- Assess habitat suitability for threatened species that can be predicted by habitat surrogates (ecosystem credits) and for threatened species that cannot be predicted by habitat surrogates (species credit species);
- Identify potential prescribed biodiversity impacts on threatened species and communities;
- Describe measures to avoid and minimise impacts on biodiversity values and prescribed biodiversity impacts during project planning;
- Describe impacts to biodiversity values and prescribed biodiversity impacts and the measures to mitigate and manage such impacts;
- Identify the thresholds for the assessment and offsetting of impacts, including:
 - Impact assessment of potential entities of serious and irreversible impacts (SAIL);
 - Impacts for which an offset is required;
 - Impacts for which no further assessment is required; and
 - Describe the application of the no net loss standard, including the calculation of the offset requirement.

A compliance table showing how this report meets the requirements of BAM is provided in **Appendix A**.

1.4. Project Description

1.4.1. Location

The WSU Milperra Campus is located entirely within the suburb of Milperra in the Canterbury-Bankstown Local Government Area (LGA) and is located approximately 20 kilometres (km) west of the Sydney Central Business District. It is located at 2 and 2A Bullecourt Avenue, Milperra, which is legally known as Lot 2 DP1291984 and Lot 1 DP101147. The project will be located within the WSU Milperra Campus site, and the area subject to ecological investigations for the project is hereafter referred to as the 'study area', which comprises the WSU Milperra Campus and Ashford Avenue, and is approximately 20.12ha in area (**Figure 2**).

The study area is largely zoned R1 – General Residential, with smaller areas zoned RE1 – Public Recreation, E1 – Local Centre and C2 – Environmental Conservation. The study area is bound by the M5 Motorway to the south, Ashford Avenue and existing residential dwellings to the west, Bullecourt Avenue and existing industrial development to the north, and Horsley Road and existing industrial development to the east. Adjoining the study area along the southeastern boundary is Mount St Joseph Catholic College.

A substantial number of bus stops are located along Bullecourt Avenue and Horsley Road, servicing routes that connect passengers both within and beyond the Canterbury-Bankstown LGA, including direct links to Bankstown Central (approximately 8.5km drive from the site), Westfield Burwood, and Westfield Miranda. While the nearest train line is the T8, accessible via East Hills, Panania, and Revesby stations, the T6 line at Bankstown Station can also be reached via bus services operating near the study area.

The development site footprint comprises 18.2ha of land directly impacted by the SSDA and is referred to within this BDAR as the subject land. All temporary/ancillary construction facilities and infrastructure will be contained within the subject land. Therefore, for the purposes of this assessment, the subject land comprises both the construction footprint and the operational footprint of this SSDA.

A site map and location map have been prepared in accordance with the BAM and are presented in **Figure 2** and **Figure 3**, respectively.

1.4.2. Rezoning of the WSU Milperra Campus

The WSU Milperra Campus was relocated to Bankstown with the aim of changing the current ‘suburban’ campus network into a hybrid campus model which includes both suburban and city centre campuses. This Strategy was endorsed by the University Board of Trustees in June 2017, and the relocation ensures that the university is in a more accessible location for many students, due to the Metro, bus and train lines within Bankstown CBD. Mirvac teamed with WSU to prepare a Planning Proposal for the WSU Milperra Campus, that sought to amend the Canterbury-Bankstown LEP to rezone the site to enable the creation of a new residential neighbourhood with the LGA.

Ecological surveys were conducted within the WSU Campus for the Planning Proposal by EcoLogical between 2020 and 2022 to determine the ecological values present within the campus. Following extensive field surveys, it was determined that the campus contained the Critically Endangered Ecological Community (CEEC) Cumberland Plain Woodland, in a variety of condition states. Most notable was the area of relatively untouched Cumberland Plain Woodland in the northeast of the study area.

Taking into consideration the requirements to avoid and minimise impacts on biodiversity under the BAM, Mirvac and WSU agreed to rezone this area in the northeast from SP2 – Infrastructure to C2 – Environmental Conservation, so that any future management and use of this patch of land will need to be considered in the context of the BC Act (**Figure 4**). The rezoning has been approved, and the northeast corner (the ‘conservation area’) is now zoned C2 and has the following zonal objectives under the LEP:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

The rezoning of the WSU Campus to include the C2 zoned land was performed with avoidance to biodiversity values in mind, and it has been included within this BDAR as it speaks to the history of the project. However, the project has undergone a number of design iterations to conserve as much native vegetation as possible outside of this C2 zoned area. Details of the further avoidance to biodiversity as a result of this can be found in **Section 7.2.2** of this BDAR.

1.4.3. Project Overview

The redevelopment of the WSU Campus is a master planned community project designed with an emphasis on providing a range of human needs and activities within close proximity. It looks to provide a higher density urban footprint to meet the expectations of increased housing and variety of dwelling choice, green transport focus with pedestrian/ cycleway, thereby a lower carbon footprint, and the protection of the conservation area.

The project will be delivered in stages and across two separate SSDA Projects, and comprises the construction of approximately 385 dwellings, three (3) public parks, new roads and shared paths, civil infrastructure, a car park, and the management of conservation land.

Specifically, across the two SSDAs, consent is sought for:

- Tree removal
- Site remediation (excluding works carried out as category 2 remediation works)
- Construction of bulk earthworks, public roads and landscaping, and services
- Augmentation of existing services and road infrastructure
- Construction of three (3) public parks
- Construction of 385 dwelling houses
- Construction of a carpark to service the existing childcare centre and E1 Local Centre zoned land
- Subdivision resulting in 385 residential lots, infrastructure lots, and the creation of a community title lot for land zoned C2 Environmental Conservation and E1 Local Centre
- Conservation works including the management of >2ha Cumberland Plain Woodland species.

This SSDA comprises of all civil works across the entirety of the site as well as the construction of all 62 dwellings in Stages 1 and 2 only, which are as follows:

- **Stage 1** – Commencement of site-wide tree removal and land remediation, creation of two (2) super lots and total of 22 residential lots, and construction of 22 dwelling houses fronting Ashford Avenue. This will be the first stage to be delivered and will connect into the existing infrastructure that located within Ashford Avenue.

- **Stage 2** – Creation of four (4) super lots, a new lot (Lot 25) across the RE1 Public Recreation zoned land, and 40 residential lots. This stage also involves the construction of 40 dwellings within Stage 2, and the construction of new roads and the new public park referred to in the Civil Plans as the 'Central Park'.
- **Stage 3a** – Creation of a new super lot, and the construction of perimeter roads surrounding the existing childcare centre, construction of a new car park to service the childcare centre and C2 Environmental Conservation zoned land. It is proposed all associated civil works required to enable the operation of the existing childcare centre will be delivered under this stage. The new traffic intersections at both Bullecourt Avenue and Horsley Road will be constructed.
- **Stage 3b** – Creation of three (3) lots to be delivered under a Community Title Scheme for the E1 Local Centre zoned land.
- **Stage 4** – Creation of eight (8) super lots, a new lot (Lot 50) across the RE1 Public Recreation zoned land, and a new lot (Lot 49) across the SP2 Infrastructure zoned land. This stage also involves the construction of new roads, the stormwater infrastructure Basin 1 and Basin 2, and the new public park referred to in the Civil Plans as the 'Southern Park', all to be dedicated to Council.
- **Stage 5** – Creation of six (6) super lots and construction of new roads and civil works.
- **Stage 6** – Creation of nine (9) super lots and a new lot (70) across the RE1 Public Recreation zoned land. This stage also involves the construction of new roads and civil works, and the new public park referred to in the Civil Plans as the 'Northern Park', all to be dedicated to Council.
- **Stage 7** – Creation of six (6) super lots and construction of road and civil works.

The second SSDA will seek consent for all outstanding works in Stages 3 to 7, which are as follows:

- **Stage 3** – Construction of the childcare alterations and additions and construction of a permanent structure for commercial use.
- **Stage 4** – Creation of the subsequent subdivision into 107 residential lots and construction of dwellings.
- **Stage 5** – Creation of the subsequent subdivision into 65 residential lots and construction of dwellings.
- **Stage 6** – Creation of the subsequent subdivision into 92 residential lots and construction of dwellings.
- **Stage 7** – Creation of the subsequent subdivision into 59 residential lots and construction of dwellings.

The layout of the project is shown in **Figure 5** - noting that the staging as outlined is subject to change; the development permits up to 430 dwellings

1.4.4. Identification of the Development Site Footprint

The development footprint that is the subject to the current DA contains both the construction footprint and the operational footprint for the project. The overall development site footprint is hereafter referred to as the 'subject land', i.e. any mentioning of the development footprint or development site within this BDAR is synonymous with the subject land.

1.4.5. General Description of the Subject Land

The subject land has an area of approximately 18.2ha and is the subject of numerous easements affecting the site, including two easements to drain water, easements for electricity and other purposes, and a right of carriageway.

Since the demolition of the previous buildings within the subject land, the subject land currently comprises:

- Existing at-grade car park (within Zone 4) repurposed as parking and hardstand area for the temporary sales office.
- Existing at-grade car park for the Childcare Centre (generally within the location of the future Road 2B).
- At-grade roads off Bullecourt Avenue.
- A large oval to the south.
- The Western Sydney University Early Learning Centre (Child-care centre).
- Vegetation of varying significance, including Cumberland Plain Woodland.

The subject land is bound by the M5 Motorway to the south, Ashford Avenue / existing residential dwellings to the west, Bullecourt Avenue / existing industrial development to the north, and Horsley Road / existing industrial development to the east. Adjoining the subject land along the southeastern boundary is Mount St Joseph Catholic College.

A substantial number of bus stops are located along Bullecourt Avenue and Horsley Road, servicing routes that connect passengers both within and beyond the LGA, including direct links to Bankstown Central (approximately 8.5km drive from the subject land), Westfield Burwood, and Westfield Miranda. While the nearest train line is the T8, accessible via East Hills, Panania, and Revesby stations, the T6 line at Bankstown Station can also be reached via bus services operating near the subject land.

1.4.5.1. Historical and Present Land Use

The WSU Milperra Campus is one of eleven Western Sydney University Campuses within metropolitan Sydney. The study area is approximately 20.12 ha in size and is bounded by Bullecourt Avenue to the north, Horsley Road to the east, the M5 Southwest Motorway to the south and Ashford Avenue to the west. There is an industrial warehouse estate to the north and east of the study area, and residential properties to the west. Within the bounded area, there is a Council operated hockey field in the northwest, and Mt St Joseph's Catholic School in the southeast. Prior to establishing in 1975, the majority of the study area, excluding the conservation area, has been historically cleared and used for agricultural purposes.

The subject land is approximately 18.20ha in area, and comprises the disused university campus in the north, and a disused sport's oval in the south.

1.4.5.2. Topography and Soils

The subject land is low lying and sits approximately between 3-10m above sea level. The Soil Landscapes of the Penrith 1:100 000 Sheet Map (Hazelton et al. 1989) and soil landscapes available on eSpade (DPIE 2020a)

indicates that the study area is mapped as the Blacktown soil landscape. The Blacktown soil landscape comprises gently undulating rises on Wianamatta Group shales with red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines.

The following landscape features have been mapped within the subject land:

- Mitchell's Landscape: Ashfield Plains
- IBRA Region: Sydney Basin
- IBRA Subregion: Cumberland

1.4.5.3. Hydrology

There are no watercourses or waterbodies within the subject land or study area.

1.4.5.4. Vegetation

The vegetation of the Canterbury-Bankstown LGA and greater Western Sydney area have been heavily cleared for urban development. The vegetation in the subject land and study area was historically cleared for agriculture, before being cleared for the development of the university in 1975.

The vegetation within the subject land and study area largely exists as planted native canopy trees, over an exotic garden understorey that was planted for landscaping purposes within the university grounds. However, there are small patches of remnant canopy trees that have been attributed to belonging to the Critically Endangered Ecological Community Cumberland Plain Woodland. These again exist over an exotic, planted understorey between the university buildings. The northeastern portion of the study area is zoned C2 (which is hereafter referred to as the 'conservation area'). The conservation area contains high-quality Cumberland Plain Woodland, that aligns with both the BC Act listing and the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act) listing for the Threatened Ecological Community (TEC).

1.5. Information Sources

1.5.1. Databases

Several databases were utilised during the preparation of this BDAR, including:

- NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) BioNet Atlas (DCCEEW (NSW) 2024a);
- NSW DCCEEW Threatened Biodiversity Data Collection (DCCEEW (NSW) 2024b);
- NSW DCCEEW BioNet Vegetation Classification database (DCCEEW (NSW) 2024b);
- Commonwealth DCCEEW Species Profile and Threat Database (DCCEEW (Cwlth) 2024); and
- Commonwealth DCCEEW Directory of Important Wetlands in Australia (C'wth DCCEEW 2024).

1.5.2. Literature

This BDAR has utilised and/or given due consideration to the results and/or spatial data from the following documents:

- Vegetation Mapping of the Sydney Metropolitan Area;
- Western Sydney University Milperra Campus Redevelopment Preliminary Ecological Assessment (Ecological 2022b);
- Western Sydney University Milperra Campus Redevelopment Ecological Assessment (Ecological 2022a);
- Western Sydney University Milperra Campus Arboricultural Impact Assessment Report (Temporal Tree Management 2025); and
- Planning Proposal, Western Sydney University Milperra (Elton Consulting 2023);
- Canterbury-Bankstown Local Environment Plan (LEP) 2023 (Canterbury-Bankstown LGA 2023b);
- Canterbury-Bankstown Development Control Plan (DCP) 2023 (Canterbury-Bankstown LGA 2023a); and
- Bankstown City Council Biodiversity Strategic Plan 2015-2025 (Bankstown City Council 2015).

This BDAR has also used information from the ecological assessments prepared by Cumberland Ecology (now SLR) submitted to Council for previous (now withdrawn) DAs, including:

- Western Sydney University Milperra Campus Stage 1 Flora and Fauna Assessment (Cumberland Ecology 2024b);
- Western Sydney University Milperra Campus Stage 2 Biodiversity Development Assessment Report (Cumberland Ecology 2024a);
- Western Sydney University Milperra Campus Stage 3 Flora and Fauna Assessment
- Western Sydney University Milperra Campus Childcare Biodiversity Development Assessment Report (Cumberland Ecology 2025a)
- Western Sydney University Milperra Campus Vegetation Management Plan (Cumberland Ecology 2025b); and
- Western Sydney University Milperra Campus Hollow Offset Replacement Strategy and Nestbox Management Plan (Cumberland Ecology 2024).

As part of the preparation of this BDAR, relevant legislation, policies and guidelines were also reviewed. Other sources of information have been referenced throughout this BDAR.

1.5.3. Aerial Photography

The aerial imagery utilised in this BDAR is sourced from NearMap and is dated 22 July 2024. Historical aerial imagery from 1943 as available on SixMaps, as well as historical aerial imagery from the 1960s – 1990s, sourced from NSW Government Spatial Services – historical imagery viewer, was also consulted.

2. Methodology

2.1. Review of Existing Data

Database analysis was conducted for the locality of the subject land using the BioNet Atlas (EHG 2024a). The locality is defined as the area within a 5 km buffer from the boundary of the subject land. The BioNet Atlas search facility was used to generate records of threatened flora and fauna species and populations listed under the BC Act and/or EPBC Act within the locality of the subject land. The abundance, distribution and age of records generated within the search areas provided supplementary information for the assessment of occurrence of those threatened species within the subject land.

The following databases and map tools were also interrogated:

- Species data that is held in the BioNet Atlas (EHG 2024a);
- NSW State Vegetation Type Map (SVTM) (DPE 2024b);
- BioNet Vegetation Classification database (EHG 2024b);
- Threatened Biodiversity Data Collection (TBDC) (EHG 2024c); and
- Biodiversity Values Map and Threshold Tool (DPE 2024a).

The information collected during the database analysis provided additional information on the ecological constraints associated with the subject land and study area, and informed surveys.

2.2. Landscape Features

Landscape features requiring consideration were initially determined via desktop assessment. Field surveys undertaken by Cumberland Ecology on 20 – 23 August 2024 sought to verify the following landscape features:

- Rivers, streams and estuaries;
- Important and local wetlands;
- Karsts, caves, crevices, cliffs and areas of geological significance; and
- NSW BioNet Landscapes.

No amendments were required to be made to any of these landscape features following field surveys.

2.3. Native Vegetation Surveys

Native vegetation surveys were undertaken within the WSU Campus between 20- 23 August 2024 by a botanist and an ecologist from Cumberland Ecology. The survey consisted of the following:

- A random meander survey across the study area to compile a species list and to map vegetation communities;
- Parallel transect surveys within areas of native vegetation to detect threatened flora species;
- A plot-based vegetation integrity assessment performed in accordance with the BAM; and

- Taking photographs of vegetation to provide a visual documentation of Plant Community Types (PCTs) present and their condition.

Identification of the PCTs occurring within the study area was guided by the findings of the floristic survey. The data collected during surveys of the study area was analysed in conjunction with a review of the PCTs held within the VIS Classification Database. Consideration was given to the occurrence within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and Cumberland IBRA Sub-regions. The locations of flora surveys within the subject land and study area are shown in **Figure 6**.

2.3.1. Vegetation Mapping

Previous vegetation mapping studies have been undertaken across the subject land, study area and surrounds, including broad scale mapping of the Sydney Metropolitan Area and ground-truthing of the study area by Eco Logical for the Planning Proposal (Ecological 2022b, a). The vegetation within the entire subject land and study area was ground-truthed by a botanist and ecologist from Cumberland Ecology on 20 – 23 August 2024 to examine and verify the mapping of the condition and extent of the different plant community types (PCTs). Mapping of plant communities within the subject land was undertaken by random meander surveys through patches of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Soils were also inspected.

Records of plant community boundaries were made using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs. The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the subject land.

2.3.1.1. Assessment Approach for Mapping of Areas of *Cynodon dactylon*

One of the dominant grass species across the entirety of the subject land is *Cynodon dactylon* (Couch), a species commonly used as a pasture and lawn grass and on sport's fields as it can be mown to a low height and repairs quickly from damage. The below section details the approach taken when assessing *Cynodon dactylon* within the subject land and study area, as part of the vegetation surveys completed for the project.

While *Cynodon dactylon* is officially listed as a native species by the NSW Herbarium, the status of *Cynodon dactylon* as native or exotic has been contentious amongst Australian botanists for many years. Two varieties of the species (out of a total of seven worldwide) are considered to occur in Australia within the Flora of Australia (Nightingale et al. 2020c). *Cynodon dactylon* var. *dactylon* is considered to be an early introduction, i.e. an exotic species, across all of Australia, with the exception of potentially Lord Howe Island and Norfolk Island (Nightingale et al. 2020a). *Cynodon dactylon* var. *pulchellus* is considered to be native to Australia, and is a rare variety which is endemic to the Murray River in Victoria (VIC) and South Australia (SA), and elsewhere in south-east Australia, which are the only areas where it is known to occur (Nightingale et al. 2020b).

Varieties of *Cynodon dactylon* are not currently recognised by the New South Wales (NSW) Herbarium, which lists the variety which by distribution would be considered to be *Cynodon dactylon* var. *dactylon* (var. *pulchellus* does not occur in NSW) in the Flora of Australia, as *Cynodon dactylon* only. *Cynodon dactylon* is currently considered to be native across New South Wales by the NSW Herbarium (Botanic Gardens Trust 2021), though is noted as being "widely cultivated as a lawn grass and for agriculture". This is a precautionary approach however, as Dr Richard Jobson, the Poaceae expert at the Royal Botanic Gardens Sydney (i.e. the NSW

Herbarium), has confirmed that the status of *Cynodon dactylon* as native versus exotic has not been resolved, and provided correspondence with Dr Chris Lambrides of the University of Queensland who also confirms the current status is not resolved (R Jobson, personal communication, 21 May 2014). Dr Chris Lambrides is one of a small group of botanists at the University of Queensland who are at the forefront of expertise on *Cynodon dactylon* in Australia, having conducted multiple studies on the phenotypic and genotypic variation of *Cynodon* species in Australia.

The reason for the current uncertainty around the status of *Cynodon dactylon* as native or introduced, dates back to early collections of the species by Robert Brown in the period between 1802 and 1805 in the Sydney region. Robert Brown himself considered it to be introduced (Langdon 1954), and it was included on a list specifically of species Brown located surrounding Sydney, he considered to be introduced to Australia, that he recognised from elsewhere in the world, that had by that period become naturalised surrounding Sydney (Groves 2002).

Langdon (1954) considered that the early collection of *Cynodon dactylon* by Robert Brown is indicative the species is exotic. He considered the species could easily have been common in the first decade of colonisation of Sydney, prior to the period Brown surveyed the area, due to the ease with which the species is known to spread into a variety of habitats. He notes ships bringing both cattle and cattle feed (including grass), and potted plants with soil in which *Cynodon dactylon* seed could be present, throughout the early period of Sydney, stopped at areas in which the species occurs in Africa, Southern Asia, and the East Indies, and imported items from these areas. Langdon provided further evidence for his viewpoint through a study of fungal pathogens of *Cynodon dactylon* in the areas it naturally occurs versus in Australia. He found that pathogens which are difficult to introduce, due to their life cycles needing to align with life cycles of the host, are absent from *Cynodon dactylon* in Australia, while pathogens that are easily transported with plant material including seeds are present.

One of the most recent and robust scientific studies undertaken to elucidate the status of *Cynodon* species in Australia, including *Cynodon dactylon* was undertaken by Jewell et al. (2012). This study was a phylogenetic study, in which mutations in areas of the genomes of individuals of *Cynodon* spp. were looked at in comparison to mutations in individuals from elsewhere in the world. The areas of genomes analysed in these types of studies mutate relatively rapidly, and as such if a population of a species has been established in a certain geographical location for a period of time, the genome should differ from individuals of the species in other areas which are geographically isolated from the population. Due to the rate at which mutations accumulate in these areas of the genome being known, these studies are able to provide approximate lengths of time for how long populations of a species have been separated. As such, if *Cynodon dactylon* is naturally occurring in Australia, an isolated island continent, the species should have accumulated mutations such that a population in Australia is distinct from populations elsewhere in the world. The results of the study indicated that genetic diversity of all *Cynodon* species in Australia was similar to genetic diversity of individuals of the *Cynodon* species elsewhere in the world, that all *Cynodon* species including *Cynodon dactylon* are introduced to Australia, and that introductions have occurred more recently than 500 years ago due to low divergence of genes between Australian and international populations. This strongly indicates *Cynodon dactylon* is not a native species to Australia and was introduced following European colonisation. A further, more recent phylogenetic study undertaken by Peterson et. al (2015) which analysed samples of grass species within the Poaceae subtribe

Eleusininae, which includes the *Cynodon* genus, had the result that the single Australian sample of *Cynodon dactylon* included grouped strongly with North American samples. The Australian sample had not undergone any substantial mutation to the extent it could genetically be shown to be distinct from North American samples, meaning the species has not been in Australia for long, and this further supports a post-European introduction. The study also demonstrated low genetic separation between *Cynodon dactylon* varieties sampled, meaning with further investigation the varieties may in the future be discarded for a broader concept of the species.

The only evidence *Cynodon dactylon* could be native to Australia is from collections made surrounding Sydney by Robert Brown between fourteen and seventeen years after Sydney had been colonised, enough time for an agriculturally introduced population to become naturalised in the area, and there is significant evidence this is not a reason to consider the species native to Australia. Robert Brown himself considered it to be an introduced species. The current status of *Cynodon dactylon* as native in NSW is an overly cautious, precautionary approach that is not evidence based. Scientific evidence explained above indicates that the species is introduced to Australia. It is notable that the NSW Herbarium is the only herbarium in Australia that considers the species to be native to Australia, and all other state herbaria describe it as introduced/naturalised (Department for Environment and Water SA 2021, Northern Territory Government 2021, Queensland Government 2021, Royal Botanic Gardens Victoria 2021, Salas and Baker 2021).

It is also important to note that *Cynodon dactylon* is **not** listed as one of the many characteristic species mentioned for either Cumberland Plain Woodland or River Flat Eucalypt Forest within the respective final determinations. It is also notable that the dominance of this grass within the subject land does not extend to the nearby conservation area, which contains comparatively undisturbed Cumberland Plain Woodland with a diverse understorey, and a VI score of 91. If the species was a native constituent of Cumberland Plain Woodland, it could be expected to be well represented in the conservation area, but it is absent, although notably present in the mown condition state, which has been planted and maintained as a garden used by the childcare centre.

Council have expressed their concerns with considering *Cynodon dactylon* an exotic species, and it was a consistent issue brought up during the earlier, now withdrawn, staged DAs. Despite the fact that Cumberland Ecology regard *Cynodon dactylon* as an exotic species for the reasons explained above, at the request of Council and the client, it has been assessed as a native species throughout this BDAR and kept as a native species in the BAM-Calculator (BAM-C).

2.3.2. Vegetation Integrity Assessment

A plot-based vegetation survey and vegetation integrity assessment was undertaken concurrently within the subject land and study area in accordance with the BAM (hereafter referred to as 'BAM plots'). These BAM plots were undertaken in accordance with Section 4.2.1 and Section 4.3.2 of the BAM.

A total of seven (7) BAM plots were undertaken within the study area on 20 - 23 August 2024, and their locations are shown on **Figure 6**. The BAM plots required the establishment of a 20 x 50 m plot with an internal 20 x 20 m plot. The following data was collected within each BAM plot:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within the 20 m x 20 m floristic plot;

- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within the 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within the 20 m x 20 m floristic plot;
- Assessment of function attributes within the 20 m x 50 m plot, including:
 - Count of number of large trees;
 - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
 - Regeneration based on the presence of living trees with stems <5 cm DBH;
 - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within each 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within each 20 m x 50 m plot.

The location of BAM plots has sought to capture the environmental variation of the PCTs identified within the subject land and study area. **Table 3** summarises the plot requirements based on the size and number of vegetation zones in the subject land. As shown in this table, the minimum number of plots has been completed for each vegetation zone in the study area, albeit outside of the subject land.

Table 3 BAM plot survey requirements

Vegetation Zone	PCT	Condition	Area within Subject Land (ha)	Area within Study Area (ha)	Minimum Number of Plots Required for Study Area	Number of Plots Completed
1	3320	Canopy Only	0.60	0.60	1	1
2	3320	Mown	0.15	0.15	1	1
3	3320	Exotic Ground	0.34	0.87	1	2
	3320	Intact	0.00	1.39	1	1
4	4025	Canopy Only	0.06	0.06	1	1

2.4. Threatened Flora Species Survey

2.4.1. Habitat Constraints

Desktop assessments and field surveys within the study area included assessment of habitat constraints and microhabitats for predicted species credit flora species.

2.4.2. Targeted Species Surveys

Under Section 5.2.2 of the BAM, species credit species can be excluded from further assessment, and thereby targeted surveys, if it is determined that none of the species-specific habitat constraints are present within the

subject land. Furthermore, under Section 5.2.3 of the BAM, a candidate species credit species can be considered unlikely to occur in the subject land (or specific vegetation zones) if after carrying out a field assessment, the assessor determines that the habitat is substantially degraded such that the species is unlikely to utilise the subject land (or specific vegetation zones).

2.4.2.1. Random Meander Surveys

Random meander surveys were utilised, in order to refine vegetation polygon boundaries (as described above). Additionally, areas of non-native vegetation within the study area were searched for threatened flora species during the random meander survey.

2.4.2.2. Parallel Transect Survey

Threatened flora surveys generally in accordance with ‘Surveying threatened plants and their habitats – NSW survey guide for the biodiversity assessment method’ (DPIE 2020) were undertaken within all areas of native vegetation within the study area. The parallel transects were also supplemented by BAM plots and random meander surveys.

The parallel transects were undertaken within the study area during two separate survey periods, being August 2024, and February 2025. Parallel transects were completed within areas of native vegetation containing suitable habitat for threatened flora species. Where threatened flora species were recorded, the survey focused on the identification of the area of habitat and counting the number of individuals.

The parallel transect surveys included searching transects spaced approximately 5 m apart within all areas of native vegetation.

2.4.3. Flora Survey Effort

Due to the historic disturbance of soils, absence of a shrub layer within the subject land and presence of imported fill suppressing any potential seed bank, the habitats within the subject land were considered to be sufficiently degraded to rule out the presence of the majority of candidate flora species credit species generated by the BAM-C. Further species were excluded from further assessment as the species-specific habitat constraints were absent from within the subject land.

Despite this, random meander surveys were performed throughout the entire site, and parallel transects were performed within areas of native vegetation, for threatened flora species whose survey periods overlapped with the vegetation surveys as precautionary measure (**Figure 6**). Flora species included within the targeted searches are shown in **Table 4**.

Table 4 Flora survey dates

Scientific Name	Recommended Survey Period	Dates of Survey within Study Area	Survey Method
<i>Acacia pubescens</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Eucalyptus bethamii</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey

Scientific Name	Recommended Survey Period	Dates of Survey within Study Area	Survey Method
<i>Eucalyptus glaucina</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> endangered population	Jan-Feb, Nov-Dec	24 February 2025	Random meander, parallel transects
<i>Micromyrtus minutiflora</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Persoonia nutans</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Pultenaea pedunculata</i>	Sept-Dec	20-23 August 2024	Random meander, parallel transects, plot survey
<i>Pimelea curviflora</i> var. <i>curviflora</i>	Jan-March, Oct-Dec	24 February 2025	Random meander, parallel transects
<i>Pimelea spicata</i>	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey
<i>Syzygium paniculatum</i>	Apr-June	20-23 August 2024, 24 February 2025	Random meander, parallel transects, plot survey
<i>Wahlenbergia multicaulis</i> – endangered population	All year	20 – 23 August 2024	Random meander, parallel transects, plot survey

As described in **Table 4** above, both *Pultenaea pedunculata* and *Syzygium paniculatum* were surveyed for outside of their recommended survey periods in the TBDC.

Syzygium paniculatum is a rainforest species, and is a conspicuous small tree to tree, that has no association with PCT 3320 and would not historically have occurred in this dry vegetation type (NSW Threatened Species Scientific Committee, 2025). It is only associated with PCT 4025 within the Study Area (DCCEEW (NSW), 2025) – these areas comprise isolated trees over exotic grass species, and as such are too degraded to support the species, and the species was not located during surveys or has potential to have been missed. It is not certain why PCT 4025 is associated with the species, as the final determination considers the species was likely only present in littoral and subtropical rainforest historically, mostly close to the coast – in Sydney most confirmed natural records are around Towra Point, and the northern beaches (Centre for Plant Biodiversity Research, 2025). If the species was present, it is readily identifiable without fruit in non-fruiting times from other species known to occur within the Sydney Region, and as such the fruit is not required to check for multiple embryos – this character is only useful for separating it from *Syzygium crebrinerve*, which does not occur as far south as the Subject Land (Botanic Gardens Trust, 2025). The sparse occurrences of oil glands in the leaves separates it from *Syzygium oleosum*, which has dense glands in leaves – this character is easily checked by holding leaves to a light source. The only other species overlapping in range, *Syzygium australe* is also easily separated by the conspicuous decurrent leaf bases forming pockets in the nodes, on smaller twigs/branches, where they intersect with the next leaf further down the branch (Botanic Gardens Trust, 2025). *Syzygium paniculatum* does

not have this character. The species is not considered to be likely to have ever historically occurred within or nearby to the Subject Land.

Pultenaea pedunculata is known to start flowering from August onwards, and so the surveys at the end of August were deemed suitable for this species. It is a woody sub-shrub that would not survive mowing regimes outside of the core patch of PCT 3320 to be retained within the Study Area (Botanic Gardens Trust, 2025). No such sub-shrubs were present and unidentified during parallel transects in suitable areas of habitat, although suitable areas of habitat are only present within vegetation to be retained. The species is only currently known to occur in Villawood and Prestons, both locations with fewer than 10 plants, and is broadly otherwise considered extinct in the Sydney Region, with the exception of a much larger population around Appin, which is not near to the Study Area (EHG, n.d.; NSW Threatened Species Scientific Committee, 1999). In addition to microhabitats being too degraded to support the species in the Subject Land, for the aforementioned reasons, the species is also considered very unlikely to occur within the Study Area, and no similar sub-shrubs were located during targeted surveys.

Table 5 below shows the flora survey effort, including dates and staff members.

Table 5 : Flora survey effort

Survey Type	Date	Effort	Personnel
Vegetation mapping	20-22 August 2024	60 person hours	Bryan Furchert, Katrina Wolf, Cecilia Eriksson Pinatacan, Jaqueline Britton
Vegetation Integrity Assessment	23 August 2024	20 person hours	Bryan Furchert, Cecilia Eriksson Pinatacan
Threatened flora searches	20-22 August 2024	Observations throughout day	Bryan Furchert, Katrina Wolf, Cecilia Eriksson Pinatacan
	23 August 2023	20 person hours	Bryan Furchert, Jacqueline Britton
	24 February 2025	20 person hours	Callum Fleming, Alix Murray

2.5. Threatened Fauna Species Surveys

Under Section 5.2.2 of BAM, species credit species can be excluded from further assessment, and thereby targeted surveys, if it is determined that none of the species-specific habitat constraints are present within the subject land. Furthermore, under Section 5.2.3 of BAM, a candidate species credit species can be considered unlikely to occur on the subject land (or specific vegetation zones) if after carrying out a field assessment, the assessor determines that the habitat is substantially degraded such that the species is unlikely to utilise the subject land (or specific vegetation zones).

Field surveys conducted by Cumberland Ecology within the subject land in March and April 2025 included assessment of habitat constraints and microhabitats for predicted species credit fauna species and assessment of potential breeding habitat for species/ecosystem credit species (hereafter referred to as dual credit species). This included desktop assessment of proximity of the subject land to features such as caves and waterways

and field inspection of microhabitats including leaf litter, stick nests, hollowing-bearing trees, significant bush rock, fallen logs, culverts, water bodies and decorticating bark.

Based on presence/absence of habitat constraints (if listed for species) or site-specific habitat conditions, the following species listed in **Table 6** were considered as candidate species requiring further assessment. The list of candidate species for further assessment and justification for removal of some initial candidate fauna species is further detailed in **Section 5.3** of this BDAR.

Table 6 Fauna survey effort

Scientific Name	Common Name	Survey Period	Dates of Survey	Survey Method
<i>Burhinus grallarius</i>	Bush Stone Curlew	All year	10 – 13, 17 and 20 March 2025, 1 – 4 April 2025	Diurnal bird survey, nocturnal bird survey
<i>Callocephalon fimbriatum</i> *	Gang Gang Cockatoo	Jan, Oct - Dec	20 – 23 August 2024, 10 March 2025, 1 – 4 April 2025	Diurnal bird survey, habitat assessment
<i>Calyptorhynchus lathami lathami</i>	Southeastern Glossy Black Cockatoo	April - Aug	20 – 23 August 2024, 10 March 2025, 1 – 4 April 2025	Diurnal bird survey, habitat assessment
<i>Cercartetus nanus</i>	Eastern Pygmy Possum	Jan - Mar, Oct - Dec	10 – 13, 17 and 20 March 2025	IR cameras, spotlighting
<i>Chalinolobus dwyeri</i> *	Large-eared Pied Bat	Jan, Nov – Dec	24 – 28 February 2025	Echolocation call detection, roost watches
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	All year	11 March 2025	Diurnal active search
<i>Miniopterus australis</i>	Little Bent-winged Bat	Jan – Feb, Dec	24 – 28 February 2025	Echolocation call detection, roost watches
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Jan – Feb, Dec	24 – 28 February 2025	Echolocation call detection, roost watches
<i>Ninox connivens</i>	Barking Owl	All year	10 – 13, 17 and 20 March 2025	Nocturnal surveys, spotlighting
<i>Ninox strenua</i>	Powerful Owl	All year	10 – 13, 17 and 20 March 2025	Nocturnal surveys, spotlighting
<i>Petaurus norfolcensis</i>	Squirrel Glider	All year	10 – 13, 17 and 20 March 2025	IR cameras, spotlighting
<i>Phascolarctos cinereus</i>	Koala	All year	10 – 13, 17 and 20 March 2025	SAT surveys, spotlighting

Scientific Name	Common Name	Survey Period	Dates of Survey	Survey Method
<i>Tyto novaehollandiae</i>	Masked Owl	All year	10 – 13, 17 and 20 March 2025	Nocturnal surveys, spotlighting

2.5.1. Fauna Survey Methods

Targeted threatened fauna surveys were undertaken within the subject land for species credit species or breeding habitat for species that are both ecosystem and species credits species (hereafter referred to as dual credit species) that were assessed as candidate species credit species for further assessment. The survey design has been guided by the following:

- NSW Government (2020): Biodiversity Assessment Method;
- DEC (NSW) (2004): Threatened Biodiversity Survey and Assessment, Guidelines for Development and Activities (Working Draft);
- Survey Guidelines for Australia's Threatened Mammals (DotE 2011b);
- Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE 2022a);
- The Spot Assessment Technique: a tool for determining localised level of habitat use by Koalas (Phillips and Callaghan 2011); and
- 'Species credit' threatened bats and their habitats (OEH, 2018).

All surveys were undertaken during periods specified in the TBDC (EHG 2024c) for each species, apart from the Gang-gang Cockatoo, as outlined above, and according to relevant survey guidelines. Further discussion is included below.

The locations of the fauna surveys are shown in **Figure 7**.

2.5.1.1. Habitat Assessment

A fauna habitat assessment was conducted by an ecologist between 20 - 23 August 2024 and on the 10 March 2025. The subject land and study area was assessed for groundcover, shrub/understory cover, canopy cover, tree hollows as well as other habitat features such as bush rock, cliffs, fallen trees and signs of fauna use such as scats, scratches and scrapings.

The nature and extent of fauna habitats in the subject land and study area were assessed and areas where fauna species could reside or forage were identified. This included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, nests, fallen logs, and wetland areas. Particular focus was given to identifying trees with large hollows suitable for threatened cockatoos, or the presence of raptor nests in large old trees.

Additionally, while the presence of nesting/breeding habitat for White-bellied Sea-Eagle (*Haliaeetus leucogaster*), Square-tailed Kite (*Lophoictinia isura*) and Eastern Osprey (*Pandion cristatus*) were ruled out

during habitat assessment stage, these species were targeted during the diurnal bird surveys, in order to identify any offsite breeding habitat that may occur.

2.5.1.2. Diurnal Bird Census

Diurnal bird surveys were undertaken in the subject land, using the area search method, which involves walking within a 2-ha area and recording all avian species observed. This was conducted at sunrise at three sites within the subject land for a minimum of 20 minutes per site, over a period of four days.

Species targeted: South-eastern Glossy Black-Cockatoo, Gang-gang Cockatoo

Relevant survey guidelines: *Threatened Biodiversity Survey and Assessment: Guidelines for Activities and Developments (DEC (NSW) 2004)*, *Survey Guidelines for Australia's Threatened Birds (DEWHA 2010)*.

A diurnal bird census was undertaken in April, which is outside of the recommended survey period for the Gang-Gang Cockatoo. Nonetheless, the TBDC profile states that this species may need heavily timbered woodlands for breeding. Within the subject land, there is only one single large hollow (larger than 7cm in diameter and higher than 3m off the ground) that would meet the description of the habitat requirements in the TBDC.

As the single large hollow on site was found to be occupied by Galahs at every site visit, it was determined that the Gang-gang Cockatoo did not utilise the subject land for breeding habitat.

2.5.1.3. Nocturnal Bird Surveys

Nocturnal bird surveys were conducted at the centre point of the subject land using a call playback technique with a recording of the targeted species call. Following the call playback, the area immediately surrounding around the centre point of the subject land was spotlighted to visually search for the targeted species.

Call playback surveys involved arriving at the centre point of the site and listening for unsolicited calls for 10 minutes, followed by broadcasting of the pre-recorded calls for no more than 15 seconds followed by at least 30 seconds of listening time to watch and listen for an owl that may be circling overhead. The call broadcasting occurred for 15 minutes for each targeted species unless the species was detected before 15 minutes expires. As there are multiple targeted species, this process was repeated individually for each of the species and was then followed by 10 minutes of spotlighting in the immediate area. This process was conducted once per night for six nights at the centre point of the site.

Species targeted: Bush Stone-Curlew, Barking Owl, Powerful Owl, Masked Owl.

Relevant survey guidelines: *Threatened Biodiversity Data Collection Survey Guidelines (EHG 2024)*.

2.5.1.4. Nocturnal Mammal Surveys

Spotlighting was undertaken via random meander searches throughout the subject land using high power hand-held torches, focussing on hollow-bearing trees, burrows and any identified fauna runs. This was conducted once per night (~2 hours) for six nights, in conjunction with the owl surveys. Surveys included sunset surveys as many of the mammals are most active at crepuscular times.

Species targeted: Eastern Pygmy Possum, Squirrel Glider, Koala.

Relevant survey guidelines: *Survey Guidelines for Australia's Threatened Mammals* (DotE 2011a), *Threatened Biodiversity Survey and Assessment: Guidelines for Activities and Developments* (DEC (NSW) 2004), *Koala (Phascolarctos cinereus): Biodiversity Assessment Method Survey Guide* (DPE 2022b).

2.5.1.5. Infrared Cameras

Four arboreal infrared (IR) cameras were installed within areas of suitable habitat of the subject land. Each camera was set to take three photos in succession when triggered. These were left on site for approximately eight (8) weeks. Motion sensor cameras were placed facing native vegetation to determine whether any of the targeted species are present on within the subject land. The IR cameras were retrieved at the end of the survey, and the data was analysed, and species identified by an experienced ecologist.

Species targeted: Eastern Pygmy-possum, Squirrel Glider, Koala

Relevant survey guidelines: *Survey Guidelines for Australia's Threatened Mammals* (DotE 2011), *Threatened Biodiversity Survey and Assessment: Guidelines for Activities and Developments* (DEC (NSW) 2004)

2.5.1.6. Koala SAT Surveys

Surveys for Koalas were undertaken using the Spot Assessment Technique (SAT) throughout the subject land, where possible. Survey locations were randomly selected due to the limited habitat available in the subject land, based on each patch of vegetation within the site that contains Koala food trees. Once a central food tree was established, a maximum of two-person minutes were spent searching for faecal pellets (scats) within a one metre radius of the base of the central tree and 29 surrounding trees. Tree trunks were searched for scratch marks, and the canopy was observed for any koalas present.

Species targeted: Koala

Relevant survey guidelines: *Koala (Phascolarctos cinereus): Biodiversity Assessment Method Survey Guide* (DPE 2022)

2.5.1.7. Diurnal Active Searches

A diurnal active search was undertaken within the subject land for the Cumberland Plain Land Snail. The survey involved searches within 1 metre of native trees with bark and/or leaf litter present at the base. Searches included disturbance (via raking) of the bark and/or leaf litter to search for live snails or snail shells.

Species targeted: Cumberland Plain Land Snail,

Relevant survey guidelines: *Threatened Biodiversity Survey and Assessment: Guidelines for Activities and Developments* (DEC (NSW) 2004).

2.5.1.8. Microchiropteran Bat Surveys

a. Echolocation Call Detection

Four echolocation call detection units (Anabat Swift) were deployed within the subject land over a period of four consecutive nights in February 2025. The units were set to record from sunset to sunrise. As microchiropteran bats are generally most active between October and March, the survey was undertaken when the weather is warm during the optimum survey period, thereby increasing the likelihood of detecting

microchiropteran bats. The ANABAT units were retrieved, and the recorded bat calls were analysed, and species identified by an experienced expert (see **Appendix B** for detailed bat analysis).

Species targeted: Large-eared Pied Bat, Little Bent-winged Bat and Large Bent-winged Bat

Relevant survey guidelines: *'Species credit' threatened bats and their habitats* (OEH 2018).

b. Roost Watches

A search of a microbat roost was undertaken by looking for bats or signs of bats (urine stains, droppings, remains, and bat fly casings) in suitable roost habitat during the daytime. All roost searches used a torch to shine in holes, cracks and crevices, and carried a handheld bat detector to locate (and identify) bats that may call.

Roost watch surveys using an echolocation recording device (Anabat Swift) were carried out at dusk in February. Roost watches included watching tree hollow/old buildings for approximately 30 minutes prior to dusk and 30 minutes after dusk (i.e., minimum of one hour) using an echolocation recording device to identify potential bat roosts as well as the species roosting. During roost searches, the time and location of any bats detected (either seen or recorded on echolocation device) were recorded.

Species targeted: Large-eared Pied Bat, Little Bent-winged Bat and Large Bent-winged Bat

Relevant survey guidelines: *'Species credit' threatened bats and their habitats* (OEH, 2018).

2.6. Weather Conditions

Weather conditions during the field surveys to date was appropriate for detection of a range of flora and fauna species. A summary of weather conditions in the wider locality of the study area (BOM Weather Station 066137 -Bankstown Airport) during the field survey is provided in **Table 7**.

Table 7 Weather conditions during the field surveys

Date	Temperature Minimum (°C)	Temperature Maximum (°C)	Rainfall (mm)
20/08/2024	7.2	23.0	0
21/08/2024	12.6	26.6	0
22/08/2024	11.9	23.6	0
23/08/2024	6.8	22.8	0
24/02/2025	19.7	28.1	0.4
25/02/2025	20.4	23.3	0
26/02/2025	17.6	29.0	0
27/02/2025	21.1	31.4	0
28/02/2025	19.8	37.7	0
10/03/2025	19.1	27.2	0.6
11/03/2025	19.8	24.3	10.8

Date	Temperature Minimum (°C)	Temperature Maximum (°C)	Rainfall (mm)
12/03/2025	19.2	27.5	9.0
13/03/2025	17.6	32.3	0
17/03/2025	15.8	22.0	0
20/03/2025	19.0	32.9	0
1/04/2025	16.6	26.0	0
2/04/2025	13.7	27.1	0
3/04/2025	12.1	25.3	0
4/04/2025	13.3	25.0	0

3. Landscape Features

3.1. Assessment Area

The subject land is approximately 18.2ha in size and is shown in **Figure 2**. As the project is being assessed as a non-linear project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. The assessment area is approximately 1002.68 ha in size and is shown in **Figure 3**.

3.2. Landscape Features

Landscape features identified within the subject land and assessment area are outlined below. The extent of these features within the subject land is shown in **Figure 2** and the extent within the assessment area is shown in **Figure 3**.

3.2.1. IBRA Bioregions and IBRA Subregions

The subject land and assessment area occur within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and within the Cumberland IBRA Subregion.

3.2.2. Rivers, Streams and Estuaries

The subject land and assessment area occur within the Sydney Metro catchment. No mapped watercourses occur within the subject land, however numerous watercourses occur within the assessment area. In addition to the Georges River (sixth or higher order) that flows approximately 1km from the western boundary of the subject land, several first, second and fourth/fifth order streams occur within the assessment area. In accordance with Appendix 3 of the BAM, a riparian corridor of 10 m, 20 m, 40 m and 50 m either side of the waterway applies to 1st, 2nd, 4th/5th and ≥6th order streams, respectively.

3.2.3. Important Wetlands

No wetlands (artificial or natural) occur within the subject land and there are no important wetlands included in the Cth DCCEEW Nationally Important Wetlands directory or the *State Environmental Planning Policy (Resilience and Hazards) 2021* database in the subject land or assessment area.

3.2.4. Habitat Connectivity

The subject land is included in the Connected Corridors for Biodiversity Mapping (SSROC 2016), which maps the regional biodiversity corridors that link the Royal National Park to the Ku-ring-gai Chase National Park. A small section of the subject land has been mapped as 'Priority Habitat' within this map, however the identified area is comprised of scattered trees, some of which are remnant Cumberland Plain Woodland, and the others are either planted native or woody exotic. The area mapped as Priority Habitat appears to be based on broad-scale mapping as it also contains cleared areas, including buildings and roads/footpaths which do not provide suitable habitat for native fauna (**Figure 8**).

The southern portion of the subject land has been identified as 'Supporting Habitats' which are described as "generalised boundaries of mixed vegetation in a highly urbanised environment". This is comprised of a row of *Casuarina glauca* (Swamp Oak) trees that have largely been planted along the boundary of the M5

Motorway, which may provide limited connectivity for native species along the motorway to the subject land and the wider study area.

The remainder of the subject land has been mapped as 'Supporting Areas' within the corridor. This is described as comprising all areas within the corridor that are not mapped Priority Habitat or Supporting Habitats. The parts of the subject land mapped as Supporting Areas are largely comprised of exotic dominated grassland and cleared areas and contains very little connectivity between the treed vegetation within the subject land.

Additionally, the southern boundary of the study area has been mapped in the *Canterbury-Bankstown Biodiversity Strategic Plan 2015-2025* (the 'Plan') as containing a 'transition corridor' (see Figure 11 of the Plan) (Bankstown City Council 2015), which was identified as an already vegetated tract of land within the previous Bankstown LGA. This is known as the M5 Motorway Corridor. Overall, the remaining vegetation within the subject land is likely to only provide 'stepping stone' habitat for aerial species between the M5 Motorway Corridor and the conservation area through the canopy layer. Ground-dwelling native fauna species are unlikely to use the subject land as 'stepping stone' habitat due to the lack of understorey vegetation present.

In summary, the identified habitat corridors within the subject land contains some native vegetation that provides limited connectivity through scattered trees to the wider study area and vegetation beyond the site. The north, east and west of the study area comprise residential or industrial estates, with scattered trees within the streets and the gardens, and so native fauna, other than highly mobile, aerial species, are unlikely to use the subject land to reach areas of native vegetation outside of the study area. There are numerous reserves located to the south of the subject land, such as the Killara, Horsley Park and Kelso Park Reserves, which contain areas of relatively undisturbed native vegetation. Native fauna species, other than highly aerial species such as birds and microbats, are unlikely to use the subject land as 'stepping stone' habitat to reach these reserves, as they are separated from the subject land by the M5 South Western Motorway, therefore connectivity within the subject land is largely limited to connectivity along the M5 Motorway to the wider study area.

3.2.5. Karsts, Caves, Crevices, Cliffs and Areas of Geological Significance

No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the subject land or assessment area based on searches of available aerial imagery from NearMap, or topographic data available from SixMaps.

3.2.6. Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value have been mapped within the subject land or assessment area.

3.2.7. NSW (Mitchell) Landscapes

The subject land is largely located within the 'Ashfield Plains' NSW (Mitchell) Landscape, with the southern portion of the subject land located within the 'Georges River Alluvial Plain' NSW (Mitchell) Landscape. The assessment area mostly comprises the 'Ashfield Plains' NSW (Mitchell) Landscape and the 'Georges River Alluvial Plain' NSW (Mitchell) Landscape, however areas of the 'Woronora Plateau' NSW (Mitchell) Landscape are present in the south of the assessment area (see **Figure 3**).

3.2.8. Soil Hazard Features

No soil hazard features have been identified within the subject land or the assessment area.

3.3. Native Vegetation Cover

The native vegetation cover was determined using GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised the detailed vegetation mapping prepared by Cumberland Ecology in conjunction with the State Vegetation Type Map (SVTM) prepared by NSW DCCEW (DPE 2025). The native vegetation cover within the assessment area is shown in **Figure 3**. It occupies approximately 159.69 ha, which represents approximately 15.93% of the assessment area (approximately 1002.68 ha). Therefore, the native vegetation cover value is assigned to the cover class of >10-30%.

The remaining land within the assessment area comprises cleared land and exotic vegetation. No significant differences between the aerial photographs used in this assessment and the native vegetation cover shown in **Figure 3** have been identified.

4. Native Vegetation

4.1. Native Vegetation Extent

The subject land and wider study area have been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. The native vegetation extent within the subject land was determined through aerial photograph interpretation and field surveys. The native vegetation extent within the subject land is shown in **Figure 9**. It occupies approximately 3.20 ha, which represents approximately 17.58% of the subject land. The native vegetation extent within the subject land comprises planted and remnant native vegetation. An additional 6.56ha comprises planted native and exotic dominated grassland.

The remaining areas within the subject land comprise cleared land, including buildings and roads, and exotic vegetation, totalling an area of approximately 8.45 ha (**Figure 9**). In accordance with Section 4.1.2 of the BAM, these areas do not require further assessment, unless they provide habitat for species credit species or are proposed for restoration as part of an offset.

No differences between the aerial photographs used in this assessment and the native vegetation extent shown in **Figure 9** have been identified.

4.2. Plant Community Types

4.2.1. Overview

The analysis determined that the native vegetation within the subject land aligned with two PCTs held within the BioNet Vegetation Classification database. **Table 8** provides a summary of the PCTs identified within the subject land, whilst the distribution of the PCTs is shown in **Figure 10**. Details of the vegetation within the subject land are outlined below, including justification for PCT selection.

Table 8 Plant Community Types and other vegetation within the subject land

PCT #	PCT Name	Study Area (ha)	Subject Land (ha)
3320	Cumberland Shale Plains Woodland	3.01	1.10
4025	Cumberland Red Gum Riverflat Forest	0.06	0.06
-	Planted Native Vegetation	2.04	2.04
-	Exotic Vegetation	2.06	2.06
-	Planted Native and Exotic Dominated Grassland	6.56	6.56
-	Cleared Land	6.39	6.39
Total:		20.12	18.20

4.2.2. PCT 3320 - Cumberland Shale Plains Woodland

Vegetation Formation: Grassy Woodlands

Vegetation Class: Coastal Valley Grassy Woodlands

Percent Cleared Value: 93.03

4.2.2.1. BioNet Vegetation Classification Description

This community is a tall sclerophyll open forest to woodland with a sparse mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover on the undulating shale plains of western Sydney (EHG 2024b). The canopy very frequently includes *Eucalyptus tereticornis* and *Eucalyptus moluccana*, with ironbarks (*Eucalyptus crebra* and *Eucalyptus fibrosa*) occasionally present, however prominent in localised areas, and the stringybark species *Eucalyptus eugenioides* commonly occurs. The sparse shrub to small tree layer very frequently includes *Bursaria spinosa* and one or more species of Acacia, of which *Acacia parramattensis*, *Acacia decurrens* and *Acacia falcata* are the most frequent and abundant.

The mid-dense ground layer typically includes grasses, forbs, twiners and a hardy fern. *Microlaena stipoides* is almost always present and *Themeda triandra*, *Dichondra repens*, *Brunoniella australis*, *Cheilanthes sieberi subsp. sieberi*, *Desmodium varians*, *Aristida vagans* and *Glycine tabacina* are very frequent. This is the most widespread PCT on the Cumberland Plain, occupying much of the plain between Bankstown and the Hawkesbury and Nepean rivers. It typically occurs in a warm, moist climate below 120 metres asl however can occur up to 200 metres asl on the undulating terrain between Douglas Park and Campbelltown to the east of the Nepean River. While widespread, this PCT primarily occurs in small, often disturbed patches within a rural or urban matrix.

4.2.2.2. General Description – Subject Land

Within the subject land and study area, PCT 3320 occurs as a large intact patch in the north-east, and as scattered patches otherwise throughout the subject land, in varying condition. There are four vegetation zones of this PCT within the subject land.

Condition zones of the PCT across the subject land are shown in **Figure 10**.

4.2.2.3. PCT 3320 Vegetation Zones

i. PCT 3320_Intact

This vegetation zone occurs within the north-east of the study area, outside of the subject land, in an area proposed to be conserved. It represents the most intact occurrences of PCT 3320 present, in which native species are dominant in all strata. This is likely due to bushland regeneration efforts, as other areas within the conservation area have large abundances of exotic species. The canopy is dominated *Eucalyptus moluccana* (Grey Box), and *Eucalyptus tereticornis* (Forest Red Gum), and *Eucalyptus crebra* (Narrow-leaved Ironbark) also occurs. A sub-canopy is present and includes younger individuals of the canopy species along with *Melaleuca nodosa* and *Exocarpos cupressiformis* in some areas.

The shrub layer is moderately dense and includes *Bursaria spinosa* (Blackthorn), *Daviesia ulicifolia* (Bitter Gorse Pea), and *Leucopogon juniperinus* (Prickly Beard Heath). Exotic species are rare in the layer, but there are sporadic occurrences of some such as *Ochna serrulata* (Mickey Mouse Plant).

The ground layer is dominated by *Microlaena stipoides* var. *stipoides* (Weeping Grass), with other species present including the grasses *Themeda triandra* (Kangaroo Grass), *Aristida vagans* (Threeawn Grass), and *Paspalidium distans*, the forbs *Brunoniella australis*, *Brunoniella australis* (Blue Trumpet), and *Solanum prinophyllum* (Forest Nightshade), and the sedge *Gahnia aspera*.

There are scattered occurrences of exotic species which include the grass *Setaria parviflora* (Pigeon Grass), and the forbs *Asparagus aethiopicus* (Ground Asparagus), and *Bidens pilosa* (Cobbler's Pegs).

An example of PCT 3320 in the study area is shown in **Photograph 1**.

Photograph 1 PCT 3320_Intact within the study area



ii. PCT 3320_Exotic_Ground

This vegetation condition has a native dominated canopy of *Eucalyptus moluccana* and *Eucalyptus tereticornis*, and to a lesser extent *Eucalyptus crebra*. *Allocasuarina littoralis* (Black Oak), *Exocarpos cupressiformis*, and *Acacia decurrens* (Black Wattle) are present in the sub-canopy along with younger individuals of the canopy species. The shrub layer is dominated by native species, and includes *Ozothamnus diosmifolius*, *Olearia viscidula*, and *Bursaria spinosa*, and the vulnerable *Acacia pubescens* (Downy Wattle). The presence of scattered individuals of native species which do not match well with shales in Western Sydney, such as *Zieria smithii*, have probably been planted in the patch, potentially by bushland regenerators. Exotic species are relatively common and include *Olea europaea* subsp. *cuspidata* (African Olive) and *Ochna serrulata*.

The ground layer in this vegetation zone is highly dominated by exotic species in most areas, often with sub-dominant occurrences of the grasses such as *Entolasia marginata* (Bordered Panic), and *Microlaena stipoides* var. *stipoides*. Native forbs are present, though not as commonly as in the intact form, and include *Dianella longifolia* and *Dichondra repens* (Kidney Weed).

Dominant exotic grass species include *Ehrharta erecta* (Panic Veldtgrass), *Ehrharta longiflora* (Annual Veldtgrass), and *Megathyrsus maximus* (Guinea Grass). Common exotic forbs include *Bidens pilosa* and *Asparagus aethiopicus*.

An example of this community is shown in **Photograph 2**.

Photograph 2 PCT 3320_ExoticGround in the subject land



iii. PCT 3320_Mown

This condition zone comprises remnant Cumberland Plain Woodland trees with some native species remaining in the ground layer, however with an absent shrub layer, and closely cropped ground layer due to mowing, in order to maintain the zone as an Asset Protection Zone (APZ) for the childcare centre. Canopy species include *Eucalyptus moluccana* and *Eucalyptus tereticornis*.

Native species persisting in the ground layer include *Microlaena stipoides* var. *stipoides*, *Eragrostis leptostachya* (Paddock Lovegrass), *Bothriochloa decipiens* var. *decipiens* (Pitted Bluegrass), and *Rytidosperma racemosa*. Native forbs include *Cotula australis* (Common Cotula), *Oxalis perennans*, and *Veronica plebeia* (Trailing Speedwell).

Exotic grass species are dominant in the ground layer and include *Poa annua* (Winter Grass), *Paspalum dilatatum*, *Ehrharta erecta*, and *Briza minor* (Little Quaking Grass).

An example of this community is shown in **Photograph 3**.

Photograph 3 PCT 3320_Mown in the subject land



iv. PCT 3320_Canopy Only

This condition zone includes remnant or regrowth PCT 3320 canopy trees across the subject land, and potentially in some cases planted individuals, with an entirely artificial understorey and ground layer. Review of historical aerial photographs from the 1940s onwards shows that although the majority of the subject land has been cleared at various points in time, woody vegetation, such as shrubby regrowth can be seen in most places where there are currently scattered occurrences of PCT 3320 trees over an exotic ground layer. As such, unless trees related to this PCT occurred as straight rows of young trees, as a precautionary approach all of these trees are considered to be remnant or regrowth. Understorey species are limited to varying garden plantings, where present, and where trees occur in the open, they occur over a mown ground layer of exotic lawn grass species and lawn weeds.

Canopy trees across the subject land include *Eucalyptus tereticornis*, *Eucalyptus moluccana*, *Eucalyptus crebra*, and *Angophora floribunda*. Shrubs are a varying mix of native species, mostly cultivars, such as *Callistemon viminalis* and exotic shrub species such as *Murraya paniculata* (Orange Jessamine).

Mown grass species include *Cenchrus clandestinus* (Kikuyu) and *Cynodon dactylon* var. *dactylon* (Couch). There are occasional scatter persisting native species in the ground layer such as the native grass *Microlaena stipoides* var. *stipoides* and the forb *Dichondra repens*.

An example of this community can be found in **Photograph 4**.

Photograph 4 PCT 3320_Canopy in the subject land



4.2.2.4. Justification of PCT Selection

Identification of this PCT within the subject land was guided by review of existing data, and the results of the surveys undertaken by Cumberland Ecology. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification database. As part of the selection process for a suitable PCT, consideration was initially given to the following:

- IBRA subregion: Cumberland;
- Vegetation formation: Grassy Woodlands;
- Alignment with TEC: Cumberland Plain Woodland; and
- Canopy species: *Eucalyptus moluccana*, *Eucalyptus crebra*, and *Eucalyptus tereticornis*.

Table 9 PCT 3320 selection justification

Filter	Selection/Discussion
Likely PCT matches from SVTM (pre-1750) over or nearby to PCT 3320 polygons in site-specific mapping	PCT shortlist: 3320, 3448
Plot to PCT Centroid	3319, 3320, 3321, 3260, 4025, 4024, 4058
Matches (Top 5) – 2 plots	

Filter	Selection/Discussion
Selection	PCT 3319 was discarded as the community does not occur on hilly terrain of the cumber plain. PCT 3321 was discarded as the Subject Land does not occur in a shale/sandstone transitional area. PCT 3448 is mapped across this area by the State Vegetation Type Map but was discarded based on the lack of <i>Eucalyptus fibrosa</i>. PCT 4023 was discarded as this community is heavily dominated by <i>Casuarina glauca</i>. PCT 4024 was discarded as this community nearly always includes <i>Eucalyptus baueriana</i> in the canopy, and occurs on alluvial flats. PCT 4025 was discarded as this community occurs on alluvial flats alongside streams that drain the Cumberland Plain. PCT 4058 was discarded as this community occurs in hinterland areas on creeks draining sandstone. PCT 3260 was discarded as this occurs on coastal fringes only. PCT 3320 was selected as this community very frequently includes <i>Eucalyptus tereticornis</i>, <i>Eucalyptus moluccana</i>, and with ironbarks (<i>Eucalyptus crebra</i> and <i>Eucalyptus fibrosa</i>). The canopy of vegetation within the Subject Land is dominated by <i>Eucalyptus tereticornis</i> and <i>Eucalyptus moluccana</i>, with <i>Eucalyptus crebra</i> occurring frequently. Cumberland Plain Woodland, associated with PCT 3320, is described as occurring on Wianamatta Shale derived soils (NSW Scientific Committee 2009a), which matches the soil landscape matching of the Subject Land as containing the Blacktown soils landscape consisting of Wianamatta Group shales. This was evidenced on site by all areas consisting of red/brown clays, and a general absence of sandstone rocks in surface soils, which would indicate PCT 3321. The location in Western Sydney on the Cumberland Plain is also consistent with the description of this PCT (NSW Scientific Committee 2009a). Species matches of the PCT with plots include: <i>Eucalyptus crebra</i>, <i>Eucalyptus moluccana</i>, <i>Eucalyptus tereticornis</i>, <i>Bursaria spinosa</i> (Blackthorn), <i>Microlaena stipoides</i> var. <i>stipoides</i>, <i>Cymbopogon refractus</i>, and <i>Caesia parviflora</i> var. <i>parviflora</i>.

4.2.2.5. Alignment with Threatened Ecological Communities

Within the BioNet Vegetation Classification, PCT 3320 is associated with the following Threatened Ecological Community (TEC):

- Cumberland Plain Woodland in the Sydney Basin Bioregion.

This TEC is listed as critically endangered under the BC Act and the EPBC Act.

i. BC Act

Occurrences of PCT 3320 within the subject land conform to the BC Act listing for the TEC. The final determination does not state condition classes, and as such most remnant or regrowth vegetation comprising PCT 3320 species is expected to conform to the BC Act listing. However, the final determination describes Cumberland Plain Woodland as:

"The ground cover is dominated by a diverse range of grasses including *Aristida ramosa* (Purple Wiregrass), *A. vagans* (Threeawn Speargrass), *Cymbopogon refractus* (Barbed Wire Grass), *Dichelachne micrantha* (Plumegrass), *Echinopogon caespitosus* (Forest Hedgehog Grass), *Eragrostis leptostachya* (Paddock Lovegrass), *Microlaena stipoides* (Weeping Grass), *Paspalidium distans* and *Themeda australis* (Kangaroo Grass), and with graminoids *Carex inversa* (Knob Sedge), *Cyperus gracilis*, *Lomandra filiformis* subsp. *filiformis* (Wattle Mat-rush) and *L. multiflorus* subsp. *multiflorus* (Many-flowered Mat-rush). The ground cover also includes a diversity of forbs such as *Asperula conferta* (Common Woodruff), *Brunoniella australis* (Blue Trumpet), *Desmodium varians* (Slender Tick Trefoil), *Dianella longifolia* (Blue Flax Lily), *Dichondra repens* (Kidney Weed), *Opercularia diphylla*, *Oxalis perennans* and *Wahlenbergia gracilis* (Australian Bluebell), as well as scramblers, *Glycine* spp. and *Hardenbergia violacea* (Native Sarsaparilla) and the fern *Cheilanthes sieberi* (Poison Rock Fern)."

It also states:

"After total or partial clearing, the tree canopy may remain sparse or may regrow to form dense stands of saplings and small trees, which are typically associated with a ground layer of reduced cover and diversity. Either or both of the upper-storey and mid-storey may be absent from the community. Native grasslands derived from clearing of the woodland and forest are also part of this community if they contain characteristic non-woody species listed in Paragraph 3."

As a result, all occurrences of PCT 3320 within the subject land are considered to meet the BC Act listing of the Cumberland Plain Woodland TEC.

ii. EPBC Act

PCT 3320 corresponds to the Cumberland Plain Woodland CEEC as listed under the EPBC Act where condition thresholds are met. The data collected from the field surveys on the 20 – 23 August 2024 has been compared against the condition thresholds for the EPBC listed TEC, as shown in **Table 10**. Based on the comparison, the following zones meet the listing under the EPBC Act: Intact, Mown and Exotic Ground.

Table 10 EPBC condition thresholds for Cumberland Plain Woodland

Category and rationale	Thresholds	Consistent with study area?
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is functional	Minimum patch size is ≥ 0.5 ha AND $\geq 50\%$ of the perennial understorey vegetation cover is made up of native species	Consistent for PCT 3320_Intact only.

Category and rationale	Thresholds	Consistent with study area?
and consistent with minimum mapping unit size applied in NSW		
OR		
B. Larger patches which are inherently valuable due to their rarity	Minimum patch size is ≥ 5 ha AND $\geq 30\%$ of the perennial understorey vegetation cover is made up of native species	Inconsistent with all conditions of PCT 3320.
OR		
C. Patches with connectivity to other large native vegetation remnants in the landscape	Minimum patch size is ≥ 0.5 ha AND $\geq 30\%$ of the perennial understorey vegetation cover is made up of native species AND The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species that is ≥ 5 ha in area	Inconsistent with all conditions of PCT 3320.
OR		
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain	Minimum patch size is ≥ 0.5 ha AND $\geq 30\%$ of the perennial understorey vegetation cover is made up of native species AND The patch has at least one tree with hollows per ha or at least one large tree (≥ 80 cm DBH) per ha from the upper tree layer species	Consistent for PCT 3320_Intact, PCT 3320_Exotic Ground and PCT 3320_Mown. Inconsistent for PCT 3320_Canopy only.

4.2.3. PCT 4025 Cumberland Red Gum Riverflat Forest

Vegetation Formation: Forested Wetlands

Vegetation Class: Coastal Floodplain Wetlands

Percentage cleared: 88.84

4.2.3.1. General Description (NSW BioNET Vegetation Classification)

PCT 4025 is a tall to extremely tall sclerophyll open forest with a mid-stratum of soft-leaved shrubs and small trees and dense, grassy ground layer situated on the alluvial flats alongside streams that drain the Cumberland Plain or more rarely the broad alluvial flats of the Hawkesbury and Nepean river systems to the west of Sydney (EHG 2024b). The canopy almost always includes red gums (*Eucalyptus tereticornis*, *Eucalyptus amplifolia*), occasionally associated with an apple (*Angophora floribunda*, *Angophora subvelutina*), which may be locally prominent. A sparse mid-stratum almost always includes *Bursaria spinosa* and one or more *Acacia* species, of which *Acacia parramattensis* is the most frequent and abundant. The ground layer is typically characterised by a dense cover of grasses along with soft-leaved forbs and ferns. A high cover of *Microlaena stipoides* is almost always present with more scattered *Dichondra repens*, *Opismenus aemulus* and *Solanum prinophyllum* being very frequent.

The largest remaining areas are situated along the smaller streams and, while widespread, this PCT primarily occurs in small, often disturbed patches and is threatened by ongoing weed invasion following flood events. It typically occurs in a warm, moist climate at low elevation with a mean of 60 metres asl, however may occur up to 320 metres in southern parts of the Cumberland Plain. Where saline soils occur on the floodplain, this PCT grades into PCT 4023 which includes *Casuarina glauca* in its canopy. Where the floodplain narrows in valleys with sandstone escarpments upslope, it grades into PCT 4058 which includes a wider range of shrubs and scramblers including *Sigesbeckia orientalis* subsp. *orientalis*, *Breynia oblongifolia* and *Rubus parvifolius*. As elevation or distance from the margin of the floodplain increases, this PCT grades into grassy woodlands of the Cumberland Plain (PCT 3320) in which *Eucalyptus moluccana* is common.

4.2.3.2. General Description (Subject Land)

This PCT occurs as one small patch in the south-west of Subject Land. There is one condition zone of PCT 4025 within the subject land (**Figure 9**), Canopy, in which a native shrub layer is absent, and the ground layer has extremely low native species richness.

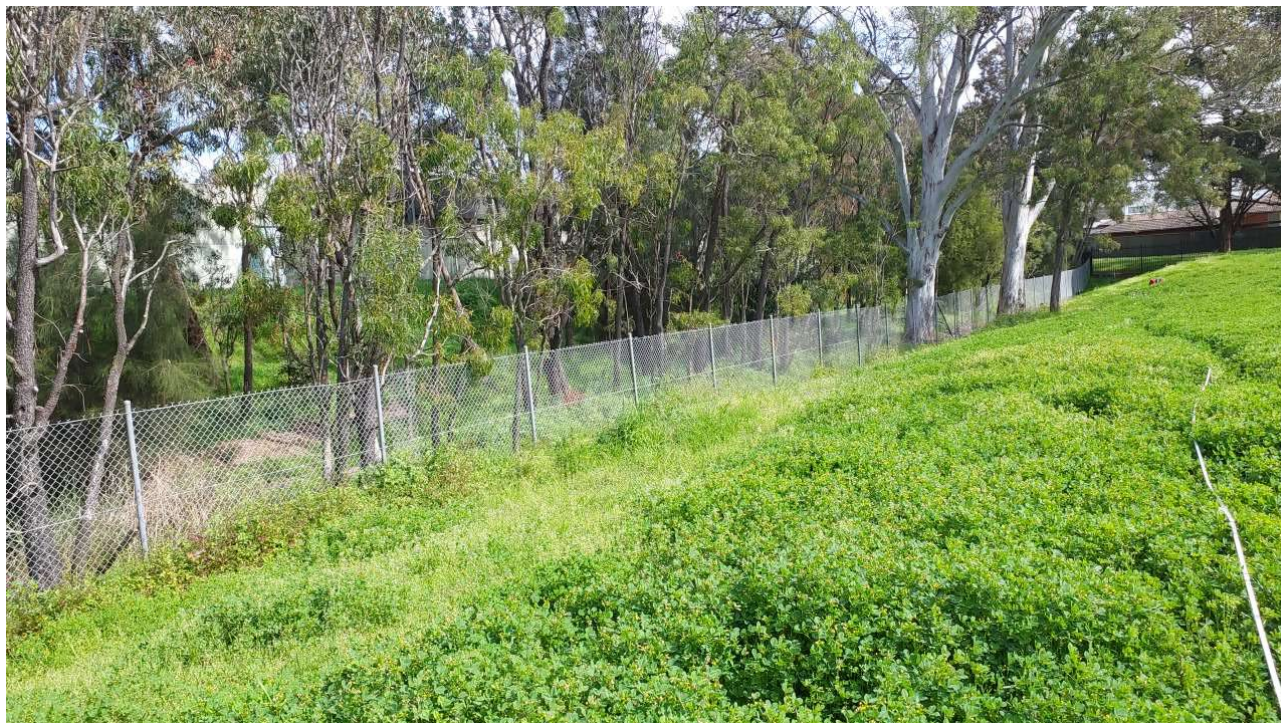
4.2.3.3. PCT 4025 Vegetation Zones

i. PCT 4025 Canopy

This condition zone is the only condition zone within the subject land and consists of PCT 4025 with a native canopy. The patch comprises a single canopy tree only, of *Eucalyptus amplifolia* subsp. *amplifolia* (Cabbage Gum). No native shrub layer is present, and the ground layer is highly dominated by exotic species such as the grasses *Paspalum dilatatum* and *Ehrharta erecta*, and forbs such as *Medicago polymorpha*. Natives in the ground layer were limited to scattered occurrences of the forbs *Einadia trigonos* (Fish Weed) and *Dianella caerulea*.

An example of this vegetation zone within the subject land is shown as **Photograph 5**.

Photograph 5 PCT 4025_Canopy within the subject land



4.2.3.4. Justification of PCT Selection

Identification of this PCT within the subject land was guided by review of existing data, and the results of the surveys undertaken by Cumberland Ecology. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification database. As part of the selection process for a suitable PCT, consideration was initially given to the following:

- IBRA subregion: Cumberland;
- Vegetation formation: Floodplain Wetland;
- Alignment with TEC: Riverflat Eucalypt Forest; and
- Canopy species: *Eucalyptus amplifolia*.

Table 11 PCT 4025 selection justification

Search Term/Filter			Selection/Discussion
Non-PCT Methods	Filter	Tool	
Likely PCT matches from SVTM over or nearby to PCT 4025 polygons in site-specific mapping			PCT shortlist: 3320, 3348, 4023, 4024, 4025

Search Term/Filter		Selection/Discussion
PCT Filter Tool		
IBRA Bioregion and Subregion		Sydney Basin Cumberland
Vegetation Class		Coastal Floodplain Wetland
Upper stratum		<i>Eucalyptus amplifolia</i>
Shrub		-
Ground		
Shortlist		Highest matches (6-7) shortlist of seven PCTs: 3315, 3320, 3321, 3344, 3433, 3446, 4039
Selection		PCT 3315 was discarded as this is a spotted gum/ironbark assemblage community that occurs in the Hunter Valley. PCT 3320 was discarded as this community very frequently includes <i>Eucalyptus tereticornis</i> and <i>Eucalyptus moluccana</i>, with ironbarks (<i>Eucalyptus crebra</i> and <i>Eucalyptus fibrosa</i>). The canopy of vegetation within the Subject Land is dominated by <i>Eucalyptus amplifolia</i>. <i>Eucalyptus amplifolia</i> and an adjacent drainage line and indicates alluvial habitat. PCT 3320 is not an alluvial floodplain community. PCT 3321 was discarded due to the lack of characteristic canopy species and a lack of shale/sandstone geology. PCT 3344 was excluded as this PCT does not occur on the Cumberland Plain. PCT 3348 was excluded due to the lack of canopy dominant <i>Eucalyptus fibrosa</i>. PCT 3433 was discarded as this is a <i>Corymbia maculata</i> and <i>Eucalyptus fibrosa</i> dominated community. PCT 3446 was discarded as this is spotted gum/ironbark assemblage from the north coast. PCT 4023 was discarded as this community is heavily dominated by <i>Casuarina glauca</i>. PCT 4024 was discarded as this community nearly always includes <i>Eucalyptus baueriana</i> in the canopy, and describes this species as being rare to absent in PCT 4025. PCT 4026 was discarded as this community occurs on tidal estuarine flats. PCT 4039 was discarded as this community is from the Hunter Valley. PCT 4025 was selected as this PCT is associated with alluvial flats alongside streams that drain the Cumberland Plain. A small floodplain is present in this area of the subject land, and historically larger areas of the surrounding Fullwood Reserve were part of the floodplain of the tributary of Bow Bowing Creek flowing through Fullwood Reserve. The canopy of this community

Search Term/Filter	Selection/Discussion
	almost always includes <i>Eucalyptus tereticornis</i> , or <i>Eucalyptus amplifolia</i> , the latter being the dominant species across the subject land. Species matches of the PCT with plots include: <i>Eucalyptus amplifolia</i> , <i>Acacia implexa</i> , <i>Dianella caerulea</i> , and <i>Einadia trigonos</i>

4.2.3.5. Alignment with Threatened Ecological Communities

PCT 4025 is aligned with the NSW TEC River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, listed as an Endangered Ecological Community (EEC). This community is also listed under the EPBC Act as the CEEC, River-flat Eucalypt Forest on Coastal Floodplains of Southern New South Wales and Eastern Victoria.

i. BC Act

Occurrences within the subject land are consistent with the final determination (NSW Threatened Species Scientific Committee 2011) for the BC Act listed community because it fits the description as being associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains, and occurs below 250 m in elevation. The subject land has a canopy dominated by one of the most widespread and abundant characteristic species described for the TEC, *Eucalyptus amplifolia*. Other species recorded within the subject land that are characteristic of the TEC as described in the final determination for the community include *Einadia trigonos* and *Dianella caerulea*.

ii. EPBC Act

PCT 4025 corresponds to the Riverflat Eucalypt Forest CEEC as listed under the EPBC Act where condition thresholds are met. The data collected from the field surveys on the 20 – 23 August 2024 has been compared against the condition thresholds for the EPBC listed TEC (Threatened Species Scientific Committee 2020), as shown in **Table 12**. Based on the comparison, the instance of Riverflat Eucalypt Forest within the subject land does not conform to the EPBC Act listing.

Table 12 EPBC condition thresholds for Riverflat Eucalypt Forest

Condition thresholds	Large patch The patch is ≥2ha OR Small contiguous patch The patch is ≥0.5ha within a larger area of native vegetation ≥5ha	Small patch The patch is ≥0.5ha	Consistent with subject land?
High condition ≥80% of its total perennial understorey vegetation cover is comprised of native species AND	CLASS A1 Large or contiguous patch in good condition	Class B1 Small patch in high condition	Not consistent – none of the conditions are met

Condition thresholds	Large patch The patch is ≥ 2 ha OR Small contiguous patch The patch is ≥ 0.5 ha within a larger area of native vegetation ≥ 5 ha	Small patch The patch is ≥ 0.5 ha	Consistent with subject land?
Ground cover richness ≥ 10 native species per sample plot AND ≥ 20 large trees ³ per ha			
Good condition with arboreal mammals $\geq 50\%$ of its total perennial understorey vegetation cover is comprised of native species AND Ground cover richness ≥ 6 native species per sample plot AND ≥ 10 large trees per ha AND Evidence of 4 or more species of arboreal mammals detected in the patch	CLASS A2 Large or contiguous patch in good condition with arboreal mammals	CLASS B2 Small patch in good condition with arboreal mammals	Not consistent – none of the conditions are met
Good condition $\geq 50\%$ of its total perennial understorey vegetation cover is comprised of native species AND Ground cover richness ≥ 6 native species per sample plot AND ≥ 10 large trees per ha	CLASS B3 Large or contiguous patch in good condition	CLASS C1 Small patch in good condition	Not consistent – none of the conditions are met
Moderate condition $\geq 30\%$ of its total perennial understorey vegetation cover is comprised of native species AND Ground cover richness ≥ 4 native species per sample plot	CLASS C2 Large or contiguous patch in moderate condition		Not consistent – none of the conditions are met

4.3. Non-PCT Vegetation Communities

4.3.1. Planted Native Vegetation

Planted native vegetation occurs throughout the subject land. This vegetation community consists of planted native canopy trees, shrubs, and ground layer species throughout a large amount of garden throughout the subject land, and as scattered tree plantings in exotic dominated grassland areas. It includes one species that is likely to have been indigenous to the locality, including *Eucalyptus sideroxylon* (Mugga Ironbark), and individuals of *Eucalyptus tereticornis* and *Eucalyptus moluccana* in garden settings, such as in straight lines along boundaries.

It also includes species not indigenous to Sydney such as the species *Eucalyptus microcorys* (Tallowwood) and *Callistemon viminalis*.

These native trees occur over a ground layer in lawns areas dominated by exotic grass species such as *Cenchrus clandestinus* (Kikuyu) and planted occurrences of *Cynodon dactylon* var. *dactylon*. Exotic forbs are also common under trees and include *Hypochaeris radicata* (Catsear), and *Modiola caroliniana*.

The BAM includes a streamlined assessment module for "Planted Native Vegetation". This module simplifies the assessment of impacts on planted native vegetation within a development site. The decision-making key outlined in Section D.1 of Appendix D of the BAM provides a framework to determine whether the streamlined assessment module for planted native vegetation can be applied to a site.

An assessment against the decision-making key in Appendix D of the BAM was undertaken and it was determined that areas mapped as Planted Native Vegetation in the subject land did not need to be assigned to a PCT. **Table 13** provides an assessment against the decision-making key for the subject land.

The planted origin of the areas identified as 'Planted Native Vegetation' in the subject land is evident when reviewing a series of historical imagery from the 1940s onwards to present day (**Figure 11**), as per imagery held within the Historical Imagery Viewer and described in **Section 1.4.4**.

Table 13 Decision-making key to determine the application of the streamlined assessment module for planted native vegetation

Decision-Making Key	Response
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	No – Planted Native Vegetation does not form a mosaic with remnant native vegetation. The areas of Planted Native Vegetation within the subject land are separated from areas of both PCTs, and have an exotic dominated ground layer, or a ground layer of garden plantings. The species <i>Cynodon dactylon</i> var. <i>dactylon</i> occurs in some exotic dominated grassland areas within the subject land, notably in the south where it has a high coverage in a sports field on fill, and artificial bunds provided for spectators. This species is considered native by the NSW Herbarium, despite a lack of

Decision-Making Key	Response
	scientific evidence, and all studies on the provenance in Australia indicating an exotic origin. Areas have not been mapped separately, as they are co-dominated with exotic grass species.
2. Is the planted native vegetation: a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	No – the Planted Native Vegetation has not been planted for the purposes of environmental rehabilitation or restoration, or to replace or regenerate a PCT or threatened species population or habitat. Plantings are predominately a mix of species which would not have historically been indigenous to the suburb, and plantings do not occur in association with any attempts at revegetation of the shrub or ground layer, they occur over exotic dominated grassland or garden plantings. Grassland areas with high coverage of <i>Cynodon dactylon</i> var. <i>dactylon</i> has been planted for recreational and aesthetic purposes only.
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: 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 – the Planted Native Vegetation has not been planted to provide habitat for threatened species under any of options a-g, and does not comprise individuals of any translocated threatened species.
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration	No – Planted Native Vegetation was not undertaken for the purposes of revegetation, rehabilitation or restoration. They are

Decision-Making Key	Response
without a legal obligation to secure or provide for management of the native vegetation?	parkland/garden plantings within the grounds of a former university.
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	Yes – native species have been planted for aesthetic or horticultural purposes only as part of the landscaping within the grounds of a university. Planted Native Vegetation has been considered for use by threatened species within Chapter 5 of this BDAR.
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	Yes, some vegetation is on this list. <i>Cynodon dactylon</i> var. <i>dactylon</i> is present within mown and unmown grassland areas. <i>Callistemon viminalis</i> is present in landscape plantings.

An example of this vegetation community is seen below in **Photograph 6**.

Photograph 6 Planted native vegetation within the subject land



4.3.2. Exotic Vegetation

Exotic vegetation is throughout garden plantings in the subject land, such as the shrub *Murraya paniculata* the tree *Jacaranda mimosifolia*, and the native tree *Corymbia citriodora*, which is not native to NSW and is therefore exotic under the BAM.

An example of this community is shown in **Photograph 7**.

Photograph 7 Exotic vegetation within the subject land



4.3.3. Planted Native and Exotic Dominated Grassland

This vegetation community occurs as maintained lawns/open space throughout the subject land. It is dominated by exotic grass species, such as *Cenchrus clandestinus* (Kikuyu Grass), although the debatably native grass species *Cynodon dactylon* var. *dactylon* is present in some areas, but this is planted due to the reasons explained in **Section 2.4.1.1**. A number of exotic forbs are also common and include *Plantago lanceolata* (Lamb's Tongues), *Gamochaeta americana* (Cudweed), and *Modiola caroliniana* (Red-flowered Mallow).

An example of this community is shown in **Photograph 8**.

Photograph 8 Planted native and exotic dominated grassland within the subject land



4.4. Threatened Ecological Communities

The occurrences of the PCT 3320 and PCT 4025 identified within the subject land have all been assessed as being associated with a TEC under the BC Act, and all occurrences, other than PCT 3320 (canopy only) and PCT 4025 (canopy only), are associated with a TEC under the EPBC Act. No other vegetation within the subject land conforms to a TEC under the BC Act and/or EPBC Act. **Table 14** summarises the TECs identified within the subject land and their distribution is shown in **Figure 12**.

Table 14 Threatened ecological communities within the subject land

TEC Name	BC Act Status	EPBC Act Status	Vegetation Zone	Study Area (ha)	Subject Land (ha)
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	Does not conform to listing	3320_1_Canopy Only	0.60	0.60
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	CEEC	3320_2_Exotic Ground	0.87	0.34

TEC Name	BC Act Status	EPBC Act Status	Vegetation Zone	Study Area (ha)	Subject Land (ha)
Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC	CEEC	3320_3_Mown	0.15	0.15
Riverflat Eucalypt Forest in the Sydney Basin Bioregion	EEC	Does not conform to listing	4025_5_Canopy only	0.06	0.06

4.5. Vegetation Integrity Assessment

The native vegetation identified within the subject land was assigned to vegetation zones based on PCTs and broad condition states. Patch sizes were subsequently assigned for each of the vegetation zones. The extent of the vegetation zones and associated patch size classes within the subject land are shown in **Figure 2** and **Figure 13**.

The vegetation zones were assessed using survey BAM plots (see **Section 2.3.2**) to determine the vegetation integrity score. BAM plot data utilised within the BAM-C to determine the vegetation integrity score is provided in **Appendix C** whilst flora data collected from field surveys in the entire study area is provided in **Appendix D**. Data was collected digitally using the ArcGIS Survey123 app on an Android operating system, and as such there are no scans of field data sheets appended. The vegetation integrity assessment utilised the benchmark data held within the BAM-C (as derived from the BioNet Vegetation Classification). Therefore, this assessment did not utilise local benchmarks.

Vegetation zones, patch sizes, and vegetation integrity (VI) scores for the subject land are summarised in **Table 15**.

Table 15 Vegetation integrity scores for the subject land

Vegetation Zone	PCT	Condition	Area (ha)	Patch Size Class	VI Score	Hollow-bearing Trees Present?
1	3320	Canopy	0.60	>100	23.4 (Composition = 5.6, Structure = 52.4, Function = 43.9)	Yes
2	3320	Mown	0.15	>100	54.6 (Composition = 35.6, Structure = 78.4, Function = 58.3)	Yes
3	3320	Exotic Ground	0.34	>100	54.2 (Composition = 29.2, Structure = 76.1, Function = 71.7)	Yes
5	4025	Canopy	0.06	>100	25.4	Yes

Vegetation Zone	PCT	Condition	Area (ha)	Patch Size Class	VI Score	Hollow-bearing Trees Present?
					(Composition = 14.1, Structure = 32, Function = 36.3)	

5. Threatened Species

5.1. Identifying Threatened Species for Assessment

The BAM-C generates a list of threatened species requiring assessment utilising several variables. The following criteria have been utilised to predict the threatened species requiring further assessment in the BAM-C:

- IBRA region: Sydney Basin;
- IBRA subregion: Cumberland;
- Associated PCTs: 3320 and 4025
- Percent native vegetation cover in the assessment area: 15.93%;
- Patch size: >100 ha; and
- Credit type: Ecosystem and/or Species Credit species.

Based on the above variables, the BAM-C generated a list of 34 ecosystem credit species and 44 species credit species. These totals include twelve dual credit species which are considered as ecosystem credit species for their foraging habitat and as species credit species for their breeding habitat. Ecosystem credit species and species credit species are assessed further in **Section 5.2** and **Section 5.3**, respectively.

In accordance with Section D.2 of the BAM, the suitability of the planted native vegetation for use by threatened species was included within the threatened species surveys conducted for flora and fauna (see **Section 2.4** and **Section 2.5**). Areas of Planted Native Vegetation in the subject land were not considered to comprise habitat for threatened species. Only two hollow-bearing trees are located within planted native vegetation, one of which is proposed to be retained in the central park open space, and the second within the planted vegetation along Ashford Avenue which is proposed to be removed. Numerous threatened species surveys were conducted within the subject land, and no use of hollow-bearing trees by threatened species was detected.

5.2. Ecosystem Credit Species

5.2.1. Overview

Table 16 lists the predicted ecosystem credit species for the vegetation zones within the subject land and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. All ecosystem species have been retained in the assessment. The highest sensitivity class of these species is "High Sensitivity to Potential Gain", which has subsequently been utilised by the BAM-C for the calculation of ecosystem credits.

5.2.2. Justification for Removal

No ecosystem credit species have been removed from the assessment; therefore, no justification for removal is provided.

Table 16 Ecosystem credit species requiring further assessment

Scientific Name	Common Name	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?	Justification if Not Retained
<i>Anthochaera phrygia</i>	Regent Honeyeater (foraging habitat)	3320, 4025	High	Yes	-
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	3320, 4025	Moderate	Yes	-
<i>Botaurus poicilotilus</i>	Australasian Bittern	4025	Moderate	Yes	-
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (foraging habitat)	3320, 4025	Moderate	Yes	-
<i>Calyptorhynchus lathami</i>	Glossy Black- Cockatoo (foraging habitat)	3320, 4025	High	Yes	-
<i>Chthonicola sagittate</i>	Speckled Warbler	3320, 4025	High	Yes	-
<i>Circus assimilis</i>	Spotted Harrier	3320, 4025	Moderate	Yes	-
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	3320, 4025	High	Yes	-
<i>Daphoenositta chrysoptera</i>	Varied Sittella	3320, 4025	Moderate	Yes	-
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	3320, 4025	High	Yes	-
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	3320, 4025	Moderate	Yes	-
<i>Falco subniger</i>	Black Falcon	3320, 4025	Moderate	Yes	-
<i>Glossopsitta pusilla</i>	Little Lorikeet	3320, 4025	High	Yes	-
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (foraging habitat)	3320, 4025	High	Yes	-
<i>Hieraaetus morphnoides</i>	Little Eagle (foraging habitat)	3320, 4025	Moderate	Yes	-
<i>Hirundapus caudacutus***</i>	White-throated Needletail	3320, 4025	High	Yes	-
<i>Irediparra gallinacean</i>	Comb-crested Jacana	4025	Moderate	Yes	-
<i>Lathamus discolor</i>	Swift Parrot (foraging habitat)	3320, 4025	Moderate	Yes	-
<i>Limosa limosa</i>	Black-tailed Godwit (foraging habitat)	4025	High	Yes	-

Scientific Name	Common Name	Relevant PCT	Sensitivity to Gain Class	Retained in Assessment?	Justification if Not Retained
<i>Lophoictinia isura</i>	Square-tailed Kite (foraging habitat)	3320, 4025	Moderate	Yes	-
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	3320	Moderate	Yes	-
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	3320, 4025	High	Yes	-
<i>Miniopterus australis</i>	Little Bent-winged Bat (foraging habitat)	3320, 4025	High	Yes	-
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (foraging habitat)	3320, 4025	High	Yes	-
<i>Neophema pulchella</i>	Turquoise Parrot	3320, 4025	High	Yes	-
<i>Pandion cristatus</i>	Eastern Osprey (foraging habitat)	3320, 4025	Moderate	Yes	-
<i>Petroica boodang</i>	Scarlet Robin	3320	Moderate	Yes	-
<i>Petroica phoenicea</i>	Flame Robin	3320, 4025	Moderate	Yes	-
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox (foraging habitat)	3320, 4025	High	Yes	-
<i>Pycnoptilus floccosus</i>	Pilotbird	4025	Moderate	Yes	
<i>Rostratula australis</i>	Australian Painted Snipe	4025	Moderate	Yes	-
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	3320, 4025	High	Yes	-
<i>Stagonopleura guttata</i>	Diamond Firetail	3320, 4025	Moderate	Yes	-
<i>Varanus rosenbergi</i>	Rosenberg's Goanna	3320, 4025	High	Yes	-

*** Species not listed under BC Act but listed under Commonwealth EPBC Act.

5.3. Species Credit Species

5.3.1. Overview

A total of 44 species credit species are predicted, including 11 dual credit species which are considered as species credit species for their breeding or important habitat.

Table 17 lists the flora and fauna species credit species predicted for the vegetation zones within the subject land, and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. Under Sections 5.2.2 and 5.2.3 of the BAM, further species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

Detailed habitat assessments of the site were undertaken as described in **Section 2.5**. The habitat assessments focussed on habitat features relevant to species credit species predicted to occur. This included determining the presence/absence of the habitat constraints identified for the predicted threatened species and the condition of these habitat constraints and other microhabitats.

The habitat assessment surveys conducted during August 2024 focused on determining if habitat for any potential species credit species (or relevant breeding component for dual credit species) was either not present or substantially degraded such that the species is unlikely to utilise the subject land or a specific vegetation zone in accordance with the requirements of Step 3 (a) of Section 6.4 of the BAM. Based on the results of the survey, a number of species were removed from consideration due to either the habitat being too degraded or required habitat constraints not being present as shown in **Table 17**.

Out of the assessed predicted species, 12 fauna species and 12 flora species have been retained for further assessment and have been targeted during surveys outlined in **Section 2.4** and **Section 2.5**, respectively.

Table 17 Predicted species credit species

Scientific Name	Common Name	BC Status	Act Status	EPBC Status	Sensitivity to Gain Class	Retained in Assessment?
Flora						
<i>Acacia pubescens</i>	Downy Wattle	V		V	High	Yes
<i>Deyeuxia appressa</i>	-	E		E	High	No
<i>Dillwynia tenuifolia</i>	-	V		-	Moderate	No
<i>Eucalyptus benthamii</i>	Camden White Gum	CE		V	Moderate	Yes
<i>Eucalyptus glaucina</i>	Slaty Red Gum	V		V	High	Yes
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Juniper-leaved Grevillea	V		-	Moderate	Yes
<i>Hibbertia puberula</i>	-	E		-	High	No
<i>Hibbertia</i> sp. <i>Bankstown</i>	-	CE		CE	High	No
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> endangered population	-	E		-	Moderate	No
<i>Micromyrtus minutiflora</i>	-	E		V	High	Yes
<i>Persoonia hirsta</i>	Hairy Geebung	V		-	Moderate	Yes
<i>Persoonia nutans</i>	Nodding Geebung	E		E	Moderate	Yes
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V		V	High	Yes
<i>Pimelea spicta</i>	Spiked Rice-flower	E		E	High	Yes
<i>Pomaderris brunnea</i>	Brown Pomaderris	E		V	High	No
<i>Pomaderris prunifolia</i> – endangered population	-	E		-	High	No
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	E		E	Very High	No

Scientific Name	Common Name	BC Status	Act	EPBC Act Status	Sensitivity to Gain Class	Retained in Assessment?
<i>Pultenaea parviflora</i>	-	E		V	Moderate	No
<i>Pultenaea pedunculata</i>	Matted Bush-pea	E		-	High	Yes
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E		V	High	Yes
<i>Wahlenbergia multicaulis</i> – endangered population	Tadgell’s Bluebell – endangered population	E		-	High	Yes
Fauna						
<i>Anthochaera Phrygia</i>	Regent Honeyeater (Breeding)	CE		CE	High	No
<i>Burhinus grallarius</i>	Bush Stone-curlew	E		-	High	Yes
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (Breeding)	E		E	High	Yes
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black Cockatoo (Breeding)	V		V	High	Yes
<i>Cercatus nanus</i>	Eastern Pygmy Possum	V		-	High	Yes
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	E		E	Very High	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle (Breeding)	V		-	High	No
<i>Hieraaetus morphnoides</i>	Little Eagle (Breeding)	V		-	Moderate	No
<i>Lathamus discolor</i>	Swift Parrot (Breeding)	E		CE	Moderate	No
<i>Limosa limosa</i>	Black-tailed Godwit (Breeding)	V		E	High	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	E		V	High	No
<i>Lophnoictina isura</i>	Square-tailed Kite (Breeding)	V		-	Moderate	No
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E		-	High	Yes
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	V		-	Very High	No

Scientific Name	Common Name	BC Status	Act	EPBC Act	Sensitivity to Gain Class	Retained in Assessment?
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Breeding)	V		-	Very High	No
<i>Myotis macropus</i>	Southern Myotis	V		-	High	Yes
<i>Ninox connivens</i>	Barking Owl	V		-	High	Yes
<i>Ninox strenua</i>	Powerful Owl	V		-	High	Yes
<i>Pandion cristatus</i>	Eastern Osprey (Breeding)	V		-	Moderate	No
<i>Petauroides norfolcensis</i>	Squirrel Glider	V		-	High	Yes
<i>Phascolarctos cinereus</i>	Koala	E		E	High	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox (Breeding)	V		V	High	Yes
<i>Tyto novaehollandiae</i>	Masked Owl	V		-	High	Yes

Key: E = Endangered, CE = Critically Endangered, V = Vulnerable

5.3.2. Justification for Removal

5.3.2.1. Threatened Flora Species

i. *Deyeuxia appressa*

Deyeuxia appressa has been excluded from further assessment as it has not been recorded since 1942 as per the TBDC and is only known from two locations pre-1942 that are remote from the subject land (Killara and Georges River, south of Bankstown). The two records are associated with damp habitats – these microhabitats are not present within the subject land. Further, microhabitats associated with the ground layer are considered degraded due to a long history of agricultural use and likely compaction from cattle and grazing, and additionally with disturbance associated with clearing the majority of vegetation back to bare earth during the construction of the university in 1979.

ii. *Dillwynia tenuifolia*

Dillwynia tenuifolia has been excluded from further assessment because the subject land is outside the core distribution for the species, which extends from Penrith east to Colbee. Outside of this range, and within Western Sydney, they have been found within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest, neither which are present in the subject land.

iii. *Hibbertia puberula*

Hibbertia puberula has been excluded from further assessment because microhabitats are not present within the subject land. *Hibbertia puberula* is associated with dry sclerophyll woodland communities, and occasionally heathlands. The subject land consists of largely planted native canopy species, with a small amount of remnant species, over an entirely exotic, landscaped understorey.

iv. *Hibbertia* sp. *Bankstown*

Hibbertia sp. *Bankstown* has been excluded from further assessment because the species is only known to occur at one population at Bankstown Airport, in tertiary alluvial soil along Airport Creek, which is outside of the subject land.

v. *Marsdenia viridiflora* subsp. *viridiflora* - endangered population

Marsdenia viridiflora subsp. *viridiflora* - endangered population has been excluded from further assessment as microhabitats are not present within the subject land. *Marsdenia viridiflora* subsp. *viridiflora* is known to grow in vine thickets, none of which are present in the subject land, and open shale woodland. Open shale woodland in the form of Cumberland Plain Woodland is present in good condition in the conservation area, however within the subject land it is highly degraded and exists as remnant canopy trees over an entirely exotic or planted understorey, which has been maintained for use as a university campus.

vi. *Pomaderris brunnea*

Brown Pomaderris (*Pomaderris brunnea*) has been excluded from further assessment as microhabitats are not present within the subject land. Brown Pomaderris grows in moist woodland on clay and alluvial soils of floodplains and creeks, none of which are present within the subject land.

vii. *Pomaderris prunifolia* – endangered population

Pomaderris prunifolia – endangered population has been excluded from further assessment as the subject land is outside of the known distribution for the species. *Pomaderris prunifolia* – endangered population is known from only three sites within the Parramatta, Auburn, Strathfield and Bankstown LGAs – at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown.

viii. *Pterostylis saxicola*

The Sydney Plains Greenhood (*Pterostylis saxicola*) has been removed because it is only known to occur in five locations within western Sydney: Georges River National Park, close to Yeramba Lagoon, Peter Meadows Creek, and St Marys Towers, none of which are in the subject land. This species is associated with sandstone rock shelves above cliff lines, or mossy rocks in gullies, neither of which are present in the subject land.

ix. *Pultenaea parviflora*

Pultenaea parviflora has been removed from further assessment as microhabitats are not present within the subject land. *Pultenaea parviflora* is known to exist in scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest, with a dominant canopy of species including *Eucalyptus fibrosa*, *Eucalyptus globoidea* and *Eucalyptus longifolia* (amongst others), none of which are present within the subject land. The subject land consists of remnant, planted or exotic canopy trees over an entirely planted or exotic understorey which has been maintained as a university campus.

5.3.2.2. Threatened Fauna Species

i. Regent Honeyeater (Breeding)

The Regent Honeyeater (*Anthochaera phrygia*) has been excluded from further assessment as the subject land is not located on the 'Mapped Important Areas' for the species map (EH&H, 2022). Breeding habitat for these species is limited to specific areas that are not associated with, or in the vicinity of, the subject land, therefore since the species credit species component for these species is associated with breeding habitat only, the Regent Honeyeater was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

ii. Large-eared Pied Bat

The Large-eared Pied Bat (*Chalinolobus dwyeri*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.* None of these habitat features, or records held within BioNet, are present within the subject land or within two kilometres of the subject land.

iii. White-bellied Sea Eagle (Breeding)

The White-bellied Sea-Eagle (*Haliaeetus leucogaster*) has been removed from the assessment due to a lack of breeding habitat features. Breeding habitat is described in BioNet as *'live large old trees within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines AND the presence of a large stick nest within tree canopy; or an adult with nest material; or adults observed duetting within breeding period.'* Large stick nests, or evidence of suitable nests were not observed during any of the surveys of the study area or adjoining lands.

iv. Little Eagle (Breeding)

The Little Eagle (*Hieraaetus morphnoides*) has been excluded from further assessment due to the lack of nest trees in the subject land. Breeding habitat for these species is limited to large stick nests within old living and occasionally dead trees, and no nests were recorded in, or within the vicinity of, the subject land. Therefore, since the species credit species component for these species is associated with breeding habitat only, the Little Eagle was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

v. Swift Parrot

The Swift Parrot (*Lathamus discolor*) has been excluded from further assessment as the subject land is not located on the 'Mapped Important Areas' for the species (EH&H, 2022). Breeding habitat for these species is limited to specific areas that are not associated with, or in the vicinity of, the subject land, therefore since the species credit species component for these species is associated with breeding habitat only, the Swift Parrot was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

vi. Black-tailed Godwit

The Black-tailed Godwit (*Limosa limosa*) has been excluded from further assessment as the subject land is not located on the 'Migratory Shorebird Important Habitat Map' for the species (EH&H, 2022). Breeding habitat for these species is limited to specific areas that are not associated with, or in the vicinity of, the subject land, therefore since the species credit species component for these species is associated with breeding habitat only, the Black-tailed Godwit was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

vii. Green and Golden Bell Frog

The Green and Golden Bell Frog (*Litoria aurea*) has been excluded from further assessment as the habitat constraints for the species are absent from the subject land. The Green and Golden Bell Frog inhabits marshes, dams and side-streams, none of which are present in the subject land. The subject land is completely free from watercourses and waterbodies, so therefore it has been removed from the assessment.

viii. Square-tailed Kite (Breeding)

The Square-tailed Kite (*Lophoictinia isura*) has been excluded from further assessment due to the lack of nest trees in the subject land. Breeding habitat for these species is limited to large stick nests within living trees on forest edges, and as such no nests were recorded in or within the vicinity of, the subject land, therefore since the species credit species component for these species is associated with breeding habitat only, the Square-tailed Kite was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

ix. Little Bent-winged Bat (Breeding)

The Little Bent-winged Bat (*Miniopterus australis*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers*

of individuals >500; or from the scientific literature. None of these habitat features, or records held within BioNet, are present within the subject land.

x. Large Bent-winged Bat (Breeding)

The Large Bent-winged Bat (*Miniopterus orianae oceanensis*) has been removed from the assessment as the habitat constraints for the species are absent from the subject land. The TBDC lists the following habitat constraint for the species: *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* None of these habitat features, or records held within BioNet, are present within the subject land.

xi. Eastern Osprey (Breeding)

The Eastern Osprey (*Pandion cristatus*) has been excluded from further assessment due to the lack of nest trees in the subject land. Breeding habitat for these species is limited to large stick nests within dead trees, or in dead crowns of live trees within coastal environments, and as such no nests were recorded in or within the vicinity of, the subject land therefore since the species credit species component for these species is associated with breeding habitat only, the Eastern Osprey was excluded from further assessment and assessed as ecosystem credit species for foraging habitat only.

5.3.3. Presence of Candidate Species Credit Species

5.3.3.1. Surveys

Twelve predicted threatened flora species and twelve predicted threatened fauna species were assessed as candidate species credit species requiring further assessment (i.e. retained in assessment as per **Table 17**. Targeted threatened flora surveys were undertaken within the subject land as described in **Section 2.4**, and targeted threatened fauna surveys as described in **Section 2.5**. **Table 4** and **Table 6** summarise the targeted species, survey dates and survey methods.

All threatened flora species were surveyed during appropriate seasonal conditions, except for *Pultenaea pedunculata* and *Syzygium paniculatum*, which were surveyed for outside of their recommended survey periods on the TBDC. *Pultenaea pedunculata* is known to start flowering from August onwards, and so the surveys at the end of August were deemed suitable for this species. In addition, our botanist is considered highly skilled at identification and would be capable of identifying *Pultenaea pedunculata* from its leaves. *Syzygium paniculatum* is a small to medium sized rainforest tree that flowers between November and February. Threatened flora surveys were undertaken in February 2025, which found no signs of this species and it would have been easily identifiable by its flowers. Additionally, the August surveys did not locate this species, which could have been identified by its leaves alone.

A diurnal bird census was undertaken in April, which is outside of the recommended survey period for the Gang-Gang Cockatoo. Nonetheless, the TBDC profile states that this species may need heavily timbered woodlands for breeding. Within the subject land, there is only one single large hollow that would meet the description of the habitat requirements in the TBDC, which is proposed to be retained by the project. As the single large hollow on site was found to be occupied by Galahs at every site visit, it was determined that the Gang-gang Cockatoo did not utilise the subject land for breeding habitat.

Four raptor species were predicted in the BAM-C as dual credit species, which means they only need to be considered if suitable breeding habitat is present within the subject land. In the case of all four raptor species, the White-bellied Sea Eagle, the Eastern Osprey, the Little Eagle and the Square-tailed Kite, breeding habitat is in the form of large stick nests. Habitat assessments were undertaken multiple times throughout the project (as per **Table 6**), and an incidental fauna list was taken every time an ecologist was present onsite. Stick nests were recorded within the subject land, the majority were small, and the single medium sized one was used by the Australian Magpie. Therefore, as the species credit species component for all four raptor species is associated with breeding habitat only, and there was no breeding habitat recorded within the subject land, they have been assessed as ecosystem credit species for foraging habitat only.

5.3.3.2. Expert Report

This assessment has not utilised any expert reports.

5.3.3.3. Candidate Species Occurrence

Southern Myotis calls were recorded on ultrasonic bat detectors at one location (**Appendix B**).

Five individuals of Downy Wattle (*Acacia pubescens*) were recorded in the study area, albeit outside of the subject land.

5.3.3.4. Non-Candidate Species Occurrence

The Grey-headed Flying-Fox (*Pteropus poliocephalus*) was recorded during field surveys flying overhead and are assumed to be foraging. As the habitat constraints for breeding of Grey-headed Flying-fox (breeding camps) are absent from the subject land, this species has been assessed as ecosystem credit species for foraging habitat only.

Additionally, one threatened microbat species, the Large Bent-Winged Bat (*Miniopterus orianae oceanensis*) was positively recorded using the acoustic recorded, as analysed by Heidi Kolkert of Impact Ecology (see report provided in **Appendix B**), however as the habitat constraints for breeding of the Large Bent-winged Bat are absent from the subject land, this species has been assessed as ecosystem credit species for foraging habitat only.

5.3.4. Extent of Habitat

5.3.4.1. Southern Myotis

The Southern Myotis is a microchiropteran bat species found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers (EHG 2022)

The Southern Myotis has disproportionately large feet with widely spaced toes which are distinctly hairy and with long, curved claws. It has dark grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm (OEH 2019, EHG 2022) The species generally roosts close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage and forages over streams and pools catching insects and small fish by raking their feet across the water surface (OEH 2019, EHG 2022).

The Southern Myotis was recorded foraging within the subject land. Parts of the vegetation within the subject land is located within 200 m of a waterbody with pools/ stretches 3m or wider on the other side of the M5 Motorway. Furthermore, some hollow-bearing trees with small hollows have been recorded within the subject land.

As such, parts of the habitat within the subject land is considered to comprise roosting/breeding (vegetation) and is within 200m of foraging habitat. In accordance with NSW Government guidelines (2018), the species polygon boundary aligns with the PCTs within the subject land which are associated with the species in the Threatened Biodiversity Data Collection.

Therefore, the following constitute the species polygon for the species:

- Zone 4: 4025_Canopy with a VI score of 30.8

Credit calculations for Southern Myotis have been conducted based on the impacts to areas of these vegetation zones that lie within 200m of waterbodies within the subject land. The habitat condition and area for the species polygon are provided in **Table 18** below, whilst the species polygon for the Southern Myotis is shown in **Figure 14**.

Table 18 Details of the species polygon for the Southern Myotis

Species Credit Species	Vegetation Zone	Habitat Condition (VI) Loss	Habitat within the Subject Land (ha)	Habitat to be Impacted (ha)
Southern Myotis	4025_Canopy	-30.8	0.06	0.06

5.3.4.2. Downy Wattle

Five individuals of the Downy Wattle (*Acacia pubescens*) were recorded during the surveys of the study area. Although not present in the subject land, due to its proximity to it and the impact to 0.34ha of suitable habitat, it has been included as a species credit species for the purpose of this BDAR. As such, a species polygon has been created for the purposes of calculating the impacts on the species. The species polygon for the Downy Wattle has been created in accordance with the habitat requirements outlined in the TBDC, and includes the following steps:

- Identify the PCTs/vegetation zones associated with the Downy Wattle in the TBDC;
- Create a shape file for the relevant vegetation zones (using GIS) to create the extent of the final species polygon.

The species polygon was then used to calculate the area of each of the vegetation zones impacted for the purpose of calculating species credits for the Downy Wattle. The habitat condition and area for the species polygon are provided in **Table 19** below, whilst the species polygon for the Downy Wattle is shown in **Figure 14**.

Table 19 Details of the species polygon for the Downy Wattle

Species Credit Species	Vegetation Zone	Habitat Condition (VI) Loss	Habitat within the Subject Land (ha)	Habitat to be Impacted (ha)
Downy Wattle	3320_ExoticGround	-34.6	0.33	0.33

The intact, mown and canopy condition states of Cumberland Plain Woodland have not been included in the species polygon for the Downy Wattle. The intact condition has not been included as it will not be impacted as part of the proposal. The canopy condition exists throughout the subject land as remnant trees over an exotic, planted understorey, that is maintained as manicured gardens, meaning that there is no possibility of the Downy Wattle establishing. The mown condition state is maintained as an Asset Protection Zone (APZ) surrounding the daycare centre, and so it does not contain shrubby, understorey vegetation. Due to the regular mowing of this area, the Downy Wattle would not be able to establish, hence this zone is not considered as suitable habitat for the species.

6. Prescribed Impacts

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017*. Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development on the habitat of threatened species or ecological communities associated with:
 - karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
 - human-made structures;
 - non-native vegetation;
- Development on areas connecting threatened species habitat, such as movement corridors;
- Development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or “upsidence” from underground mining);
- Wind turbine strikes on threatened and protected animals; and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

An assessment of the relevance of these prescribed impacts to the project is provided in **Table 20**. The location of prescribed impacts is shown in **Figure 16**.

Table 20 Identification of prescribed impacts on the development site

Prescribed Impact	Relevance to the Project
Karst, caves, crevices, cliffs, rock outcrops and other geological features of significance	Not relevant. No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the subject land or assessment area. Prescribed impact not relevant.
Human-made structures	Not relevant. The subject land contains a childcare centre that is currently closed. However, there will be no impact to the building, and so this prescribed impact is not relevant. Additionally, all university buildings within the subject land have been demolished under a separate DA (DA1512/2023), therefore human-made structures impact is not relevant.
Non-native vegetation	Non-native vegetation occurring within the subject land comprises areas of exotic grasses, shrubs and trees within the exotic vegetation communities mapped. This vegetation may provide some low-value habitat for native fauna species, including threatened birds and bats, on occasion. Impacts to non-native vegetation would occur during the construction phase of the project and result in a long-term impact.
Habitat connectivity	The subject land contains native vegetation that has some minor connectivity to other retained native and planted vegetation in the study area and the surrounding properties. The proposed development will not fragment or break existing levels of connectivity but will result in a minor reduction to the area of ‘stepping-stone’ habitat available as a whole.

Prescribed Impact	Relevance to the Project
Waterbodies, water quality and hydrological processes	No waterbodies are present within the subject land. The project will alter current hydrological processes and has the potential to impact water quality, noting that the existing hydrological processes are presently engineered as a result of past residential development. Any changes to water quality and/or hydrological processes will be appropriately managed through design and are anticipated to meet all Council requirements. The impacts to water quality and hydrological processes would primarily occur during construction and would be short-term.
Wind farm developments	Not relevant. The project does not comprise a wind farm development
Vehicle strikes	Relevant. The subject land was previously operational as a university campus, so threatened fauna species were already at risk of vehicle strike. As the subject land is proposing to become a residential development, there will be more cars accessing the subject land in the long term, however impacts will be minimised as vehicle movement will be limited through the introduction of speed limits.

7. Avoid and Minimise Impacts

This section includes demonstration of efforts to avoid and minimise impacts on biodiversity values identified within the subject land, which includes assessment of direct, indirect and prescribed impacts. The subject land includes the area to be completely cleared for the proposed development (the development site footprint) as well as areas that will be accessible to the future residents (the operational footprint).

7.1. Requirements under the BAM

Section 7 of the BAM (Stage 2: Impact assessment (biodiversity values and prescribed impacts) provides guidance and outlines requirements to apply the hierarchy of avoid, minimise and offset for assessing direct, indirect or prescribed impacts on biodiversity values. Broadly the two main factors that require consideration (emphasis added) include:

- Locate the proposal to *avoid or minimise* direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat; and
- Design the proposal to *avoid or minimise* direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat.

As per Section 3.2 of the Stage 2 Operational Manual where an impact cannot be avoided, reasonable measures must be identified to minimise the proposed impact.

These requirements for avoidance and minimisation are addressed in the following sections.

7.2. Avoid and Minimise Direct and Indirect Impacts on Native Vegetation and Habitat

This section summarises the need for the proposed project in the local area, the suitability of the location chosen for the project, and the specific considerations for the design of the development footprint, including consideration of biodiversity values as well as non-biodiversity constraints. The development footprint is shown in **Figure 5**.

It should be noted that as part of the Planning Proposal, mass avoidance was considered which retained approximately 2ha of the highest quality native vegetation within the study area, which is now zoned C2 – Environmental Conservation, which guided the subsequent development masterplan layout. Further avoidance of native vegetation within the subject land is discussed in more detail in **Sections 7.2.2** and **7.2.3**.

7.2.1. Need for the Project

The project masterplan was designed specifically for the WSU Milperra Campus, and so no other locations were considered as part of the planning for the project. A Planning Proposal was submitted in 2021 for the rezoning of the WSU Milperra Campus from SP2 – Education Establishment to a combination of R1 – General Residential, C2 – Environmental Conservation, E1 – Local Centre and RE1 – Public Recreation (Elton Consulting 2023), with the aim to provide more housing diversity and to assist in addressing the increasing demand for housing in the local area. The Planning Proposal was approved in 2023, and the project masterplan was developed specifically for the WSU Milperra Campus in accordance with the objectives of various governing bodies and legislation, as described in the sections below.

7.2.1.1. Western Sydney University

The WSU Milperra Campus has been relocated to Bankstown with the aim of changing the current 'suburban' campus network into a hybrid campus model which includes both suburban and city centre campuses. This Strategy was endorsed by the University Board of Trustees in June 2017, and the relocation ensures that the university is in a more accessible location for many students, due to the Metro, bus and train lines within Bankstown CBD. It has been proposed that the WSU Milperra Campus site should be repurposed for reinvestment into the WSU's new campus, as well as its education and research offerings, which is consistent with the University's objectives and functions under the *Western Sydney University Act 1997*.

The masterplan for the project has been prepared in support of the university's transformative initiative, with the aim of improving the local area for existing and future residents. The project will provide a diverse range of housing to support affordability, a walkable and cycle-friendly neighbourhood with shops and services, and open space for active and passive recreation.

The childcare centre within the subject land consists of two day-care centres; one pre-school and one out-of-hours care facility. The pre-school previously operated as the 'Western Sydney University Early Learning Bankstown', which has a capacity of 67 places. The planning proposal enabled the subject land to be rezoned as E1 - Local Centre, which will allow the childcare centre to be upgraded to allow more spaces, and it will provide opportunities for small-scale commercial, and business uses to meet the day-to-day needs of the residents.

The 'no go' approach would not enable redevelopment and so would not allow for the reinvestment into the WSU's new campuses.

7.2.1.2. Canterbury-Bankstown Development Control Plan 2023

The Canterbury-Bankstown DCP includes a specific clause (Clause 11.13) that applies to the entire WSU Milperra Campus, with a number of objectives relating to the overall layout and future development of the site. These include:

- The WSU Milperra Campus will accommodate a new low-rise medium density precinct that will provide up to 430 dwellings, offering a diverse housing product that will help to meet existing and future local housing demand;
- The proposed development must aim to provide a positive contribution to the existing and future residential context, while conserving any significant remnant vegetation;
- The redevelopment of the precinct will create new destinations for public interaction by integrating the new residential neighbourhood with the existing community through the creation of new proposed open spaces and connected streets, pedestrian paths and cycleways that increase connectivity across the precinct;
- A neighbourhood centre will cater for small scale retail opportunities and businesses whilst supporting the precinct's existing childcare services, providing a high-quality community meeting point; and

- The remnant Cumberland Plain woodland in the C2 Conservation Zone in the north-eastern corner of the site will be retained and maintained.

These objectives are only relevant to the WSU Milperra Campus site, and so the project masterplan has been prepared with these in mind and for the study area. Additionally, the Canterbury-Bankstown DCP specifies an overall structure plan which guides road and lot layouts, widths, and controls, which has informed the current civil design and ensured compliance. The structure plan was influenced by the rezoning stage where significant avoidance of the C2 land was completed.

7.2.1.3. Our Greater Sydney 2056 – South District Plan

The South District Plan is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. The focus of this plan is the identification of planning priorities to achieve a liveable, productive and sustainable future for the South District, which include the Canterbury-Bankstown LGA. The relevant objectives of the South District Plan are:

- Greater housing supply;
- Housing is more diverse and affordable;
- Great places that bring people together; and
- Environmental heritage is identified, conserved and enhanced.

The former NSW Department of Planning and Environment's projections of population growth and household growth in the South District translates to a need for an additional 83,500 homes between 2016 and 2036. The proposed development will supply 420 new dwelling types, with a diverse range of affordability, to respond to the changing household and age profile of the South District.

The project masterplan has focused on providing a 'great place to live' within the WSU Milperra Campus site. It will provide three open spaces for active and passive recreation, and a walkable and cycle-friendly neighbourhood with shops and services, including a childcare centre. The area mapped as C2 – Environmental Conservation is proposed to be retained and managed to improve the condition of the Cumberland Plain Woodland currently present, and canopy tree species representative of Cumberland Plain Woodland are to be retained where possible throughout the overall study area.

As Bankstown and its surrounds is one of the preferred areas to live within the South District, the location of the WSU Milperra Campus is ideal for the proposed development. The project masterplan has been prepared to achieve the objectives laid out in the South District Plan for the WSU Milperra Campus.

7.2.1.4. Canterbury Bankstown Housing Strategy 2020

The *Canterbury Bankstown Housing Strategy 2020* (Housing Strategy) (City of Canterbury Bankstown 2020) was developed to align with the South District Plan. The Housing Strategy analyses the LEPs of both the former Canterbury Council and Bankstown Council and recommends adjustments to ensure that the housing criteria can be met.

One of the main aspirations of the Housing Strategy is to focus at least 80% of new dwellings within walking distance of areas of high amenity and access to jobs, services and community facilities. It also seeks to increase affordability and diversity of housing and to promote housing choice. The Housing Strategy recognises that a range of housing is needed to support the aging population, the increasing number of students and families.

The Housing Strategy acknowledges that the WSU Campus will become vacant due to the relocation to Bankstown and states the following: *The Milperra Campus is being relocated into the Bankstown City Campus upon its completion. The Western Sydney University site at Milperra provides the opportunity for sustainable community uses public open space and new educational uses. Future master planning and community engagement will inform the area's future.* The redevelopment of the campus will allow for approximately 400 new dwellings, all within close proximity to local amenities, new open spaces and a community centre.

7.2.1.5. State Environmental Planning Policy (Transport and Infrastructure) 2021

The project is consistent with the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) (NSW Government 2021). This policy aims to facilitate the effective delivery of infrastructure across the State along with providing for consultation with relevant public authorities during the assessment process. The T&I SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency and aims to provide for the effective delivery of Educational Establishments and Childcare Facilities across the state by improving regulatory certainty and simplifying the approval pathway.

The planning proposal does not contain provisions that conflict or obstruct the application of the T&I SEPP. The proposal has retained the childcare facility on site, which will assist with local containment and will reduce the dependency on external infrastructure for convenience. It has also enabled the development of a larger scale and more accessible university campus within the Bankstown CBD. As stated in consultation with the government, the delivery of expanded or new educational establishments is preferred in alternate locations, and so the 'no-go' approach for this project would not align with the aims of the T&I SEPP.

7.2.2. Project Location

Section 7.1.1 of the BAM states that knowledge of biodiversity values should inform the decision-making process relating to the location of a project. Measures to avoid or minimise impacts from clearing native vegetation and threatened species habitat can include locating the project in areas lacking or with low biodiversity values, avoiding areas mapped on the important habitat map, or avoiding native vegetation that is a TEC. A discussion of the considerations, measures and constraints relevant to avoidance are discussed in the sections below.

7.2.2.1. Considerations

In selecting the project's final development footprint, the following matters were considered in accordance with the BAM:

a. Knowledge of biodiversity values should inform decisions about the location of the proposal.

Eco Logical conducted detailed vegetation surveys from 2020-2022 to inform a Preliminary Ecological Report (Ecological 2022b) and a Redevelopment Ecological Assessment (Ecological 2022a) that were used to support

a Planning Proposal for the study area, which was submitted in 2022. The entire study area was previously zoned SP2 – Infrastructure and was the home of a disused university campus. From their field surveys, Eco Logical determined that the northeast section of the study area (referred to as the conservation area throughout this report), comprised of a relatively untouched patch of good quality Cumberland Plain Woodland.

Through consultation with Eco Logical, Mirvac agreed that the best outcome for this patch would be to zone it C2 – Environmental Conservation, so that any future management and use of this patch of land will need to be considered in the context of the BC Act. The C2 zone has the following objectives under the Canterbury-Bankstown LEP:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values; and
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

As there was a significant portion of avoidance done at the rezoning stage, the subdivision design was based off lot yield, in line with the housing targets and legislative requirements outlined in **Section 7.2.1** above. Despite this, the project has been located and designed to conserve areas of better-quality Cumberland Plain Woodland, and the majority of the canopy layer surrounding the future parks is to be retained as a result of the ecological assessment conducted on-site.

As described in previous chapters of this BDAR, the PCTs within the subject land comprise an area of approximately 1.10ha (0.6ha of Canopy, 0.15ha of Mown and 0.34ha of Exotic Ground) of Cumberland Plain Woodland and 0.06ha of Canopy River Flat Eucalypt Forest. Both of these PCTs are of high biodiversity value because of the restricted distribution and highly cleared condition of these communities. The remainder of the site comprises a mix of planted natives and exotic vegetation that are generally considered to be of low biodiversity value.

Full clearing within mapped areas of Canopy Cumberland Plain Woodland and Canopy Riverflat Eucalypt Forest involves the removal of remnant canopy trees over an entirely exotic/planted understorey to facilitate the masterplan. It was originally proposed that 0.57ha of Canopy Cumberland Plain Woodland was to be removed to facilitate the project, however design changes made during the projects Response to Submission (RTS) stage have resulted in the retention of three additional patches of Canopy Cumberland Plain Woodland within the subject land, with a total area of 0.07ha. The removal of the remaining 0.5ha of Canopy Cumberland Plain Woodland is unavoidable, as many of the trees are within roads that have been designed in accordance with the Canterbury-Bankstown DCP, which has established road standards and locations, or are within areas of contaminated land. The removal of the one canopy tree (0.06ha) of Riverflat Eucalypt Forest is also unavoidable due to the requirement to install a retaining wall along the southern boundary of the subject land, to prevent an impact on the M5 Motorway and for aesthetic purposes for the development.

Clearing within mapped areas of Mown Cumberland Plain Woodland are limited to understorey only, as it contains Bushfire Prone Land, and so this area will be maintained as an Asset Protection Zone (APZ) in line with the current APZ for the Childcare Centre (DA-752/2011). The vegetation within this zone will be managed in accordance with *Planning for Bushfire Protection 2019* (NSW Rural Fire Service 2019) and in accordance with

the Vegetation Management Plan (VMP) prepared for the project (Cumberland Ecology 2025b) (our reference: 23021RP5).

The entirety of the mapped areas of Intact Cumberland Plain Woodland and the majority of the mapped areas of Exotic Ground Cumberland Plain Woodland will be retained for bush regeneration thus avoiding impacts to the majority of this zone. The Exotic Ground Cumberland Plain Woodland consists of 0.16ha that will be maintained under the current APZ, and so no change in VI score will occur, 0.02ha that comprises a single canopy tree to be removed within the R1 zoned land, and the remaining 0.17ha consists of understorey only vegetation. It should be noted that in accordance with the BAM, the approximately 0.1ha of this zone comprises the tree canopy along a road, and so there is no understorey vegetation actually being removed. Additionally, the 0.06ha that comprises the proposed carpark in the E1-zoned land contains four small individuals (approximately 2m tall) of *Acacia decurrens* to be removed in the understorey.

The remaining understorey vegetation to be removed in this zone comprises largely weedy vegetation along the road verge, with dominant exotic species such as *Asparagus aethiopicus*, *Araujia sericifera* and *Ehrharta calycina* present. The vegetation along this verge will be subject to the VMP for the project, which will result in the removal of these species regardless, and so the impact to native vegetation along this road verge is minimal.

Avoidance to Cumberland Plain Woodland has been focused on the area of land behind the Childcare Centre that is currently zoned E1 under the Canterbury-Bankstown LEP. The land behind the Childcare Centre comprises Cumberland Plain Woodland in the Mown and Exotic Ground condition and contains 22 remnant trees that have been assessed as having a high retention value by the project arborist. Vegetation removal is permitted in the E1 zoned land; however the project has avoided all impacts to the vegetation by retaining the current Childcare Centre and subjecting it to internal works only in order to meet the increased capacity as required by Council.

The vegetation within the E1 zoned land has the highest biodiversity value within the subject land. It contains Cumberland Plain Woodland that has been largely subject as an APZ under the DA-752/2011, and so contains canopy trees over a native groundlayer, with minimal understorey vegetation. This patch of vegetation is connected to the conservation area and so provides higher quality habitat than the scattered remnant trees throughout the remainder of the subject land. The E1 zoned land also contains two hollow-bearing trees, including one large hollow that may be suitable for threatened cockatoos or owls.

A number of planted non-endemic native trees within the subject land are also proposed to be retained. Landscaped areas adjacent to the conservation area, including the open spaces, are also proposed to be replanted using locally endemic species representative of Cumberland Plain Woodland. While these areas will not be fully regenerated to Cumberland Plain Woodland, the use of locally endemic species nonetheless further enhances the seed bank and reduces risks from weed invasion to the conservation area. The benefit of retaining the vegetation within the open spaces, although not endemic vegetation, is that these areas contain the highest density of vegetation within the subject land and have an already connected canopy. Native fauna species would be more likely to utilise these areas for breeding or foraging, when compared to the scattered remnant trees through the subject land. Additionally, these areas contain the highest proportion of hollow-bearing trees within the subject land.

Clearing of trees within Cumberland Plain Woodland is largely limited to removal of canopy trees which are unavoidable due to the road layout specified in the Canterbury-Bankstown DCP. Thus, the location of the proposal has been informed by the biodiversity values of the subject land.

b. Selecting a final proposal location may be an iterative process.

The project masterplan went through a number of iterations at the pre-lodgement stage for the Planning Proposal to better maximise tree retention and to reduce the impact on Cumberland Plain Woodland within the study area.

A partial development of the subject land to avoid and minimise the limited impacts of biodiversity of the project is not a feasible option for the project. When considering the need for the project, as well as the ideal location of the site and the fact that it has already been modified for the purposes of the existing development, opportunities to avoid all impacts to Cumberland Plain Woodland are limited. As a result, 1.1ha of Cumberland Plain Woodland is proposed to be impacted.

When designing the project, several layout options were considered, as described in **Table 21**. The current masterplan has reduced the number of dwellings from the proposed 430 at the Planning Proposal stage, down to approximately 390 in order to retain additional vegetation within the subject land. Any additional vegetation retention would result in the number of dwellings being further reduced, which would not satisfy the overall need for the project, as described in **Section 7.2.1**.

Table 21 Consideration of alternative layout options for the project

Option	Planning Considerations	Ecology Considerations
Option 1 - Rezoning	Development of all roads detailed in the structure plan of the DCP (including standard splays and kerb returns), up to 430 dwellings within the remaining R1 zone and Employment zone E1 – Local Centre containing 8,335 square metres of Employment Area. The Residential Area facing Ashford Avenue has a Floor Space Ratio (FSR) of 0.5:1, the Residential Area facing the Northern Park has a RSR of 1.4:1 while the E1-Local Centre Zone has a FSR of 1:1. Other areas of the R1 zone aren't mapped with a maximum FSR. These are in line with the objectives of the individual zonings and DCP.	This would remove all vegetation within the subject land.
Option 2 – Initial Site-wide Bulk Earth Works	Development of all public roads detailed in the structure plan of the DCP (incl. standard splays and kerb returns), noting the following changes: - Adjustment of roads along the existing hockey field by creating a larger verge to limit the impact to existing trees along the common boundary. This	Retention of 21 additional trees and their understorey vegetation.

Option	Planning Considerations	Ecology Considerations
	resulted in loss of Residential area for dwellings but ensures the retention of trees 208 to 211, - Reduction to the amount of Employment land being developed which ensures the retention of trees 62 to 72, 74 to 76, 81 to 83 Number of dwellings has been reduced from 430 dwellings to up to 400 dwellings within the remaining R1 zone. Area of built form in the Employment zone E1- Local Centre has been reduced to less than 4,000 square metres of Hardstand Area The Residential Area facing Ashford Avenue proposed to maintain the FSR of 0.5:1 (100% of the originally approved FSR), the Residential Area facing the Northern Park has a reduced FSR of 0.85:1 (61% of the originally approved FSR) while the E1-Local Centre Zone has a reduced FSR of less than 0.48:1 (48% of the originally approved FSR). Other areas of the R1 zone aren't mapped with a maximum FSR but the FSR compared to Option 1 has reduced because the number of lots has reduced.	
Option 3 – Original SSDA Concept	Development of all public roads detailed in the structure plan of the DCP noting the following changes: - Amended kerb returns are proposed around the Central Park. This reduces the amount of pavement and introduces retaining walls which ensures the retention of trees 356 to 362, 365, 366 and 371 to 375. - Adjustment to the Horsley Road Intersection which ensures the retention of tree 19, - Adjustment of the north south road to Bullecourt Ave to move it away from the C2 zone. This reduces the amount of pavement and a small loss of residential area for dwellings which ensures the retention of trees 427-433 Number of dwellings has been reduced from 430 to up to 390 dwellings within the remaining R1 zone.	Retention of a further 24 trees and their understorey vegetation.

Option	Planning Considerations	Ecology Considerations
	Area of built form in the Employment zone E1- Local Centre has been reduced to less than 4,000 square metres of Hardstand Area The Residential Area facing Ashford Avenue proposed to maintain the FSR of 0.5:1 (100% of the originally approved FSR), the Residential Area facing the Northern Park has a reduced FSR of 0.85:1 (61% of the originally approved FSR) while the E1-Local Centre Zone has a reduced FSR of less than 0.48:1 (48% of the originally approved FSR). Other areas of the R1 zone aren't mapped with an FSR but the FSR compared to Option 1 has reduced because the number of lots has reduced.	
Option 4 – Current Concept	The retention of Tree 56 through a clause 4.6 variation request to clause 6.13 of the Canterbury-Bankstown LEP. This design amendment has allowed for the tree's retention through the shortening of the carriageway, implementation of a kerb blister, and the removal of 2 on-street car parking spaces. The retention of a patch of four trees that conform to Cumberland Plain Woodland through a design amendment to lot configurations, which has resulted in the loss of two residential lots in SSDA 2. The retention of Tree 217 through a design amendment to lot configurations, which has resulted in the loss of one residential lot in SSDA 2.	Retention of five additional trees that conform to Cumberland Plain Woodland

The 'no go' option for the project would maintain current tree cover on site but would not enable redevelopment. Under a no-go option, trees would remain and continue to grow and age, potentially to form hollows. However, there would be no requirement to replant or maintain native plant species on the site, including within the conservation area. Mowing of the manicured environments would continue as would the growth of some weeds and exotic garden plants. If a tree dies or is damaged in a storm there would be no requirement for the tree to be replaced. Therefore, over time, there is potential for the existing canopy area to be reduced and for the native vegetation to be degraded.

c. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas lacking biodiversity values.

The majority of the development has been located in areas lacking biodiversity values, namely areas of exotic grassland and cleared areas such as the existing (now demolished) university buildings, roads and unmaintained oval. As outlined above, the majority of Cumberland Plain Woodland in the study area is to be retained in the conservation area to be managed/revegetated. The proposed landscaping within the proposed development footprint with locally endemic species representative of Cumberland Plain Woodland will further increase the biodiversity value of the subject land.

The Cumberland Plain Woodland to be removed within the subject land is in a degraded condition, either with an exotic, weedy understorey, completely lacking an understorey due to APZ maintenance or canopy trees with a manicured exotic understorey. The vegetation to be removed from the Exotic Ground zone is located on the edges of the patch of Cumberland Plain Woodland, and so it is likely that they are already subject to 'edge effects'. Edge effects are impacts that occur at the interface between natural habitats, especially forests and disturbed or developed land (Yahner 1988). When an edge is created between woodland and a cleared area, such as in the case of the subject land between the Cumberland Plain Woodland and the access road for the childcare centre, changes to ecological processes within the vegetation can extend between 10 m and 100 m from the edge (Yahner 1988). These include microclimatic changes in light, temperature, humidity and wind, which can favour a suite of different species and therefore cause significant changes to the ecology of the patch (Lindenmayer and Fischer 2006). Edge effects can also result from the increase in noise and artificial light from a project.

In addition to the edge effects, the Exotic Ground Cumberland Plain Woodland to be removed either exists alongside a functional carpark, so will be subject to regular disturbance from cars and pedestrians, or within the backyard of the childcare centre which is regularly used by the children for play. It is unlikely that either of these areas would have provided high quality habitat for native fauna species, especially as there are much better-quality and undisturbed areas within the study area and its surrounds.

d. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e., areas that have a low vegetation integrity score).

The majority of the subject land comprises cleared areas and exotic vegetation and therefore does not require offsetting.

The Intact Cumberland Plain Woodland, which has the highest VI score (VI score 91), is to be retained within the conservation area whilst the majority of the Exotic Ground zone (VI score 54.4) is to be retained for bush regeneration/revegetation within the conservation area, with only 0.02ha being totally removed and 0.17ha modified to enable the creation of the access road into the development, however this area largely consists of canopy overhang along an existing road and so there will be minimal understorey vegetation to be removed (as explained further in **Section 8.6**).

The entirety of the Mown Cumberland Plain Woodland (VI score 54.6) is to be retained, however it will be maintained as an APZ as it is located on Bushfire Prone Land in accordance with *Planning for Bushfire Protection 2019* (NSW Rural Fire Service 2019). As this area is currently maintained as an APZ under (DA-752/2011), there will be no additional impact to this area, and the VI score should remain unchanged. The APZ also applies to

an area of 0.16ha of the Exotic Ground Cumberland Plain Woodland, and no impacts to the VI score are expected for this zone either.

Overall, 0.5ha of the Canopy Cumberland Plain Woodland will be removed as part of the project. These areas consist of remnant canopy trees over an entirely exotic or planted understorey, with a low VI score of 23.4. The project has prioritised the retention of the Mown condition Cumberland Plain Woodland within the subject land, as it has a much higher VI score, and is connected to the conservation area.

Thus, the development has been sited such that clearing and modification of vegetation largely located in the areas of poorest quality.

e. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal 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 or a highly cleared PCT.

One species credit species has been assessed as present within the subject land, the Southern Myotis (*Myotis macropus*), which was recorded at ANABAT closest to the conservation area (**Figure 7**). Biodiversity risk weightings for species credit species include 1, 1.5, 2, and 3 (ordered lowest risk to highest risk). Southern Myotis has a biodiversity risk weighting of 2. The project sought to avoid/minimise the removal of native vegetation (thus minimising the extent of clearing) or utilising historically disturbed areas of Cumberland Plain Woodland, such as the Canopy condition zone.

The habitat for the Southern Myotis includes patches of Riverflat Eucalypt Forest within 200m from watercourses or waterbodies greater than 3m wide that the species uses for foraging. Within the subject land, this comprises an area of 0.06ha (**Figure 15**), all of which will be removed or modified as part of the project in the southern portion of the subject land. The project proposes a landscaping plan that will revegetate the subject land with species representative of Cumberland Plain Woodland, and so this will increase the amount of suitable vegetation within 200m of the watercourse. Additionally, nestboxes, including those suitable for microbats, are proposed to be erected throughout the subject land in accordance with the Hollow Offset and Replacement Strategy and Nestbox Management Plan prepared for the project (Cumberland Ecology 2024) (our reference: 23021RP4).

Due to the proximity of the recorded *Acacia pubescens* to the subject land it has been included in this assessment. Five clumps of *Acacia pubescens* have been recorded within the exotic ground vegetation zone of Cumberland Plain Woodland, and so as a precautionary measure, it has been assumed that the removal of any of this community has the potential to impact on the population. Nonetheless, none of the recorded *Acacia pubescens* clumps will be removed by the development.

The area of the Exotic Ground condition to be removed within the subject land largely consists of poor quality, degraded vegetation along the frequently used access road from Horsely Road into the childcare centre, or canopy overhang onto an existing road. The vegetation along the access road is already in a degraded condition, due to edge effects and the disturbance from vehicles and pedestrians utilising the childcare centre. The intersection has also been amended to reduce the impacts on the conservation area, and road facilitating the entrance to the childcare centre will utilise an existing curved road in order to retain a mature *Eucalyptus*

tereticornis (Forest Red Gum), which is included in the Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2009b).

Under the Canterbury-Bankstown DCP, there is a need to provide a minimum of 30 car park spaces within the existing childcare carpark. The car park has been largely located in previously cleared areas, however 0.06ha of understorey Cumberland Plain Woodland is proposed to be removed to satisfy the carpark requirements. This area comprises four individuals of 2m tall *Acacia decurrens* that will be removed.

The subject land occurs outside of areas mapped on the important habitat maps.

f. Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas outside of the buffer area around breeding habitat features such as nest trees or caves.

Breeding habitat is present in the form of hollows which will be removed as part of the project; however, a Hollow Offset Replacement Strategy and Nestbox Management Plan has been prepared for the conservation area to be used as a guideline if any additional hollow-bearing trees are recorded during pre-clearance surveys (Cumberland Ecology 2024).

7.2.2.2. Measures

In selecting the project's final development footprint, the following avoidance and minimisation measures have been considered in accordance with the BAM:

a. Consideration of alternative modes or technologies that would avoid or minimise impacts on biodiversity values

The project is limited in usage of alternative technologies as accommodation is being built. There are no alternative technologies that would provide for the area required to service accommodation needs within the subject land which would reduce biodiversity impacts in the form of vegetation clearing.

b. Consideration of alternative routes that would avoid or minimise impacts on biodiversity values.

The project has utilised current access routes into the subject land and has amended the intersection originally proposed between Road 2 and Horsely Road to reduce the impact on the conservation area and has utilised an existing curved driveway to the childcare centre in order to retain a mature *Eucalyptus tereticornis* (Forest Red Gum). Alternative routes would require removal of remnant vegetation that is proposed to be revegetated/enhanced and would require removal of more trees than is currently proposed. Therefore, the proposed access routes maximise avoidance and minimisation of impacts on biodiversity.

c. Consideration of alternative locations that would avoid or minimise impacts on biodiversity values.

The client does not have alternative sites available for this project. The use of an alternative site is considered unwarranted given the compatibility of the project with the Planning Proposal and the need for the project, the proposed benefits to the conservation area and landscaped areas as a result of the proposed bush regeneration and native plantings, the avoidance and minimisation measures proposed and the biodiversity offsets which will be provided (**Chapter 9**).

The subject land was previously developed, with multiple university buildings onsite. Furthermore, as already explained in detail above, the entire study area is currently zoned R1 - General Residential pursuant to the Canterbury-Bankstown LEP, hence have been identified as suitable for housing types within a residential environment in accordance with the zoning objectives.

d. Consideration of alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.

The project masterplan has been prepared in accordance with the Planning Proposal for the WSU Milperra Campus, which considered the campus as a whole and took into consideration the fact that the site has been heavily impacted from historic land uses. The area of high-quality bushland, in the conservation area, was zoned C2 – Environmental Conservation based off its biodiversity value and was subsequently avoided from future proposals.

7.2.3. Project Design

In determining the design of the project masterplan, the project has sought to avoid and minimise direct impacts on native vegetation and habitat by:

- Avoidance of good-quality, intact native vegetation Cumberland Plain Woodland in the conservation area;
- A raised boardwalk is proposed within the adjacent C2 Environmental Conservation zone instead of a footpath which comprises of a raised pathway structure designed to traverse the conservation area while minimising impacts to existing vegetation, ground conditions, and ecological values. The raised design reduces the need for bulk earthworks and vegetation clearing, and allows natural drainage patterns and ground-level habitats to be preserved. The design will consider tree root mapping undertaken within the corridor, with particular consideration given to the structural root zones of adjacent trees. The alignment and support locations of the boardwalk will be developed to ensure that any structural encroachments are avoided or minimised, with all primary footings positioned outside defined tree structural roots where practicable;
- Amendments to the project design resulting in the loss of two lots in order to retain two additional patches of Canopy Cumberland Plain Woodland;
- The Childcare Centre will undergo internal works only to increase to the capacity required by Council, which results in the retention of 22 remnant trees that all conform to Cumberland Plain Woodland, and provide direct connectivity to the conservation area;
- Installation of kerb blisters on Roads 9 & 2 in order to retain Tree 56 at the front of the Childcare Centre, which is a large *Eucalyptus moluccana* that conforms to Canopy Cumberland Plain Woodland;
- Amendments to the overall project design and layout to maximise the retention of native trees, in particular those representative of Cumberland Plain Woodland and those with connected canopy, around the areas of parklands within the study area;

- Amendments to the intersection between Road 2 and Horsely Road to reduce the impact on the conservation, and curving the road entry and exit to retain a mature *Eucalyptus tereticornis*;
- Locating any temporary or ancillary construction facilities required during construction within the subject land to avoid additional clearing of vegetation;
- The outdoor play area of the childcare centre will remain as is, and so no additional impact will occur;
- The fire tanks and associated driveway in the conservation area are to be removed, therefore increasing the size of the conservation area;
- Redesigning the drainage line as a 1.5m pipe rather than a 4m batter to reduce the area of impact;
- Incorporating a detailed landscape design as part of the project, that will utilise species of Cumberland Plain Woodland, from seeds that have been collected and propagated from within the study area;
- Providing kerb blisters which retain additional trees within the central park;
- Offsetting of stormwater drainage lines to ensure they are outside of the Tree Protection Zone;
- A Vegetation Management Plan has been prepared and will be implemented for the ongoing management, restoration and enhancement of retained Cumberland Plain Woodland within the study area; and
- Minimise impacts to biodiversity through the implementation of a suite of mitigation measures (**Sections 8.6 - 8.7**), including sedimentation control, tree protection measures, nest box installation and clearing protocols such as pre-clearance and ecological clearance supervision.

7.2.3.1. Ecological Constraints Assessment

In addition to the above, Cumberland Ecology was instructed by Mirvac to provide a high-level Ecological Constraints Assessment (ECA) for the northern portion of the subject land and study area (previously Stages 4-6), which was determined to have the highest biodiversity values due to the presence of Cumberland Plain Woodland, and the fact it was mapped as Biodiversity under the Canterbury-Bankstown LEP, and portions of it were mapped on the BV Map (**Figure 17**).

Mirvac and Cumberland Ecology conducted monthly workshops over a period of six months with the engineering team to review the civil plan and project layout in order to retain as much native vegetation as possible within the subject land. A number of case studies were discussed in detail, with the objective of retaining additional vegetation, however in a workshop with Council (dated 18 June 2025), Council were not supportive of any of the proposed case studies.

One of the case studies proposed by Mirvac was to install kerb blisters on Roads 9 & 2 in order to retain vegetation at the front of the Childcare Centre, including trees that conform to Cumberland Plain Woodland. Clause 6.13 of the Canterbury-Bankstown LEP requires there to be 10m wide roads for any roads fronting childcare centres and so kerb blisters could not be installed in this location.

Despite this not being possible for Roads 9 & 2, as a result of the ECA, Mirvac have also proposed kerb blisters in the north-eastern corner of the central park to retain large, significant trees, and this option is now included

in the Masterplan DA. The outcome of this results in less off-street parking but complies with Canterbury-Bankstown DCP objectives to reduce hardstand areas within the development and also retains additional trees.

Mirvac also proposed the option to provide a pedestrian link as a replacement to the local minor road located directly to the south of central park, as this would retain additional significant trees and could also be integrated into the central park landscaping design, which would provide additional habitat connectivity throughout the subject land. As this would require the removal of Road 3 and would cause a variation to the Canterbury-Bankstown DCP structure plan, it was not approved by Council.

7.3. Avoid and Minimise Prescribed Impacts

7.3.1. Non-native Vegetation

Areas of non-native vegetation within the subject land are in the form of low-biodiversity exotic vegetation and exotic dominated grasslands.

Although the non-native vegetation may provide some habitat value for native fauna in terms of shelter and foraging resources, these areas are unlikely to be favoured over forest/woodland habitats located in the conservation area. The proposed development will remove approximately 2.06ha of non-native vegetation, and an additional 6.56 of planted native and exotic dominated grassland. The development has prioritised the retention of the good-quality native vegetation that conforms to Cumberland Plain Woodland in the E1 zoned land, and the areas of connected canopies in the existing parks and has therefore predominantly situated the development in the areas of exotic vegetation and planted native vegetation. As such, impacts to the areas of non-native vegetation are not able to be avoided as part of the project. It is noted that the replanting of native species will occur within the subject land as part of the project's Landscape Plan which will provide sheltering and foraging resources for native species in the short to long-term.

7.3.2. Habitat Connectivity

As identified previously, the subject land is included in the Connected Corridors for Biodiversity Mapping which maps the regional biodiversity corridors that link the Royal National Park to the Ku-ring-gai Chase National Park. A small portion of the subject land has been mapped as 'Priority Habitat' within this map, however the identified area is comprised of scattered trees, some of which are remnant Cumberland Plain Woodland, and the others are either planted native or woody exotic. The area mapped as Priority Habitat is somewhat 'broadbrush', as it also contains cleared areas, including buildings and roads/footpaths which do not provide suitable habitat for native fauna. The remainder of the subject land is mapped as 'Supporting Habitat' or 'Supporting Areas' which largely comprise already cleared areas or areas of exotic dominated grassland.

Additionally, the southern boundary of the WSU Campus has been mapped in the Plan as containing a 'transition corridor' (see Figure 11 of the Plan) (Bankstown City Council 2015), which was identified as an already vegetated tract of land within the previous Bankstown LGA. This is known as the M5 Motorway Corridor. The vegetation within the subject land likely only provides 'stepping stone' habitat for aerial species between the M5 Motorway Corridor and the conservation area through the canopy layer. Ground-dwelling native fauna species are unlikely to use the subject land as 'stepping stone' habitat due to the lack of understorey vegetation present.

In summary, the vegetation within the subject land contains some native vegetation that provides limited connectivity through scattered trees to the wider study area. The north, east and west of the study area comprise residential or industrial estates, with scattered trees within the streets and the gardens, and so native fauna, other than highly mobile, aerial species, are unlikely to use the subject land to reach areas of native vegetation outside of the study area. There are numerous reserves located to the south of the study area, such as the Killara, Horsley Park and Kelso Park Reserves, which contain areas of relatively undisturbed native vegetation. Native fauna species are unlikely to use the subject land as 'stepping stone' habitat to reach these reserves, as they are separated from the subject land by the M5 South Western Motorway, therefore connectivity within the subject land is limited to connectivity along the M5 Motorway to the wider study area.

No habitat corridor connectivity will be broken or fragmented due to the proposed vegetation removal, however, there will be a minor reduction in the area of habitat available. This existing habitat connectivity will be retained in the short-term and improved in the long-term through the proposed retention of vegetation within the subject land, as well as proposed plantings under a Landscape Plan.

7.3.3. Waterbodies, Water Quality and Hydrological Processes

Potential indirect impacts to water quality and hydrological processes would primarily occur as a result of sediment inputs during construction and cannot be completely avoided. Erosion and sediment control measures will be implemented during construction following Managing Urban Stormwater: Soils and Construction ("the Blue Book") (Landcom 2004).

7.3.4. Vehicle Strikes

The project will result in the creation of access roads and driveways within the subject land. As such, there is likely to be an increase in vehicle traffic within the subject land and thereby increasing the potential of vehicle strikes. The implementation of traffic control measures, primarily speed limits along access roads and driveways will reduce the potential for vehicle strikes on native fauna species.

Table 22 Summary table of options considered for the project to avoid and minimise impacts on biodiversity

Action	Adopted (Yes/No/In part)	Justification	Timing (if adopted)	Responsibility (if adopted)	Outcome (if adopted)
Incorporation of suitable technologies and design configurations to minimise overall development site footprint	Yes	As part of the design process of the project, careful consideration has been given to various design elements to reduce the overall development footprint. This includes retaining areas of remnant vegetation within bush regeneration areas, use of native species for all landscape planting and harvesting of locally endemic species. Additionally, a number of case studies were undertaken with the consultant team which incorporated a number of civil techniques with the aim of further reducing the impact to native vegetation.	During design and approval	Proponent and consultant team	Reduction of the development site footprint and will minimise impacts on biodiversity values of the subject land.
Implementation of a suite of mitigation measures	Yes	To minimise the impacts on biodiversity a suite of mitigation measures will be implemented such as nest box installation, pre-clearance/clearance measures, sediment controls, tree protection measures and the use of locally endemic species for landscape plantings. These measures will be implemented across the site with a particular focus on protecting areas proposed for bush regeneration	Pre and post construction and during operation phase	Proponent and consultant team	Minimise impacts on biodiversity values of the subject land and adjoining areas.

Action	Adopted (Yes/No/In part)	Justification	Timing (if adopted)	Responsibility (if adopted)	Outcome (if adopted)
Design amendments to various elements of the project design	Yes	The project masterplan underwent numerous iterations at the pre-lodgement phase for the planning proposal	During design and approval	Proponent and consultant team	Avoid and minimise impacts on native vegetation and TECs, retain some level of habitat connectivity.
Partial development of the study area to avoid/minimise impacts on biodiversity and achieve greater tree retention	No	The option to only undertake a partial development of the site, to avoid clearing Cumberland Plain Woodland, is not in line with the Planning Proposal or need for the project.	-	-	-
'Do-nothing' option to avoid all impacts on biodiversity	No	The do-nothing option for the project would maintain current vegetation cover on site but would not enable redevelopment.	-	-	-
Consideration of alternative sites and layouts within the subject land	Yes	Preliminary options were considered and investigated for the project. The final option selected has consideration to both biodiversity values and the development.	During design and approval	Proponent and consultant team	Retention of the intact Cumberland Plain Woodland in the conservation area.
Retention and enhancement of the conservation area	Yes	The final project design will retain the conservation area, which is made up of intact Cumberland Plain Woodland. This area will be managed under a VMP and enhanced using seeds propagated from within this area.	Post-approval and long-term	Proponent and consultant team	Retention of the intact Cumberland Plain Woodland in the conservation area.

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8. Assessment of Impacts

8.1. Direct Impacts

8.1.1. Native Vegetation Clearing

The direct impact resulting from the proposed development is the loss of vegetation and associated habitat within the subject land. **Table 23** identifies the extent of impacts to vegetation within the subject land.

Table 23 Extent of clearing impacts

Vegetation Zone	PCT #	PCT Condition Class	BC Act Status	EPBC Act Status	Subject Land (ha)
1	3320	Canopy	CEEC	-	0.50
2	3320	Mown	CEEC	CEEC	0.00
3	3320	Exotic Ground	CEEC	CEEC	0.19
4	4025	Canopy	EEC	-	0.06
-	-	Planted Native Vegetation			1.58
-	-	Exotic Vegetation			1.74
-	-	Planted Native and Exotic Dominated Grassland			6.50
-	-	Cleared Land			6.39
Total					16.96

8.1.2. Threatened Species

The direct impact resulting from the proposed development is the loss of habitat due to vegetation removal within the subject land. **Table 24** identifies the extent of impacts to habitat for species credit species within the subject land.

Table 24 Extent of threatened species impacts within the subject land

Scientific Name	Common Name	BC Act Status	Area (ha)
<i>Acacia pubescens</i>	Downy Wattle	V	0.19
<i>Myotis macropus</i>	Southern Myotis	V	0.06

8.2. Change in Vegetation Integrity Score

Table 25 details the change in vegetation integrity score (VI Score) for each vegetation zone and management zone. Five management zone types have been delineated to reflect the intended development within the development footprint, which includes areas of total vegetation retention, areas of tree retention/partial clearing, and areas of complete clearing. This includes:

- **Management Zone 1 (MZ1)** – Complete clearing: All structural layers of vegetation (canopy, mid-storey, groundcover) are proposed to be removed. Future vegetation integrity scores have been reduced to 0;
- **Management Zone 2 (MZ2)** - Tree Retention: Trees are proposed to be retained but remaining structural layers will be cleared. For MZ2 the future vegetation integrity scores have been modified as follows:
 - Future tree composition has been kept as per previous score;
 - Future composition of all other growth forms reduced to 0;
 - Future tree structure kept as existing score;
 - Future structure of all other growth forms reduced to 0;
 - Function score for number of large trees and stem size class has been kept as per previous score; and
 - Scores for all other functions reduced to 0.
- **Management Zone 3 (MZ3)** – APZ Inner Protection Area (IPA): This will apply to all areas within 20m from the childcare centre. As all structural, compositional and functional layers will be retained (as this area is already maintained as an APZ under DA-752/2011), the future vegetation integrity scores have been retained as per the recorded BAM plot scores. The vegetation will be managed in accordance with *Planning for Bushfire Protection 2019*, being:
 - Minimal fine fuel at ground level (i.e. no litter or coarse woody debris);
 - Tree canopy cover not more than 15% with preference for smooth barked evergreen trees;
 - Shrubs not below trees with no more than 10% cover;
 - Grasses can be retained but must be maintained at below 100 mm height (taller sedges and rushes will require removal).
- **Management Zone 4 (MZ4):** APZ Outer Protection Area (OPA): This will apply to all areas between 20m and 40m from the childcare centre, and as all structural, compositional and functional layers will be retained (as this area is already maintained as an APZ under DA-752/2011), the future vegetation integrity scores have been retained as per the recorded BAM plot scores. The vegetation will be managed in accordance with *Planning for Bushfire Protection 2019*, being:
 - Minimal fine fuel at ground level (i.e. no litter or coarse woody debris);
 - Tree canopy cover not more than 30% with preference for smooth barked evergreen trees;
 - Shrubs not below trees with no more than 20% cover;
 - Grasses can be retained but must be maintained at below 100 mm height (taller sedges and rushes will require removal).

- **Management Zone 5 (MZ5)** – Full retention: All structural layers of vegetation (canopy, mid-storey, groundcover) are proposed to be retained. Future vegetation integrity scores will remain the same.

Table 25 Changes in vegetation integrity score

Zone	Vegetation Zone Name	Management Zone	BRW	Area (ha)	VI Score			Total VI Loss
					Current	Future	Change	
1	3320_Canopy Only	MZ1: Cleared	2.5	0.50	23.4	0.00	-23.4	-21.9
		MZ5: Full Retention		0.10	23.4	23.4	0	
2	3320_Mown	MZ3: APZ - IPA	2.5	0.07	54.6	54.6	0	0
		MZ4: APZ - OPA		0.08	54.6	54.6	0	
3	3320_Exotic Ground	MZ1: Cleared	2.5	0.02	54.2	0.00	-67.3	-20
		MZ2: Trees Retained		0.17	54.2	23.9	-30.4	
		MZ3: APZ - IPA		0.05	54.2	54.2	0	
		MZ4: APZ - OPA		0.11	54.2	54.2	0	
5	4025_Canopy	MZ1: Cleared	2.5	0.06	30.8	0	-30.8	0

BRW = Biodiversity Risk Weighting

VI Score = Vegetation Integrity Score

There is no change in VI score for MZ3 and MZ4 because these areas are currently being maintained as an APZ under the approved DA (DA-752/2011), and so there will be no further removal of vegetation required.

8.3. Indirect Impacts

Table 26 outlines the indirect impacts to native vegetation and habitat. Due to the existing modified nature of the vegetation within the subject land, the indirect impacts of the project are not considered to be significant.

Table 26 Indirect impacts of the project

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
Inadvertent impacts on adjacent habitat or vegetation	Construction activities may result in inadvertent impacts on retained vegetation, such as increased sedimentation.	Retained vegetation within subject land and study area	Short term (during construction)	Cumberland Plain Woodland, Ecosystem credit species	Increased human activity during construction has the potential to disturb fauna within adjacent habitat areas. Resulting impacts to fauna include heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency or deter wildlife from using particular areas. The civil works is likely to result in a temporary and minor permanent impact to ecological values due to increased human presence on site during the construction period.
Reduced viability of adjacent habitat due to edge effects	Impact unlikely. The vegetation to be removed is either already along the edge of the Cumberland Plain Woodland patch in the conservation area, or scattered trees throughout the subject land, and so the				

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
	removal of this is unlikely to cause any further edge effects.				
Reduced viability of adjacent habitat due to noise, dust or light spill	The construction activities associated with the project are likely to increase the noise, dust and light above current levels within the subject land.	Retained vegetation within subject land and study area	Short term (during construction) Potential long-term for light spill due to increased housing	Ecosystem credit species	Construction noise is expected to elicit some avoidance response from fauna using the surrounding vegetation though, with consideration of the extent of habitat available in the study area, this is likely to be a temporary and negligible to minor impact. Artificial light from residences may affect nocturnal and diurnal animals by disrupting patterns, with quality of light (e.g. wavelength and colour), intensity and duration potentially evoking different responses. Impacts from increased light levels include disorientation from or attraction toward artificial sources of light; mortality from collisions with structures; and effects on light- sensitive

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
					cycles of species (e.g. breeding and migration for fauna and flowering in plants). The presence and intensity of artificial light will have most impact at the edge of adjacent vegetation communities. Furthermore, the civil works is likely to result in a negligible impact to wildlife due to the buffers proposed.
Loss of breeding habitats	The project will result in the removal of four hollow-bearing trees.	Vegetation throughout the subject land.	Long-term	Hollow-dependent ecosystem credit species (e.g. microchiropteran bats) and Southern Myotis	Reduction in available breeding habitat of hollow-dependent fauna and increased competition for hollows within vegetation on Lots adjacent to the subject land.
Transport of weeds and pathogens from the site to adjacent vegetation	A number of weeds are known to occur within the subject land and may be inadvertently spread to retained vegetation.	Retained vegetation within subject land and study area	Potential long-term	Ecosystem credit species, TECs	Reduced condition of the adjoining foraging habitat and Cumberland Plain Woodland.
Rubbish dumping	Increased pedestrian access may result in increased debris/ rubbish	Retained vegetation within subject land and study area	Long-term	Cumberland Woodland, Ecosystem credit species	Plain Ecosystem Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife. This

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
					may exacerbate other indirect impacts (e.g. road mortality). Fencing and signage will help reduce rubbish impacts.
Increased risk of starvation, exposure and loss of shade or shelter	Impact unlikely. Although the project will result in removal of several trees, these habitats are likely dominated by hardy, urban adapted species. Further habitats are retained in the wider study area as well as open space areas. Thus, the project is unlikely to cause displacement of fauna such that it increases the risk of starvation, exposure and loss of shade or shelter.	-	-	-	-
Trampling of threatened flora species	Impact unlikely. No threatened flora species have been observed, and none are likely to occur, considering the disturbed and modified nature of the subject land.	-	-	-	-

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
Inhibition of nitrogen fixation and increased soil salinity	Impact unlikely. The subject land is already highly modified from prior land uses and is likely to have elevated levels of nutrients such as N and P.	-	-	-	-
Fertiliser drift	Impact unlikely. Any application of fertiliser will be managed and monitored under a management plan.	-	-	-	-
Wood collection	Impact unlikely to occur, considering the nature of the subject land and the project as residential properties.	-	-	-	-
Bush rock removal and disturbance	Impact unlikely. No bush rock has been identified within the subject land or immediate vicinity; therefore the project is not considered to result in this indirect impact.	-	-	-	-
Increase in predatory species populations	Impact unlikely. As the subject land already occurs in a highly modified landscape the project is considered	-	-	-	-

Indirect Impact	Nature	Extent	Duration	Threatened Likely Affected	Entities	Consequences
	unlikely to result in an increase in predatory species populations.					
Increase in pest animal populations	Impact unlikely. As the subject land already occurs in a highly modified landscape the project is considered unlikely to result in an increase in pest species populations.	-	-	-		-
Increased risk of fire	Impact unlikely. The project is unlikely to increase the risk of bushfire.	-	-	-		-

8.4. Prescribed Impacts

The project has been assessed as potentially resulting in four prescribed impacts (see **Section 6.1**). An assessment of these prescribed impacts is provided below in accordance with Section 8.3 of the BAM.

8.4.1. Non-native Vegetation

8.4.1.1. Nature

The project has been designed and sited to maximise avoidance of native vegetation and subsequently non-native vegetation is proposed to be cleared for the project. Non-native vegetation includes areas of planted exotic vegetation and lawns as displayed in **Figure 16**.

8.4.1.2. Extent

The proposed development will clear a total of approximately 1.74ha of non-native vegetation, and an additional 6.56 ha of exotic dominated grassland mixed with planted native species.

8.4.1.3. Duration

Impacts to non-native vegetation would occur during the construction phase of the project. The removal of the non-native vegetation is a long-term impact.

8.4.1.4. Threatened Entities Affected

The habitat provided by non-native vegetation may provide some foraging habitat for ecosystem credit species, such as microchiropteran bats and birds. However, the non-native vegetation is not considered suitable breeding/nest habitat due to lack of hollows and structural features, other than some minor woody weeds such as scattered shrubs.

8.4.1.5. Consequences

The project will result in a reduction in non-native vegetation by approximately 1.74ha, and an additional removal of 6.56ha of a planted native and exotic dominated grassland mix. The reduction of this area of habitat is not considered to significantly impact upon threatened entities as other areas of suitable habitat, in the form of both native and non-native vegetation, will be retained within the Cumberland Plain Woodland in the conservation area, and in the numerous reserves to the south. Furthermore, areas occupied by exotic vegetation within the subject land are proposed to be revegetated for public open spaces using species representative of Cumberland Plain Woodland.

8.4.2. Habitat Connectivity

8.4.2.1. Nature

The native woody vegetation within the subject land is part of the Connected Corridors for Biodiversity Mapping which maps the regional biodiversity corridors that link the Royal National Park to the Ku-ring-gai Chase National Park. A portion of the subject land has been mapped as 'Priority Habitat' within this map, however the majority of this vegetation is to be retained within the conservation area.

The southern boundary of the subject land runs along the M5 Motorway, and this vegetation is mapped as containing a 'Transition Corridor'. As shown in **Figure 13**, canopy trees are proposed to be removed along the

southern boundary so that a retaining wall can be built to protect the project from the M5 Motorway. The removal of this vegetation, which largely comprises planted *Casuarina glauca* individuals, will not break or fragment the corridor, as the individuals to be removed are on the outer edge of the patch of planted native vegetation, and further individuals will remain within the verge.

The vegetation proposed to be removed from within the subject land, including along the M5 Motorway comprises largely scattered trees with a maintained, garden-like exotic understorey that is separated by roads and buildings, and so native ground-dwelling fauna are unlikely to utilise the subject land as a habitat corridor. Nonetheless, the removal of vegetation within the subject land will reduce the aerial connectivity slightly between the conservation area and the reserves to the south, however there will be other areas of retained treed vegetation within the subject land, and so it is unlikely that threatened fauna species will be significantly affected by the removal of these small areas of native vegetation. Stepping-stone habitat will still be retained in the subject land and wider study area.

8.4.2.2. Extent

Habitat connectivity will be reduced through the removal of 16.96ha of vegetation, 6.56ha of which is grassland. Removal of the woody vegetation within the subject land will not result in further fragmentation of habitat in the locality or a break of linkage in the corridor, as it is only a very small decrease in total area and width of the relevant corridor.

8.4.2.3. Duration

Direct impacts to habitat connectivity would occur during the construction and operational phase of the project. The reduction of habitat connectivity is a long-term impact. However, proposed revegetation in the subject land and landscaping as part of the project will restore some connectivity between vegetation in the subject land.

8.4.2.4. Threatened Entities Affected

The habitat offered by extant vegetation may provide foraging habitat for ecosystem credit species, such as the Grey-headed Flying-fox, microchiropteran bats and birds. Some species such as the Grey-headed Flying-fox would be able to fly over the proposed buildings and would only be impacted through the direct loss of foraging habitat.

8.4.2.5. Consequences

The project will result in the direct reduction in native vegetation by 16.96ha, 6.56ha of which is grassland. Although vegetation clearing within the subject land will result in a slight reduction of the existing vegetation patch, the reduction of this area of habitat is not considered to significantly impact the movement of mobile fauna species as better-quality habitat is located to the north and south within reserves that will be retained, including the area of Cumberland Plain Woodland in the conservation area. For example, the Grey-headed Flying-fox forages opportunistically, often at distances up to 30 km from camps, and occasionally up to 60-70 km per night, in response to patchy food resources (NSW Scientific Committee 2004). It is considered unlikely that native fauna would be solely reliant on the habitat within the subject land for movement between different areas of habitat.

8.4.3. Waterbodies, Water Quality and Hydrological Processes

8.4.3.1. Nature

No waterbodies are present; however, the project has the potential to impact on water quality and hydrological processes.

8.4.3.2. Extent

The extent of impacts on water quality and hydrological processes are largely limited to the subject land; however, impacts outside of the subject land may occur during clearing operations if sediment controls are not appropriately implemented and maintained.

8.4.3.3. Duration

Impacts to water quality and hydrological processes are most likely to take place during construction. These will be managed through erosion and sediment control measures to prevent sediment laden run-off from leaving the subject land. Any minor changes to surface run-off will be permanent if the development is constructed.

8.4.3.4. Threatened Entities Affected

Any changes to water quality and hydrological processes are unlikely to affect threatened entities within the subject land or beyond.

8.4.3.5. Consequences

The consequences of impacts to water quality and hydrological processes are likely to be minor and would primarily take place during construction. These impacts can be mitigated through implementation of erosion and sediment control measures.

8.4.4. Vehicle Strike

8.4.4.1. Threatened Entities Affected

Ecosystem species, such as the Grey-headed Flying-fox and ground-dwelling fauna, such as the Spotted Tail Quoll.

8.4.4.2. Nature

The subject land was previously utilised as a functioning university campus, so the subject land has already been subject to vehicles. However, vehicles will be accessing the other parts of the subject land regularly during the construction phase of the project, and so there will be an increase in the number of vehicles that will be accessing the subject land and will thereby increase the risk of fauna vehicle strike.

8.4.4.3. Extent

The risk of vehicle strike will be throughout the entire subject land during the construction phase of the project but will be limited to the car park and roads for the operational phase.

8.4.4.4. Duration

The increased risk of vehicle strike will be a long-term impact.

8.4.4.5. Consequences

The subject land was previously utilised as a university campus, and so fauna were previously at risk of vehicle strike. The construction of residential development within other sections of the study area will result in an increase in the number of vehicles that will be accessing the subject land and will thereby increase the risk of fauna vehicle strike. There will be a higher risk of vehicle strike during the construction phase of the project, as there will be a larger number of machines and vehicles accessing the entire site, however it is expected that there will be a speed limit introduced.

8.5. Impacts to Canterbury-Blacktown Council Biodiversity Values

For the preparation of this BDAR, relevant plans and guidelines for the Canterbury-Bankstown LGA have also been reviewed. It is noted that part of the study area has been mapped as 'Biodiversity' under the Canterbury-Bankstown LEP 2023 (**Figure 17**).

8.5.1. Terrestrial Biodiversity

When a proposed development is predicted to impact land identified as 'Biodiversity' on the Terrestrial Biodiversity Map, the consent authority needs to consider Clause 6.4 'Biodiversity' in the Canterbury-Bankstown LEP before making a determination on a DA.

The objective of Clause 6.4 is as follows:

"The objective of this clause is to maintain terrestrial and aquatic biodiversity by

- *Protecting native fauna and flora;*
- *Protecting the ecological processes necessary for their continued existence; and*
- *Encouraging the conservation and recovery of native fauna and flora and their habitats."*

The northern portion of the subject land is mapped as 'Biodiversity'. The mapping is somewhat "broad brush" and contains areas of remnant vegetation (comprising different condition states of Cumberland Plain Woodland), the childcare centre and associated structures, landscaped areas between buildings, university buildings and associated structures including car parks (**Figure 17**).

Table 27 below includes an assessment of paragraphs 3-4 of Clause 6.4. The relevant text from each of the paragraphs in the Canterbury-Bankstown LEP are recreated in the first column of the table, whilst responses to each paragraph are provided in the second column.

Table 27 Clause 6.4 of the Canterbury-Bankstown LEP

Canterbury-Bankstown LEP 2023	Response
<i>(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must consider -</i>	
<i>a) Whether the impact of the proposed development on the following:</i>	

Canterbury-Bankstown LEP 2023	Response
<i>i) An adverse impact on the condition, ecological value and significance of the flora and fauna on the land</i>	The subject land currently comprises 11.8ha of vegetation, 2.06ha of which is exotic vegetation, 6.56 of which is a planted native and exotic dominated grassland mix and 2.04ha of which is planted native vegetation. Cumberland Plain Woodland comprises 1.09ha of the subject land in varying condition states: mown (0.15ha), exotic ground (0.34ha) and canopy only (0.6ha). As mentioned previously, the canopy only condition state does not meet the criteria for the EPBC Act listed community, and so the project has prioritised avoiding the other condition states of the community. The project proposes to remove 0.50ha of the canopy condition of Cumberland Plain Woodland (Figure 13). It was originally proposed that 0.57ha of the Canopy Cumberland Plain Woodland be cleared as part of the project, however design amendments have allowed for the retention of three additional patches, comprising an area of 0.07ha, The landscape plantings will increase this area of this community in the long-run and improve its condition by planting understorey vegetation (where possible), which may mean it could meet the EPBC Act threshold over time. The majority of the subject land was historically cleared for agriculture prior to it becoming the university campus in 1989 (Figure 11), and so a large number of the trees are semi-mature and have not had time to develop hollows that could be used as breeding habitat. These trees would have the potential to develop into hollow-bearing trees in the far future, however the project will be installing nestboxes around the subject land to provide breeding habitat for native fauna species, in accordance with the Hollow Offset Replacement Strategy and Nestbox Management Plan (our reference: 23021RP4).
<i>ii) An adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna</i>	The vegetation within the subject land provides connectivity, breeding and foraging habitat for native fauna species. The subject land is fairly isolated from other areas of native vegetation due to its location. The M5 Motorway separates it from the Horsely Reserve and other areas of native vegetation to the south, and it is within a built-up area surrounded by industrial estates and residential estates to the north, east and west. The subject land provides little connectivity for ground-dwelling fauna, due to the limited understorey vegetation, so it is unlikely that native ground-dwelling fauna would utilise the subject land. However, aerial fauna could use the tree canopy within the subject land to reach the conservation area in the north and use the street trees to reach other areas of native vegetation outside of the subject land. It is possible that the project may reduce this aerial connectivity in the short-term during the vegetation removal, however the landscape plan proposes to plant street trees with a connected

Canterbury-Bankstown LEP 2023 Response

canopy which will use species representative of Cumberland Plain Woodland, and so the connectivity will likely be improved for aerial species in the long-term (**Figure 18**).

Breeding habitat is present in the subject land in the form of 12 hollow-bearing trees, and two stick nests. The project is aiming to remove as few of the hollow-bearing trees as possible, with only four containing small hollows/crevices proposed to be removed, however due to the location of some of them it would be impossible to retain them all. Those that are proposed to be removed will be replaced at a 1:1 ratio, using similar sized nest boxes to the one that has been removed as outlined in the Hollow Offset Replacement Strategy and Nestbox Management Plan prepared for the study area (our reference: 23021RP4).

The subject land contains foraging habitat for native fauna species due to the presence of nectar producing flowers, and due to its use as a university campus there are likely to be pest species such as rats which would attract native fauna such as owls or raptors. The project is unlikely to cause a reduction in the amount of pest species using the site, as the residential properties will still attract them, but will potentially reduce the number of flowering plants available for foraging in the short term. As mentioned previously, landscape plantings will ensure that these are replaced, using native species representative of Cumberland Plain Woodland.

iii) The potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land

The vegetation within the subject land is already fragmented (**Figure 9**). It largely consists of stands of trees that are mainly planted, with some smaller areas of remnant trees, over an entirely exotic understorey, that is maintained as 'garden plantings' between the university buildings. As the project is aiming to retain as much vegetation as possible, it is unlikely that the project will further fragment the subject land. The project has also proposed a Vegetation Management Plan that will be implemented for the retained areas of Cumberland Plain Woodland within the subject land and proposes to use landscape plantings that are representative of Cumberland Plain Woodland to further enhance the subject land.

The subject land is currently in a disturbed condition as it comprised a university campus, which was active until 2023. More recently, it has been subject to a demolition DA (DA1512/2023), which was approved to remove the university buildings within the subject land. There will be more disturbance in the short-term during the construction phase of the project, however there will likely be less disturbance in the long-term. Approximately 430 new dwellings are proposed, however the WSU Milperra Campus used to cater to approximately 8,100 students

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	meaning that there will likely be an overall reduction in human disturbance. The project has proposed to implement a VMP within the conservation area, in order to enhance and restore the Cumberland Plain Woodland. Landscape plantings between the proposed residential dwellings will utilise species representative of Cumberland Plain Woodland, using individuals that have been propagated from the conservation area. In addition to this, any hollow-bearing trees to be removed have been proposed to be replaced at a 1:1 ratio, using similar sized nest boxes to the one that has been removed. Therefore, considering all the points above, the project aims to improve the biodiversity structure, function and composition of the subject land in the long term.
<i>iv) An adverse impact on the habitat elements providing connectivity on the land</i>	As mentioned above, the existing vegetation within the subject land has connected and overlapping tree canopy, and spans throughout the conservation area. At ground level within the subject land, the mapped patch is fragmented by gardens, paths, roads and buildings and so has limited utility for native animals. However, at the level of the tree canopy it is relatively well connected and provides habitat for birds, bats, flying foxes and non-flying arboreal mammals, however it is separated to an extent by tall university buildings. The proposed development would marginally reduce the connected canopy layer in the short term during the construction phase of the project; however, the landscape plantings will increase the connectivity in the long term. The project will not fragment or isolate the subject land further, and it will not break the connectivity between the conservation area and the remainder of the study area. Connectivity will be improved in the long-term, as the Landscape Plan for the project proposes a habitat corridor of connected tree canopy between the M5 Motorway transition corridor, through the southern park, into the central park and north into the conservation area, through the proposed street plantings along road verges (Figure 18).
<i>b) Appropriate measures to avoid, minimise or mitigate the impacts of the development</i>	Avoidance of impacts to biodiversity values and the mitigation measures proposed are addressed in detail in Chapter 7 and Section 8.6 of this BDAR. As discussed within the relevant sections, appropriate measures to avoid, minimise or mitigate the impacts of the development will be implemented for the project.

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c) Any opportunity to restore or enhance remnant vegetation, habitat and biodiversity corridors	The project aims to restore and enhance the vegetation within the subject land to the best of its ability, whilst still meeting the requirement of providing 430 new dwellings as per the Planning Proposal. In accordance with the Canterbury-Bankstown DCP, a VMP has been prepared for the conservation area to improve the condition of Cumberland Plain Woodland. It advised that the VMP should apply to some areas outside of the conservation area, as the Canterbury-Bankstown DCP states that the VMP should apply to all areas of retained Cumberland Plain Woodland. It is recommended that the VMP should cover the vegetation bordering the Milperra Reserve in the northwest, and any open space areas within the subject land that could support a small patch of Cumberland Plain Woodland. The Landscape Plan for the subject land proposes to replace most of the exotic vegetation with species representative of Cumberland Plain Woodland, which will provide more foraging habitat for the native fauna species than the exotic vegetation. Seed propagation of native species within the conservation area has been ongoing since 2024, and the onsite plant nursery now comprises enough trees for 83% of the street plantings. There is also opportunity for more native understorey vegetation to be planted, which would provide better habitat connectivity for ground-dwelling fauna species than is currently available. There are 12 hollow-bearing trees within the subject land, which provide potential breeding habitat for a range of native fauna species, including threatened owls and mammals. Hollow-bearing trees are to be retained (where possible), however any hollow-bearing trees to be removed have been proposed to be replaced at a 1:1 ratio, using similar sized nest boxes to the one that has been removed as outlined in the Hollow Offset Replacement Strategy and Nestbox Management Plan prepared for the study area (our reference: 23021RP4). As mentioned previously, there is opportunity for the project to improve habitat connectivity within the study area. The conservation area is relatively isolated to other areas of native vegetation, however through landscape plantings it is possible to make this more connected. The southern boundary of the study area has been mapped in the <i>Canterbury-Bankstown Biodiversity Strategic Plan 2015-2025</i> (the 'Plan') as containing a 'transition corridor' (see Figure 11 of the Plan) (Bankstown City Council 2015), known as the M5 Motorway Corridor. Through landscape plantings of canopy and understorey species of Cumberland Plain Woodland, the project could enhance the

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	connectivity between the M5 Motorway Corridor, through the study area, to the conservation area, meaning that more native fauna species are more likely to use the conservation area.
(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:	
a) is designed, sited and will be managed, to avoid a significant adverse environmental impact	The development has been sited to minimise impacts to Cumberland Plain Woodland within the study area. The area of good-quality, Cumberland Plain Woodland within the E1-zoned land will be retained as part of the project. The development footprint was designed to only remove degraded condition states of Cumberland Plain Woodland (ie have a limited or highly exotic understorey), some of which is managed as an APZ and so is already subject to maintenance and vegetation removal. Where possible, further tree retention have been included in the subject land, including within the current parkland areas which have a connected canopy layer and contain hollow-bearing trees The subject land is not currently managed to protect native flora and fauna. The project has proposed a number of management plans, including a VMP and a Hollow Offset Replacement Strategy and Nestbox Management Plan ensure that native flora and fauna are protected to the highest possible standard.
b) if a significant adverse environmental impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise the impact.	If the project is approved, retained vegetation will be subject to a number of ameliorative measures, including: • Pre-clearance surveys and clearance supervision • Implementation of a sediment control plan • Tree protection fencing around retained vegetation • Landscape planting • Preparation and implementation of a Vegetation Management Plan for retained Cumberland Plain Woodland. • Preparation and implementation of a Hollow Offset Replacement Strategy and Nestbox Management Plan

8.5.2. Canterbury-Bankstown DCP 2023

The Canterbury-Bankstown DCP includes a specific clause (Clause 11.13) that applies to the entire WSU Milperra Campus and therefore applies to the subject land. The ecological objectives of the clause are to ensure that any proposed development will not detrimentally affect the environment and ensure that satisfactory measures are incorporated to mitigate any impacts arising from the proposal development.

Table 28 lists the mitigation measures relevant to the subject land under the DCP, and provides a description as to how they will be adhered to,

Table 28 Compliance with the Canterbury-Bankstown DCP

Canterbury-Bankstown DCP	Response
A 35% tree canopy target through retention of existing trees and the planting of the following tree species: • <i>Eucalyptus moluccana</i> (Grey Box); • <i>Eucalyptus tereticornis</i> (Forest Red Gum); • <i>Eucalyptus crebra</i> (Narrow-leaved Ironbark); • <i>Eucalyptus eugeniodes</i> (Thin-leaved Stringybark); • <i>Eucalyptus maculata</i>/<i>Corymbia maculata</i> (Spotted Gum); and • <i>Eucalyptus fibrosa</i> (Red Ironbark).	The 35% tree canopy target will be met across the entire subject land through the Landscape Plan prepared for the project, which prioritises the planting of trees representative of Cumberland Plain Woodland, and so includes the species listed in the DCP.
A Vegetation Management Plan (VMP) should be prepared and implemented for all retained Cumberland Plain Woodland for the rehabilitation, management and long-term maintenance of the community;	A VMP has been prepared by Cumberland Ecology for the conservation area (our reference: 23021RP5).
Any trees requiring consent for removal (as per Chapter 2.3 of the Canterbury-Bankstown LEP) must be replaced at a 3:1 ratio using a mix of local provenance large trees that conform with the Cumberland Plain Woodland within the study area;	Has been addressed in the VMP (our reference: 23021RP5)
Native seed from the trees proposed for removal should be collected and propagated to be used in revegetating the study area;	Seeds from species representative of Cumberland Plain Woodland within the conservation area have been collected with propagation underway for revegetating the subject land, including rehabilitation of terrestrial linkages, RE1 open space areas and street planting – in accordance with site-specific DCP. A minimum of 83% of the proposed landscape plantings are from propagated seeds and are of Cumberland provenance (both Plain Woodlands and Riverflat Forest – high ecological significance). The remaining 17% are natives – comprising a mix of propagated stock and stock procured from market for availability of required size.
Juvenile native plants proposed to be removed should be salvaged and transplanted to areas that are to be conserved within the study area;	Has been addressed in the VMP (our reference: 23021RP5)
Vegetation clearing should not take place in late winter/spring during the breeding period of birds, and a suitably qualified ecologist must be present during all tree removal; and	Vegetation clearing methods are discussed in length within this BDAR (Section 8.6) and within the VMP prepared for the project.

Canterbury-Bankstown DCP	Response
Habitat that has the potential to be salvaged (eg tree hollows, tree trunks and root balls) should be reused within the study area for habitat enhancement.	Salvageable habitat will be identified during pre-clearing surveys and will be marked during clearance supervision by the project ecologist to be reused within the study area.

8.5.3. Pre-DA Advice Meeting

Due to the project's history with Council, the client organised a meeting with Council, the Mirvac team and the project consultants on 31 October 2025 to discuss a number of items that they required more information for prior to the submission of the DA. In terms of ecology, the following item was discussed:

"BDAR does not adequately demonstrate that the mitigation hierarchy has been applied and relies too heavily on the C2 conservation zoning carried out at planning proposal."

The project ecologists, David Robertson and Alix Murray, explained the BDAR strategy and responded to the above statement using evidence from the BDAR that although the C2 zoning has been considered as avoidance, it is not the only avoidance shown. Information from **Section 7.2.2** regarding the other avoidance strategies, including the case studies that Council rejected due to DCP requirements (**Section 7.2.3.1**), was read out and explained to Council, who had no further comments as a result.

8.6. Impacts to C2-zoned Land

As outlined in **Table 2**, one of the main concerns for both the Department and Council were the impacts to C2-zoned land within the study area. The impacts were explained to the Department in depth during the meeting on 6 March 2026, however they have been replicated in this section for further clarification.

It is acknowledged that some areas along the southern edges of the C2 zoned land are located within the subject land. However, it should be noted that the final boundaries of the C2 zoned land were based on desktop assessments of canopy extent and resulted in some areas of an existing road under the canopy 'drip zone' being included within the C2 zoned land. This is evidenced by the ground-truthed vegetation mapping that shows the southern parts of the C2 zoned land being mapped as CPW – Exotic Ground. The current conditions showing the presence of the road is shown in **Photograph 9**.

While this assessment has included removal of one canopy tree from the Exotic Ground Cumberland Plain Woodland zone, this is located along Road 2 which comprises R1 zoned land. Thus, there will be no removal of trees with the conservation area, aka C2 zoned land. Furthermore, while this assessment has included clearing of 0.17 ha of understorey from the Exotic Ground Cumberland Plain Woodland zone, some of which is in the conservation area, the removal within the conservation area is limited to removal of exotic understorey to facilitate the fencing required for the VMP Area, which will benefit vegetation in the wider conservation area in the long-term.

Photograph 9 Horsely Road intersection



A raised boardwalk is proposed within the C2 zoned land along Horsely Road to formalise pedestrian desire lines and improve overall site accessibility and safety. The boardwalk will comprise of a raised pathway structure designed to traverse the conservation area while minimising impacts to existing vegetation, ground conditions, and ecological values.

The boardwalk facilitates a controlled and designated pedestrian connection between the development frontage and the surrounding network. The raised design reduces the need for bulk earthworks and vegetation clearing yet allows natural drainage patterns and ground-level habitats to be preserved. The design will consider tree root mapping undertaken within the corridor, with particular consideration given to the structural root zones of adjacent trees. The alignment and support locations of the boardwalk will be developed to ensure that any structural encroachments are avoided or minimised, with all primary footings positioned outside defined tree structural roots where practicable.

The boardwalk serves as a key mitigation measure in response to traffic and access considerations by encouraging pedestrian movement along a defined, safer route separated from vehicular conflict points. The construction of a raised boardwalk will reduce impacts to the native vegetation within the C2 zoned land when compared to constructing a footpath, as the disturbance will be limited to the pylons required to stabilise the boardwalk. As the boardwalk is to be located along the edge of the C2 zoned land, the pylons are proposed to be located in bare patches of ground or areas dominated with weeds, whilst avoiding tree roots. The boardwalk therefore provides the best outcome for biodiversity whilst still providing safe access for pedestrians.

8.7. Mitigation of Impacts to Native Vegetation and Habitat

A range of mitigation measures have been developed for the project to mitigate the impacts to native vegetation and habitat that are unable to be avoided. These include a range of measures to be undertaken before, during and after construction to limit the impact of the project. Each mitigation measure is discussed in detail below, and a summary is provided in **Table 29**.

8.7.1. Weed Management

In order to minimise the spread of weeds throughout the subject land and adjoining areas, appropriate weed control activities will be undertaken during vegetation clearing in accordance with the Greater Sydney Management Region and is subject to the Greater Sydney Regional Strategic Weed Management Plan 2023-2027 (LLS: Greater Sydney 2022) under the NSW *Biosecurity Act 2015*.

The *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds and high risk activities, as provided in the Appendices of the Greater Sydney Regional Strategic Weed Management Plan 2023-2027 (LLS: Greater Sydney 2022). To comply with the objectives of the Greater Sydney Regional Strategic Weed Management Plan, it is recommended the following measures be implemented as part of weed management for the subject land.

8.7.1.1. Prevention

Appropriate construction site hygiene measures will be implemented to prevent entry of new weeds to the area such as the cleaning of equipment prior to entering the subject land.

8.7.1.2. Eradication

Initial weed management will be carried out within the subject land according to best-practice methods. The targeted species will be those listed under Appendices 1 and 2 of the *Greater Sydney Regional Strategic Weed Management Plan 2023-2027* (LLS: Greater Sydney 2022). Initial weed treatment will include eliminating woody species and targeting large dominant infestations of exotic herbs. This may be achieved via a combination of manual weed removal and herbicide use.

8.7.1.3. Containment

Follow-up monitoring and maintenance of retained vegetation and replanting areas managed under the project's Landscape Plan should be undertaken to contain any re-emergence of weed species.

8.7.2. Delineation of Clearing Areas

To avoid unnecessary removal or damage to retained trees, as per the arborist report (Temporal Tree Management, 2024), the clearing area will be clearly demarcated with temporary fencing and signed, where appropriate, to ensure no vegetation beyond these boundaries will be inadvertently cleared during the construction process. No machinery will be parked on areas beyond the temporary fencing and no access will be allowed during construction. Ancillary facilities such as stockpile sites, site compounds and construction zones will not be located beyond the limits of clearing. Site inductions are to be given by the civil contractor to ensure all site workers and visitors are aware of any no-access areas. Appropriate tree protection measures will be installed around all trees to be retained to prevent damage during adjacent cut and fill works.

8.7.3. Tree Protection Measures

As outlined in the Arboricultural Impact Assessment prepared by Temporal Tree Management (Temporal Tree Management 2025) several tree protection measures are proposed to be implemented to avoid inadvertent impacts to trees that are marked for retention. These measures include the implementation of Tree Protection Devices (TPD), tree protection fencing, and relevant signage. It is recommended that suitably qualified arborist is engaged prior to works commencing in the subject land. Further details on tree protection measures are outlined in the Arboricultural Impact Assessment (2024).

8.7.4. Sedimentation Control Measures

The project may result in erosion and transport of sediments because of soil disturbance during construction. In order to prevent this impact, construction activities will be undertaken in accordance with "The Blue Book" (Landcom 2004). These include implementation of the following measures:

- Installation of sediment control fences;
- Covering soil stockpiles; and
- Avoiding soil disturbance prior to heavy rainfall.

8.7.5. Pre-clearance Surveys

To avoid impacts to fauna species during construction, pre-clearing surveys are to be undertaken by a suitably qualified ecologist. Pre-clearing surveys will be undertaken ahead of clearing, to limit fauna injury and mortality and to identify habitat features to be relocated. Pre-clearance surveys will be conducted by suitably qualified ecologists and all fauna found during these surveys will be encouraged to move on or relocated by the ecologists into the retained Cumberland Plain Woodland in the conservation area.

Pre-clearing surveys will include:

- Demarcation of key habitat features as hollow-bearing trees and nests;
- Checking trees for the presence of bird nests and arboreal mammals, such as possums, and bats;
- Animals found to be occupying trees and habitat will be safely removed and relocated into nearby wooded habitat;
- Identification and nomination of hollow-bearing trees or hollows to be salvaged and used for site remediation; and
- Provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature, and a record of all fauna species encountered.

Although the loss of hollows will be offset in accordance with the BAM, additional mitigation measures recommended in the Canterbury-Bankstown DCP that included salvage of hollows that are structurally sound will enhance biodiversity values within the study area. Studies have found that the re-use of hollows, particularly

large hollows, provides higher potential for uptake success compared to artificial nest boxes (Central Coast Council 2016).

Where feasible, salvaged hollows could potentially be relocated to suitably sturdy trees within the retained Cumberland Plain Woodland in the conservation area, or within the proposed parks (subject to public safety considerations). Identification of potential relocations sites can form part of future environmental management plans that generally form part of conditions of consent.

8.7.6. Staging of Clearing

In accordance with the Canterbury-Bankstown DCP, clearing will not occur during the breeding season of birds (winter-spring), and the timing of any vegetation removal will occur after consultation and approval from the project ecologist to reduce the risk on native fauna species.

The clearing will be conducted using a two-stage clearing process as follows:

Stage 1: Clearing will commence following the identification of potential habitat features by a qualified ecologist. Hollow-bearing trees marked during pre-clearing will not be cleared during the first stage; however, all vegetation around these trees will be cleared to enable isolation of the feature. All trees (as set out in the Canterbury-Bankstown DCP) and other habitat features, such as hollow-bearing logs, can be removed during Stage 1 only if done under supervision by a qualified ecologist. Identified hollow-bearing trees will be left at a minimum overnight after Stage 1 clearing to allow resident fauna to voluntarily move from the area.

Stage 2: After hollow-bearing trees have been left overnight, the trees will be cleared using the following protocols:

- Trees marked as containing hollows will be shaken by machinery prior to clearing to encourage any animals remaining to leave the hollows and move on;
- Use a bulldozer or excavator to start pushing the tree over. Move the bulldozer over the roots and continue gently pushing the tree over;
- Remove branches with hollows and sections of trunk and set aside for immediate transfer to a storage area for placement within retained vegetation; and
- All hollows will be investigated by an ecologist for the presence of fauna following felling of the tree.

The felled habitat tree will be left overnight to allow any remaining fauna time to leave the hollows and move on.

The two-stage clearing process enables fauna a chance to self-relocate upon nightfall, when foraging typically occurs.

Provisions will be made to protect any native fauna during clearing activities by the following means:

- All staff working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;

- Animals disturbed or dislodged during the clearance but not injured will be assisted to move to adjacent bushland or other specified locations; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanised).

Provision of a report following the completion of clearing works will be provided detailing the total number and species of individuals recorded and details of their release/health

8.7.6.1. Vegetation Clearance Timing

The clearance of woodland shall only occur outside of Winter (June, July and August) when fauna (particularly microchiropteran bats) are most likely to self-relocate during the clearing.

8.7.7. Landscaping

Residential development areas are proposed to be landscaped using native species to the fullest extent feasible, thus providing additional 'stepping stone' movement habitat as well as foraging resources for native species in the long term. While the landscaped areas will not be regenerated to Cumberland Plain Woodland, the proposed landscaping will provide additional habitat and connectivity for native species within the site.

Landscaping should be undertaken in accordance with the Canterbury-Bankstown DCP which has the objective of a 35% tree canopy target through retention of existing trees and the planting of the following tree species:

- *Eucalyptus moluccana* (Grey Box);
- *Eucalyptus tereticornis* (Forest Red Gum);
- *Eucalyptus crebra* (Narrow-leaved Ironbark);
- *Eucalyptus eugenioides* (Thin-leaved Stringybark);
- *Eucalyptus maculata*/*Corymbia maculata* (Spotted Gum); and
- *Eucalyptus fibrosa* (Red Ironbark).

It should be noted that Mirvac are currently propagating trees from seeds retrieved from the conservation area to be planted in the subject land following the construction of houses to reach the 35% tree canopy target with the subject land. As of time of writing, there are enough trees that have been propagated from the conservation area in the onsite nursery for 83% of the proposed landscaping.

8.7.7.1. Habitat Corridor

The Landscape Plan has also proposed a connected canopy between the M5 Transition Corridor along the southern boundary of the subject land, through to the northern conservation area, and west to the Milperra Reserve (**Figure 18**). The southern park vegetation will connect directly to the M5 Transition Corridor, and this will be connected to the central park vegetation through a connected canopy of street trees, which will largely be representative of Cumberland Plain Woodland. The central park vegetation will be directly connected

through the canopy to the conservation area through the planted street trees (again, representative of Cumberland Plain Woodland), and the conservation area will be connected to the west to the retained Ironbarks in the northern basin to the vegetation in the Milperra Reserve.

The canopy layer within the subject land is currently sparse, and only highly aerial species such as birds and bats could utilise the 'stepping stone' habitat available. The proposed connected canopy from south to north, and from the M5 Transition Corridor to the conservation area and Milperra Reserve, would provide habitat connectivity for less mobile species, such as the threatened Squirrel Glider, or common species such as Ringtail Possums.

8.7.8. Vegetation Management Plan

As part of the project, a Vegetation Management Plan (VMP) has been prepared for the area of retained Cumberland Plain Woodland in the conservation area (our reference – 23021RP5).

The VMP provides guidelines for the revegetation, regeneration and management of vegetation of Cumberland Plain Woodland that is broadly representative of the original community found within the study area. Thus, under the VMP, the condition of existing Cumberland Plain Woodland will be enhanced, creating higher quality habitat for native fauna and flora species.

8.7.9. Fencing and Signage

Areas set aside for revegetation and conservation are to be fenced off to protect areas from inappropriate access, and trampling while revegetation works are undertaken.

8.7.10. Nest Box Installation

To mitigate any potential impacts on native fauna associated with the removal of hollow-bearing trees, nest boxes are proposed to be installed as part of the project. Nest boxes are proposed to be erected at a 1:1 ratio within the existing native trees within the retained vegetation in the study area. The nest boxes are to be monitored every six months and replaced or repaired as necessary. Further details are outlined in the Hollow Offset Replacement Strategy and Nestbox Management Plan (Cumberland Ecology 2024) (our reference: 23021RP4).

8.8. Mitigation of Prescribed Impacts

The following mitigation measures, described in **Section 8.7**, are relevant to the prescribed impacts applicable to the project:

- Delineation of clearing limits;
- Pre-clearance survey;
- Staging of clearing;
- Structure removal supervision;
- Sedimentation control measures; and

- Landscaping.

No additional mitigation measures are proposed for prescribed impacts.

8.8.1. Vehicle Strike

The following mitigation measures are proposed for the prescribed impact of vehicle strike:

- Signage: appropriate signage notifying vehicles of potential fauna presence should be installed along the access road;
- Speed limits: Speed limits will be introduced to restrict the speed of vehicles travelling along the access road; and
- Lighting: Low wattage lighting, and minimal / well-spaced streetlights should be considered. The use of lights with flat glass aero screen rather than reflector glass covers may be an option to reduce glare, thus reducing impact on nocturnal fauna. The location of streetlights is subject to the final road design plans.

Table 29 Summary of mitigation measures for impacts to native vegetation and habitat

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk Consequences and of Residual Impacts
Weed management	Appropriate weed control activities will be undertaken in accordance with the Greater Sydney Regional Strategic Weed Management Plan 2023 – 2027 (LLS: Greater Sydney 2022)	Construction	Prior to construction, following vegetation clearing	Contractor	High	Spread of weeds throughout the subject land and surrounding land.
Delineation of clearing limits	Clearing limits marked either by high visibility tape on trees of metal/wooden pickets, fencing or an equivalent boundary marker. Disturbance, including stockpiling, restricted to clearing limits.	Construction	Once	Contractor	High	Unnecessary damage to trees to be retained.
Tree protection measures	Inductions to communication tree protection measures. Installation of fences around specified tree protection zones. All tree work is to be carried out by a suitably qualified and insured Arborist.	Construction	Throughout construction period	Contractor	High	Unnecessary damage to trees to be retained within the subject land.
Sedimentation control	Construction activities will be undertaken in accordance with “The Blue Book” (Landcom 2004). These include implementation of the following measures: • Installation of sediment control fences; • Covering soil stockpiles; and • Avoiding soil disturbance prior to heavy rainfall	Construction	Throughout construction period	Contractor	High	Sedimentation into retained and adjoining vegetation.

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk Consequences and Residual Impacts
Pre-clearance survey	Pre-clearance surveys will be conducted in all areas of vegetation that are required to be cleared. Pre-clearing surveys will be undertaken within one week of clearing. Habitat features will be marked during the pre-clearing survey.	Construction	Once	Contractor	Moderate	Increased and unnecessary mortality of native fauna.
Staging of clearing	Vegetation clearing will be conducted using a two-stage clearing process. Animals disturbed or dislodged during the clearance but not injured will be assisted to move to adjacent bushland or other specified locations. If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized)	Construction	Once	Contractor	High	Increased and unnecessary mortality of native fauna.
Landscaping	Landscaping and the planting of street trees within the study area should have an overall canopy cover of a minimum of 35% in accordance with the Canterbury-Bankstown DCP, using a mixture of the species listed in Section 8.7.7. The Landscape Plan has also proposed creating a connected habitat corridor through the canopy of trees representative of Cumberland Plain Woodland, providing connectivity between the M5 Transition Corridor in the	Construction	Once	Contractor	High	Loss of habitat and connectivity

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk Consequences and Residual Impacts
	south and the conservation area and Milperra Reserve in the north.					
Vegetation Management Plan	A VMP providing guidelines for the revegetation and management of the conservation area has been prepared.	Concurrent with construction works	As per VMP schedules, likely over a minimum period of 5 years	Contractor	Moderate	Loss of habitat and connectivity
Nest Box Installation	Installation of nest boxes at a 1:1 ratio in retained trees in the study area in accordance with the Hollow Offset Replacement Strategy and Nestbox Management Plan.	Prior vegetation clearing	Once	Project ecologist	Low	Reduction in available fauna habitat
Fencing and signage	Fencing and signing of conservation and revegetation areas.	Construction and operation	Throughout duration of the civil works	Contractor	Moderate	Trampling of vegetation, failure of revegetation, disturbance to fauna

8.9. Adaptive Management of Uncertain Impacts

The project is considered unlikely to result in any uncertain impacts that require adaptive management.

8.10. Use of Biodiversity Credits to Mitigate or Offset Indirect or Prescribed Impacts

Due to the small scale of indirect and prescribed impacts, the project does not propose to use additional biodiversity credits to mitigate or offset these impacts.

9. Thresholds for Assessment

9.1. Introduction

The assessment thresholds that must be considered include the following:

- Impacts on an entity that is at risk of a serious and irreversible impact;
- Impacts for which the assessor is required to determine an offset requirement;
- Impacts for which the assessor is not required to determine an offset requirement; and
- Impacts that do not require further assessment by the assessor.

The following sections outline these assessment thresholds and their relevance to the project.

9.2. Impacts on Serious and Irreversible Impact Entities

One SAI entity, Cumberland Plain Shale Woodland CEEC, will be impacted by the project. The location of the Cumberland Plain Shale Woodland in relation to the subject land is shown in **Figure 19**. A total of 0.69ha of Cumberland Plain Shale Woodland will be impacted, including 0.52ha of total removal and 0.17ha of partial removal with only understorey being affected, within the subject land. Section 9.1 of the BAM requires the provision of additional information regarding SAI entities that are TECs. The additional information is required to assist the consent authority to evaluate the nature of an impact on a potential entity at risk of a serious and irreversible impact.

The additional information requirements, and the responses to each requirement, are shown in **Table 30**.

Table 30 Additional impact assessment provisions for Cumberland Plain Woodland

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
1	The action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAI (or reference to where these have been addressed in the relevant section of the BDAR)	Avoidance of impacts to biodiversity values is addressed in detail in Chapter 7 of this BDAR.
2	The assessor must consult the TBDC and/or other sources to report on the current status of the TEC including:	-
(a)	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)	The current total geographic extent of Cumberland Plain Woodland varies depending on the source interrogated. The current extent of Cumberland Plain Woodland in the TBDC is described as only less than 9% of the original extent remaining and does not include a conclusive total area for the community. BioNet Vegetation Classification Database estimates the current area of occupancy of the community based on the PCTs conforming to Cumberland Plain Woodland (3319, 3320) as approximately 11,153 ha of the original 'Pre-European Extent' published on the database of 130,605 ha. The Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011) identifies that the TEC is restricted in geographic distribution to the Sydney Basin Bioregion and was estimated to have an extant area of approximately 11,054 ha ($\pm 1,564$

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	ha) according to mapping by (Tozer 2003), which covered the Cumberland Plain. This is reported by the final determination as being a reduction from the 'pre-European distribution' by 8.8% ($\pm 1.2\%$) suggesting the pre-European distribution of the community to cover approximately 125,613 ha. Cumberland Plain Woodland is also associated with a targeted recovery plan for the Cumberland Plain that was prepared by the Department of Environment, Climate Change and Water (DECCW) in 2011 (DECCW 2011). This document is the currently accepted standard for the retention and recovery of TECs in the Cumberland Plain. Table 2 of the recovery plan displays an estimated current total of Cumberland Plain Woodland of 24,530 ha, however, it is reported that a small portion of this total does not meet the listing criteria for the TEC. The same table also estimates the 'pre-1750 (ha)' total of the community at 125,449 ha being a reduction in area to current levels of approximately 19.5%. Of the current total area, the recovery plan reports approximately 967 ha identified as occurring within reserves. According to the Threatened Ecological Communities Greater Sydney mapping dataset (DPIE 2021), the current extent of Cumberland Plain Woodland in NSW is approximately 21,951 ha. This mapping dataset has been derived from the extraction of relevant vegetation map units contained in a variety of existing vegetation mapping projects held by DCCEEW and expert input. However, it is noted that the dataset acknowledges that one of the limitations of the dataset is that areas

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	identified as TEC may be a different TEC. The extent of this mapping in relation to the subject land and study area is shown in Figure 19. Following a review of the above information for the extent of Cumberland Plain Woodland, both current and prior to European settlement, it is clear there is some variation in area calculations. Therefore, the total current area of the community is likely to be in the middle of these areas. It is noted however, that it is unanimously accepted by all sources that the community has suffered extensive clearing to a level that the community requires significant external intervention to maintain and recover the community within the Sydney Basin Bioregion. The estimated reduction in the geographic extent of Cumberland Plain Woodland since 1970 is not available in the TBDC, BioNet Vegetation Classification Database, the final determination or the recovery plan, and was not identified from a search of available literature. Nonetheless, the pre-European extent of Cumberland Plain Woodland is listed as approximately 125,449 ha within the Cumberland Plain Recovery Plan (DECCW 2011). No published data was found in the literature on the 1970 extent of Cumberland Plain Woodland and an accurate estimate of the reduction in distribution between the current extent and the 1970 geographic extent cannot be provided.

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
(b)	The 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: Change in community structure Change in species composition Disruption of ecological processes Invasion and establishment of exotic species Degradation of habitat; and Fragmentation of habitat	According to the Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011), there has been a very large reduction in the ecological function of the community through processes such as: • Extensive removal of large old trees; • Tree-felling for crops and pastures; • Fragmentation of habitat; • Grazing by livestock and rabbits; • Modification of understory, to be dominated by woody exotic species; • Soil chemical and structural modification associated with agricultural uses; • Changes in frequency of fire regimes; • Prevention of recruitment of species, through continued under-scrubbing and mowing; and • Reduction of understorey complexity, through the reduction of native shrub cover, resulting in degradation of habitat.
(c)	Evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the: extent of occurrence area of occupancy, and number of threat defined locations	Paragraph 11 of the NSW Scientific Final Determination for Cumberland Plain Woodland (NSW Scientific Committee 2011) notes that the community is restricted in geographic distribution to the Sydney Basin Bioregion, however it is noted that this is based on an estimated extant area of 2,810 km², which was established from outdated mapping undertaken by (Tozer 2003).

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria		Response
		Based on current available information it is estimated that the current area of occupancy is between approximately 11,000 ha and 25,000 ha according to resources reviewed for Criteria 2(a). No threat defined locations are specifically identified in the TBDC, however the ecological community is critically endangered across its range. According to the Final Determination (NSW Scientific Committee 2011), small, protected areas of the community exist in reserves such as Kemps Creek, Mulgoa and Windsor Downs, Scheyville National Park, and Leacock, Rouse Hill and Western Sydney Regional Parks.
(d)	Evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation)	This principle is not identified as applicable to BDARs. The TEC does respond to management, with several successful management measures outlined in the Best Practice Guidelines for Cumberland Plain Woodland (DEC 2005).
3	Where the TBDC indicates that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Section 9.1.1(2), the assessor must record this in the BDAR.	Not applicable.
4 (a)	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: in hectares; and as a percentage of the current geographic extent of the TEC in NSW	The proposal will remove approximately 0.5ha canopy only and 0.02ha exotic ground Cumberland Plain Woodland and will remove 0.17ha of understorey only of the exotic ground Cumberland Plain Woodland, most of which consists of canopy overhang over a pre-existing road (as explained in Section 8.6)

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	The extent of the TEC in NSW differs depending on the information source. Based on a review of vegetation mapping layers, the estimated geographic extent in NSW varies between approximately 11,000 ha and 25,000 ha according to resources reviewed for <i>BAM Section Criteria 2. a)</i>. Based on the existing literature, the lowest number quoted for the estimated geographic extent of Cumberland Plain Woodland is 11,054 ha (NSW Scientific Committee 2011). Based on the lower of the numbers outlined above, the extent of Cumberland Plain Woodland to be impacted by the project is less than 0.006% of the current geographic extent of the TEC in NSW.
(b) 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:	-
Estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500m of the development footprint or equivalent area for other types of proposals	The project is not likely to significantly increase fragmentation or isolation of an important area of the TEC, as it requires minor clearing of a modified patch of this community. While the removal of PCT 3320 from within the subject land will result in a slight reduction in the overall size of the stepping stone 'patches' of Cumberland Plain Woodland extending from the study area into the subject land, it will not result in an increase in fragmentation of the TEC or lead to further isolation of patches of the TEC.

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
(c) Describing the impacts on connectivity and fragmentation of the remaining areas of the TEC measures by:	Based on the TEC Greater Sydney mapping (DPIE 2021), there are no occurrences of Cumberland Plain Woodland (or PCT 3320) within 500m of the subject land, outside of the study area. Therefore, the impact on 0.69ha represents approximately 23% of the occurrence of the TEC within the locality of the study area.
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	The removal of Cumberland Plain Woodland within the subject land will result in minor fragmentation of the locally occurring patch of native vegetation which will remain connected across the study area and wider locality.
Estimated maximum dispersal distance for native flora species characteristic of the TEC, and	The main dispersal mechanisms for flora species associated with Cumberland Plain Woodland include one or a combination of the following: • Animals, • Wind, • Water runoff, and • Gravity. Eucalypts within the community are likely to rely on animal assisted dispersal by highly mobile vertebrate pollinators (birds and bats) which disperse pollen over large areas when foraging (Southerton et al. 2003). The maximum dispersal distance for native flora species characteristic of the community is estimated to be at least 1000 m and potentially much further.

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	Although the patch of native vegetation will be fragmented, this will be minor, and the dispersal distances will not increase as a result of the project. It has also been proposed that the landscape street planting will use canopy species diagnostic of Cumberland Plain Woodland, and so the fragmentation will only be short term.
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	The areas of Cumberland Plain Woodland within the subject land largely occur as remnant native trees over a mown, an exotic dominated understorey or an entirely exotic 'garden' understorey. The change in the area to perimeter ratio of Cumberland Plain Woodland as a result of the development is negligible, considering only trees along the edge of the TEC and scattered occurrences are being removed in the subject land. As the proposed landscaping works will improve the current connectivity between the scattered occurrences of Cumberland Plain Woodland in the subject land and the good quality Cumberland Plain Woodland in the conservation area, and the proposed revegetation works will also improve the area to perimeter ratios for the overall Cumberland Plain Woodland 'patch'.
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.	The occurrence of Cumberland Plain Woodland within the subject land corresponds to three vegetation zones – canopy only, mown and exotic ground. The intact condition state has been referenced throughout this BDAR due to its proximity to the subject land.

BAM Section 9.1.1 Additional Impact Assessment Provisions Criteria	Response
	As per the BAM plot data, the calculated integrity scores are: Canopy Only: The vegetation integrity score is: 23.4 The composition score is: 5.6 The structure score is: 52.4 The function score is: 43.9 Mown: The vegetation integrity score is: 54.6 The composition score is: 35.6 The structure score is: 78.4 The function score is: 58.3 Exotic Ground: The vegetation integrity score is: 54.2 The composition score is: 29.2 The structure score is: 76.1 The function score is: 71.7
5 The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAIL is not accurate.	Not applicable.

9.3. Impacts that Require an Offset

9.3.1. Native Vegetation

In accordance with the BAM, the project requires offsets for the clearing of native vegetation as the following criteria is met:

- A vegetation zone that has a vegetation integrity score ≥ 15 where the PCT is representative of an EEC or CEEC.

The PCT and vegetation zone requiring offsets is documented in **Table 31**. This area is mapped in **Figure 20**. A credit summary report is provided in **Appendix C**.

Table 31 Summary of impact to native vegetation requiring an offset

Zone	PCT	PCT Name	MZ	Area (ha)	VI Score Loss	Credits
1	3320	Cumberland Plain Shales Woodland (Canopy Only)	MZ1	0.50	-19.5	7
			MZ5	0.10		
2	3320	Cumberland Plain Shales Woodland (Mown)	MZ3	0.07	0	1
			MZ4	0.08		
3	3320	Cumberland Plain Shales Woodland (Exotic Ground)	MZ1	0.02	-18	4
			MZ2	0.17		
			MZ3	0.05		
5	4025	Cumberland Red Gum Riverflat Forest (Canopy Only)	MZ4	0.11	-25.4	1
			MZ1	0.06		

9.3.2. Threatened Species

In accordance with the BAM, the project requires offsets for the clearing of species credit species habitat. The species credit species habitat requiring offsets is documented in **Table 32** and the areas subject to threatened species offsetting is shown in **Figure 21**.

Table 32 Summary of impacts to threatened species requiring an offset

Scientific Name	Common Name	Vegetation Zones	Biodiversity Risk Weighting	Area (ha)
<i>Acacia pubescens</i>	Downy Wattle	3320_Exotic Ground	2	0.34
<i>Myotis macropus</i>	Southern Myotis	4025_Canopy	2	0.06

9.4. Impacts that do not Require an Offset

Impacts on planted native vegetation do not require offsets as the planted native vegetation has been assessed utilising the streamlined assessment module for planted native vegetation outlined in Section D.1 of Appendix D of the BAM (see **Section 4.3.1**). Measures recommended to mitigate impacts on native fauna (including threatened species) are detailed in **Section 8.7-8.8**.

MZ3 and MZ4 do not require an offset because the vegetation within them is already maintained as an existing APZ, and this will continue under the VMP. MZ3 and MZ4 within the subject land occupy an area of 0.13ha and 0.2ha respectively, as shown in **Figure 21**.

9.5. Impacts that do not Require Further Assessment

Impacts to areas identified as exotic vegetation and cleared land within the subject land do not require further assessment. This occupies 8.45ha within the subject land and is shown in **Figure 22**.

9.6. Application of the No Net Loss Standard

The BAM sets a standard that will result in no net loss of biodiversity values where the impacts on biodiversity values are avoided, minimised and mitigated, and all residual impacts are offset by retirement of the required number of biodiversity credits.

The ecosystem credit requirement for the project is summarised in **Table 33**, whilst the 'like for like' offsetting options for the ecosystem credits are provided in **Table 34**. The species credit requirement for the project is summarised in **Table 35**.

A credit summary report from the BAM-C has been included in **Appendix C**.

Table 33 Summary of ecosystem credit liability

Zone	Vegetation Zone Name	Sensitivity to Gain	Area (ha)	Credits Required
1	3320_Canopy	High sensitivity to potential gain	0.60	7
2	3320_Mown	High sensitivity to potential gain	0.15	1
3	3320_ExoticGround	High sensitivity to potential gain	0.34	4
4	4025_Canopy	High sensitivity to potential gain	0.06	1

Table 34 Like for like offsetting options for PCT 3320

TEC	Containing Hollow-bearing Trees?	In the below IBRA Subregions	Credits
Cumberland Plain Woodland in the Sydney Basin Bioregion. This	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	7

TEC	Containing Hollow-bearing Trees?	In the below IBRA Subregions	Credits
includes PCTS 3320 and 3319			
Cumberland Plain Woodland in the Sydney Basin Bioregion. This includes PCTS 3320 and 3319	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	1
Cumberland Plain Woodland in the Sydney Basin Bioregion. This includes PCTS 3320 and 3319	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	4
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	Yes	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.	1

Table 35 Summary of the species credit liability

Scientific Name	Common Name	Area (ha)	Credits Required
<i>Acacia pubescens</i>	Downy Wattle	0.34	3
<i>Myotis macropus</i>	Southern Myotis	0.06	1

10. References

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APPENDIX A :

BAM Compliance Table

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
Introduction	Information		
	Introduction to the biodiversity assessment including:		
	identification of development/biodiversity stewardship site footprint, including:		Section 1.4
	operational footprint		
	construction footprint indicating clearing associated with temporary construction facilities and infrastructure		
	general description of development/biodiversity stewardship site		Section 1.4.5
	sources of information used in the assessment, including reports and spatial data.		Section 1.5, Section 2.1
Landscape Features	Maps and Data		
	Site Map (as described in Section 4.2)		Figure 2
	Location Map (as described in Section 4.2)		Figure 3
	Digital shape files for all maps and spatial data		To be provided in BOAMs
	Information		
Landscape Features	Identification of landscape features at the development/biodiversity stewardship site, including:		
	IBRA bioregions and subregions, NSW landscape region and area (ha)	Subject land area (ha) IBRA bioregions and subregions	Figure 2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		BioNet NSW Landscapes	
	native vegetation extent in the buffer area		Figure 2
	cleared areas	Cleared areas	Figure 3
	evidence to support differences between mapped vegetation extent and aerial imagery		N/A
	rivers and streams classified according to stream order	Rivers, streams and estuaries	Section 3.2.2, Figure 3
	wetlands within, adjacent to and downstream of the site	Wetlands within, adjacent to and downstream of the site	Section 3.2.3, Figure 3
	connectivity features	Connectivity of areas of habitat including areas identified as priority investment areas, flyways for migratory species	Section 3.2.4, Figure 8
	areas of geological significance and soil hazard features	Areas of geological significance and soil hazard features	Section 3.2.5, Section 3.2.8
		Areas of Outstanding Biodiversity Value	Section 3.2.6
	site context components, including: identification of method applied (i.e. linear or site-based) percent native vegetation cover in the landscape (development site and biodiversity stewardship site).	Percent native vegetation cover including: buffer area justification to support differences between aerial imagery used for the assessment and final mapped native vegetation cover.	Section 3.3
	Maps and Data		
	IBRA bioregions and subregions (as described in Paragraphs 4.2.1.3–4.2.1.4)	IBRA bioregions and subregions	Figures 2 and 3

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	NSW landscape regions (as described in Paragraph 4.2.1.5)	BioNet NSW landscapes	Figures 2 and 3
	Rivers and streams (as described in Paragraph 4.2.1.6)	Rivers, streams (using Strahler stream ordering) and estuaries	Figure 3
	Wetlands (as described in Paragraph 4.2.1.7)	Wetlands	Figure 3
	Connectivity of different areas of habitat (as described in Paragraphs 4.2.1.8–4.2.1.11)	Connectivity	Figures 2 and 3
	Areas of geological significance and soil hazard features (as described in Paragraphs 4.2.1.12–4.2.1.15)	Areas of geological significance and soil hazards	Figures 2 and 3
	Native vegetation extent (as described in Subsection 4.3.2)	Native vegetation cover	Figure 3
		Boundary of the subject land	Figure 2
		Areas of Outstanding Biodiversity Value	Not applicable – See Section 3.2.6
Native Vegetation	Information		
	Identify native vegetation extent within the development/biodiversity stewardship site, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery.	Native vegetation cover on subject land and justification to support differences between mapped native vegetation cover and aerial imagery.	Section 4.1 and Figure 9
	Describe PCTs within the development/biodiversity stewardship site, including:	PCTs within the subject land, including:	Section 4.2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	vegetation class	vegetation class	Section 4.2
	vegetation type	vegetation type (i.e. PCT names and ID numbers)	Section 4.2
	area (ha) for each vegetation type	area (ha)	Table 8
	species relied upon for identification of vegetation type and relative abundance	species relied upon for identification of vegetation type and relative abundance	Section 4.2
	justification of evidence used to identify a PCT (as outlined in Paragraph 5.2.1.12)	evidence and justification of decision pathway used in identification of PCT (e.g. vegetation structure and landscape position/geomorphology).	Section 4.2, Table 9, Table 11
	TEC status (as outlined in Paragraphs 5.2.1.14–5.2.1.15)	TEC status	Section 4.4
	estimate of percent cleared value of PCT (as outlined in Paragraph 5.2.1.16)	estimate of percent cleared value of the PCT (available in the BioNet Vegetation Classification)	Section 4.2
	Perform a vegetation integrity assessment of the development/biodiversity stewardship site, including:	Vegetation integrity assessment of the subject land, including:	Section 4.5
	mapping vegetation zones (Subsection 5.3.1)	description of vegetation zones within the subject land with justification for assigning vegetation zones to PCTs area (ha) of each vegetation zone	Section 4.2, Figure 13
	patch size (development site and biodiversity stewardship site)	patch size for each vegetation zone	Figures 2 and 3

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	assessing vegetation integrity using benchmark data (Subsection 5.3.3)		N/A
	survey effort as described in Subsection 5.3.4 (number of plots)	survey effort	Section 2.3, Table 3
	determining the vegetation integrity score (Appendix 6): composition condition score structure condition score function condition score vegetation integrity score.	composition, structure, function and vegetation integrity condition scores.	Section 4.5, Table 15
		Where use of local data is proposed, identify: source of information for local benchmark data justification of use of local data in preference to database values.	
	Maps and Data		
	Map of native vegetation extent within the development/biodiversity stewardship site (as described in Section 5.1)	Native vegetation extent within the subject land.	Figure 9
	Map of PCTs within the development/biodiversity stewardship site (as described in Section 5.2)	Distribution of PCTs within the subject land.	Figure 10
	Map of plot locations relative to PCTs	Plot locations relative to PCTs including GPS coordinates (GDS zone, eastings, northings and bearings)	Figure 6

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Map of TECs	TECs on the subject land	Figure 12
	Plot field data (MS Excel format)		To be provided in BOAMs
	Plot field data sheets	Plot field data and sheets	Collected in Survey123 application so no datasheets available
		Vegetation zones	
	Patch size of intact native vegetation (as described in Subsection 5.3.2)	Patch size of intact native vegetation	Figures 2 and 3
	Table of current vegetation integrity scores for each vegetation zone within the development/biodiversity stewardship site.	Table of vegetation integrity scores for each vegetation zone within the subject land	Table 16
Threatened Species	Information		
	Identify ecosystem credit species associated with PCTs on both the development site and biodiversity stewardship site as outlined in Section 6.2, including:		
	list of species derived	List of predicted ecosystem credit species associated with PCTs on the subject land	Section 5.2
	justification for exclusion of any ecosystem credit species predicted above.	Justification for exclusion of any ecosystem credit species predicted above	Section 5.2.2
	Identify species credit species on both the development site and the biodiversity stewardship site as outlined in Sections 6.3 to 6.5, including:	Identify species credit species on the subject land, including:	
	list of candidate species	list of candidate species assessed	Section 5.3

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	justification for inclusions and exclusions based on habitat features	justification for inclusions and exclusions of any species credit species predicted above based on habitat features, or vagrancy	Section 5.3.2
	indication of presence based on targeted survey or expert report	indication of presence based on targeted survey or expert report (see below)	Section 5.3.3
	details of targeted survey technique, effort, timing and weather	details of targeted survey including technique, effort, timing and weather	Chapter 2
	species polygons	species polygons	Figure 15
	biodiversity risk weighting for the species	biodiversity risk weighting for the species	Table 32
		area of suitable habitat or number of individuals counted	Section 5.3.4
	threatened species survey		
	additional requirements for wind farm developments.		N/A
	Where use of local data is proposed:	Where use of local data is proposed:	N/A
	identify relevant species	identify relevant species or population	N/A
	identify aspect of species data		N/A
	identify source of information for local data	identify source of information for local data	N/A
	justify use of local data in preference to database values.	justify use of local data in preference to database values.	N/A
	Where expert reports are used in place of targeted survey:	Where expert reports are used in place of targeted survey:	N/A
	identify the relevant species	identify the relevant species or population	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	justify the use of an expert report	justify the use of an expert report	N/A
	indicate and justify the likelihood of presence of the species and information considered in making this assessment	flag the likely presence of the species or population and the evidence to support this assessment including all information considered	N/A
	estimate the number of individuals or area of habitat (whichever unit of measurement applies to the species/individual) for the development site or biodiversity stewardship site, including a description of how the estimate was made	estimate the number of individuals or area of suitable habitat, including a description of how the estimates were made (e.g. reference populations, past reports)	N/A
	identify the expert and provide evidence of their expert credentials.	identify the expert and provide evidence of their expert credentials.	N/A
		Identify potential prescribed biodiversity impacts on threatened species.	N/A
	Maps and Data		N/A
	Table of habitats or habitat components and their sensitivity classes	Table of habitats or habitat components and their sensitivity classes.	N/A
	Table detailing the list of species credit species and presence status on site as determined by targeted survey, indicating also where presence was assumed and/or where presence was determined by expert report	Table detailing the list of species credit species; presence on subject land as determined by targeted survey, indicating where presence is assumed or by expert report.	N/A
		Mapped targeted survey locations including GPS coordinates of survey sites.	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Species credit species polygons (as described in Paragraph 6.4.1.33)	Species credit species polygons including GPS locations of any individuals counted.	N/A
	Table detailing species and habitat feature/component associated with species and its abundance on site (as described in Paragraph 6.4.1.34)	Table detailing species habitat features associated with the species and its location (GPS coordinates) and abundance on the subject land.	N/A
	Table detailing biodiversity risk weighting for species on site (as described in Section 6.6)	Table detailing biodiversity risk weighting for species credit species on the subject land.	N/A
		Map location of prescribed biodiversity impacts on the subject land	Figure 16
	For wind farm developments: maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site	For wind farm developments, maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species and raptor species resident on site.	
Avoid and Minimise Impacts	Information		
	Demonstration of efforts to avoid and minimise impact on biodiversity values in accordance with Chapter 8.	Demonstration of efforts to avoid or minimise impacts on native vegetation, threatened species habitat and prescribed impacts during project planning including: 1. locating the project –	Chapter 7

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		options considered (including maps and why they were not feasible/suitable) analyses associated with alternative options (e.g. routes, locations, sites within the property, constraints) justification for selecting proposed location 2. designing the project – temporary and permanent ancillary construction and maintenance facilities required for the proposal options for avoiding these features (e.g. alternative locations, engineering solutions, modes of technology, constraints) justification for selecting proposed location measures taken to minimise impacts long-term management of areas avoided.	
	Assessment of direct and indirect impacts unable to be avoided at the development site in accordance with Sections 9.1 and 9.2. The assessment would include but not be limited to: type, frequency, intensity, duration and consequence of impact.	Determination of the impacts on native vegetation and threatened species habitat including: describing impacts of clearing describing the nature, extent, frequency, duration and timing of indirect and prescribed impacts including during construction and operation phases, on adjacent vegetation	Chapter 8

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		calculating the change in VI score and habitat suitability	Section 8.1.2 and Section 8.2
		describing impacts that are uncertain and their management/mitigation	Section 8.9
		evaluating consequences of indirect and prescribed impacts	Section 8.3 and Section 8.4
		documenting limitations to data, assumptions and predictions.	N/A
	For major projects: details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (Section 9.4).		
	Maps and Data		
	Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility	Table of biodiversity mitigation measures to be implemented before, during and after construction to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility. Unique identifiers (e.g. BIO01) should be included for tracking through management plans and compliance auditing.	Table 29
		Map of alternative locations or sites within the development site that were considered when	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		locating and designing the project including constraints to the final selection.	
	Map of final project footprint, including construction and operation	Map of the final development site footprint, including demarcation of any prescribed impacts and measures to minimise impacts.	Figure 15
		Showing the areas of biodiversity value on the site map of where impact has been avoided will assist in demonstrating the reasonable measures that the proponent has taken to avoid and minimise impacts.	Figure 15
	Maps demonstrating indirect impact zones where applicable	Map of sites within the subject land likely to be impacted by direct, indirect and prescribed impacts where applicable.	Figure 20
Impact Summary	Information		
		Identification of impacts:	
	Identification and an assessment of the impacts which are potential serious and irreversible impacts, in accordance with Subsections 10.2.2 for impacts on CEECs and 10.2.3 for threatened species.	on entities at risk of a serious and irreversible impact (SAIL), including addressing the assessment criteria in Subsection 10.2.2 (TECs) and 10.2.3 (species) of the BAM All relevant information required by the consent authority to determine whether the proposed impact is serious and irreversible including:	Section 9.2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		clear documentation of the sources of information where confidence in the information provided is low or of questionable reliability how proposed additional measures will contribute to the recovery of the entity where information is not available, for example where impact thresholds for the entity have not been provided.	
	Identification of impacts requiring offset in accordance with Section 10.3.	requiring offsets	Section 9.3
	Identification of impacts not requiring offset in accordance with Paragraph 10.3.2.2.	not requiring offsets	Section 9.4
	Identification of areas not requiring assessment in accordance with Section 10.4.	not requiring further assessment.	Section 9.5
	Maps and Data		
		Mapped locations:	
	Map showing the location of serious and irreversible impacts	that support an entity at risk of a serious and irreversible impact (SAIL)	Figure 19
	Map of impacts requiring offset	where offsets are required	Figure 20
	Map of impacts not requiring offset	where offsets are not required, and	Figure 21
	Map of areas not requiring assessment	where no further assessment is required.	Figure 22

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		Maps illustrating the extent of a TEC or species distribution and any other data used to address the assessment criteria for an entity at risk of an SAIL.	Figure 20
Impact Summary	Information	The assessor is required to report on:	

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:		
	future vegetation integrity score for each vegetation zone at the development site (Equations 17 and 18 in Appendix 6)		Table 31
	change in vegetation integrity score (Subsection 9.1.3)		Table 31
		the biodiversity risk weighting (BRW) for each ecosystem and species credit requirement generated	Table 32
	number of required ecosystem credits for the impact of development on each vegetation zone at a development site (Subsection 11.2.3)	the number of ecosystem credits for each PCT/TEC	Table 33
	number of required species credits for each threatened species that is impacted on by development (Subsection 11.2.4).	the number of species credits for each species credit species impacted by the proposal	Table 35
	Maps and Data		
	Table of PCTs requiring offset and the number of ecosystem credits required		Table 33
	Table of threatened species requiring offset and the number of species credits required		Table 34
	Submitted proposal in the Credit Calculator	All digital data must be submitted using the Upload Files function in BOAMS:	To be submitted in BOAMs

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
		digital shape files for all maps and spatial data completion of all required data fields in BOAMS and the BAM-C. Finalised case in the BAM-C (can be returned to assessor for editing).	
Biodiversity Credit Report	Information		
	Credit classes for ecosystem credits and species credits at the development site.	biodiversity credit report from the BAM-C, which defines the number and class of ecosystem and species credits from the proposed impact.	Appendix C
	Maps and Data		
	Table of credit class and matching credit profile		Table 34

APPENDIX B :

Bat Analysis



BAT CALL ANALYSIS

27/4/2025

Client: SLR Consulting Australia Pty Ltd (Alix Murray)

Location: Western Sydney University in Milperra (2 Bullecourt Avenue).

Reporting standard

This report follows the nationally accepted standards for the interpretation and reporting of bat echolocation data (Reardon 2003). More recent versions these reporting standards are available from the Australasian Bat Society on-line at www.ausbats.org.au. Calls were analysed by Heidi Kolkert using Analook V4.2 bat call analysis software, Kaleidoscope and / or Audacity sound analysis software.

Methods for species identification

Echolocating bats produce a wide range of different shaped sounds in the form of pulses. These pulses can be viewed on a spectrogram and broken down into standard components for comparison (Pennay et al. 2004). Some bat species have distinctive echolocation calls that make them relatively easy to identify. However, many species have overlapping call frequencies and structures, making accurate identification difficult. Poor quality calls confound the issues of identifying species with similar call frequencies.

Call identification was based on existing call descriptions and keys presented in Pennay *et al.* (2004) as well as reference calls collected in New South Wales. Species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and Van Dyck & Strahan (2008) and spatial data stored on the NSW Bionet and Atlas of Living Australia (ALA 2025) and BatMap (Australasian Bat Society 2025).

Species names used in this summary follow Churchill (2008), except for *Ozimops* species, which follow Reardon *et al.* (2014).

Results

At least 12 species of insectivorous bat were recorded during the survey period (Table 1), including four threatened species listed under the *Biodiversity Conservation Act 2016*: the Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Little Bentwing-bat (*Miniopterus australis*), Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*) and Southern Myotis (*Myotis macropus*). Only one

or two positive bat calls from these threatened species were identified, with the bulk of the calls from *Chalinolobus* genus. Three further threatened species listed under the BC Act may have been recorded in the study area, including the Eastern Freetail-bat (*Micronomus norfolkensis*), Eastern Forest Bat (*Vespadelus pumilus*) and Eastern Cave Bat (*Vespadelus troughtoni*), however call profiles could not be differentiated from other similar calling bats on this occasion.

Notes on bat species calls not readily identifiable.

Chalinolobus gouldii was differentiated from other species by the presence of curved, alternating call pulses. Calls from *Ozimops* sp. were differentiated from *C. gouldii* by the presence of mainly flat pulses. Some alternating calls with short initial and down-sweeping tail were identified as probably *Micronomus norfolkensis*. When no determining call features are present however these species cannot be reliably separated.

Chalinolobus morio calls were differentiated from *Vespadelus* sp. by the presence of a down-sweeping tail and pulse alternation on the majority of pulses.

Both *Vespadelus troughtoni*, *V. pumilus* and *C. Morio* overlap in characteristic frequency. Usually these species can be reliably separated based on call shape. *Vespadelus troughtoni* has an up-sweeping tail whereas *C. morio* has a down-sweeping tail. In this instance the pulses had no tail or a mix of both and as such could not be reliably separated.

Miniopterus orianae oceanensis, *Vespadelus darlingtoni* and *V. regulus* have overlapping calls around the 44-47 kHz frequency range. *M. s. oceanensis* usually have longer-duration diagonal shaped body, a flat or down-swept tail and uneven consecutive pulses. Several calls had somewhat erratic pulse shape (e.g. some down-swept tails and some up-swept) and variable Fc, suggesting *M. o. oceanensis*. Long, high quality call sequences with regularly spaced consecutive pulses, few down-sweeping tails and lower characteristic frequencies were assigned to *Vespadelus darlingtoni*. Those calls which had no discerning characteristics could not be readily separated to species level.

Three *Nyctophilus* species (*Nyctophilus gouldi*, *N. geoffroyi* and *N. bifax*) have the potential to occur in the study area and overlap almost entirely in most frequency characteristics. All have steep near vertical call shapes. Calls belonging to the genus *Nyctophilus* could not be identified to genus level.

Myotis Macropus and *Nyctophilus* species have similar steep fragmented calls. *Myotis Macropus* can be separated by shape and pulse interval <75ms and an initial slope of greater than 400 octaves per second (OPS). Poor quality, short or fragmented calls which had a call interval between 75 and 95 ms and slope between 300 and 400 OPS could not be separated from the *Nyctophilus* sp. complex.

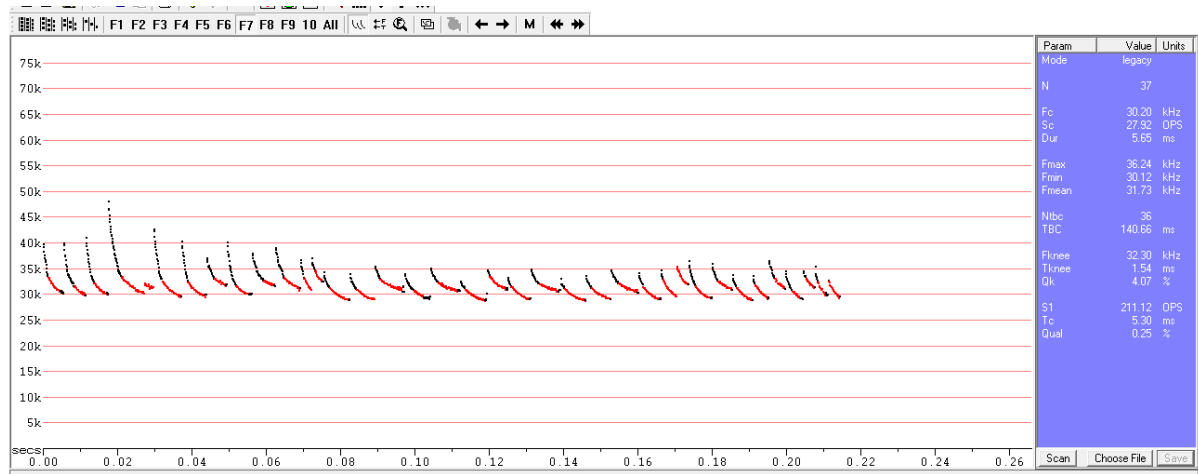
Table 1: Insectivorous bat calls recorded during the survey.

Scientific name	Common name	656183				656231			656258				711368			
		24/02/2025	25/02/2025	26/02/2025	27/02/2025	24/02/2025	25/02/2025	26/02/2025	24/02/2025	25/02/2025	26/02/2025	27/02/2025	24/02/2025	25/02/2025	26/02/2025	27/02/2025
Bat calls positively identified																
<i>Austronomus australis</i>	White-striped Freetail Bat						x		x				x		x	x
<i>Chalinolobus gouldii</i>	Chocolate Wattled Bat	x	x	x	x	x	x	x	x	x	x	x	x			x
<i>Chalinolobus morio</i>	Gould’s Wattled Bat	x	x	x	x	x	x	x	x		x			x		x
<i>Miniopterus australis</i> #	Little Bentwing Bat						x								x	
<i>Miniopterus orianae oceanensis</i> #	Eastern Bentwing Bat							x			x	x				
<i>Myotis macropus</i> #	Southern Myotis						x									
<i>Nyctophilus</i> sp.	Long-eared Bat Complex		x	x			x		x	x	x					
<i>Ozimops ridei</i>	Ride's Free-tailed Bat		x	x	x		x		x	x	x	x				
<i>Saccolaimus flaviventris</i> #	Yellow-Bellied Sheathtail Bat						x		x	x						
<i>Scotorepens orion</i>	Eastern Broad-Nosed Bat	x	x	x	x											
<i>Vespadelus darlingtoni</i>	Large Forest Bat					x	x	x			x					
<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat						x	x								
Bat calls not positively identified																
<i>Vespadelus</i> sp. or <i>C. morio</i>				x												
<i>Vespadelus troughtoni</i> # or <i>V. pumilus</i> # or <i>V. vulturnus</i>							x		x		x	x			x	
<i>V. darlingtoni</i> or <i>M. o. oceanensis</i> #		x	x												x	
<i>Micronomus norfolkensis</i> # or <i>C. gouldii</i>			x				x									
	Noise files	96	136	137	106	54	85	211	59	34	148	86	1012	1227	70	40
	Bat files	363	815	271	354	30	105	19	155	125	116	129	4	2	5	14
	Total files	459	951	408	460	84	190	230	214	159	264	215	1016	1229	75	54

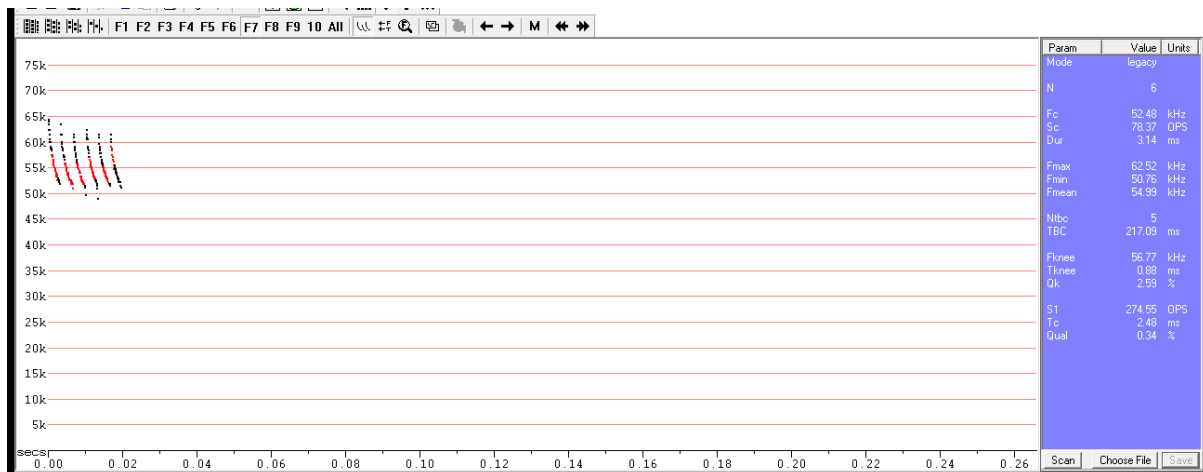
References

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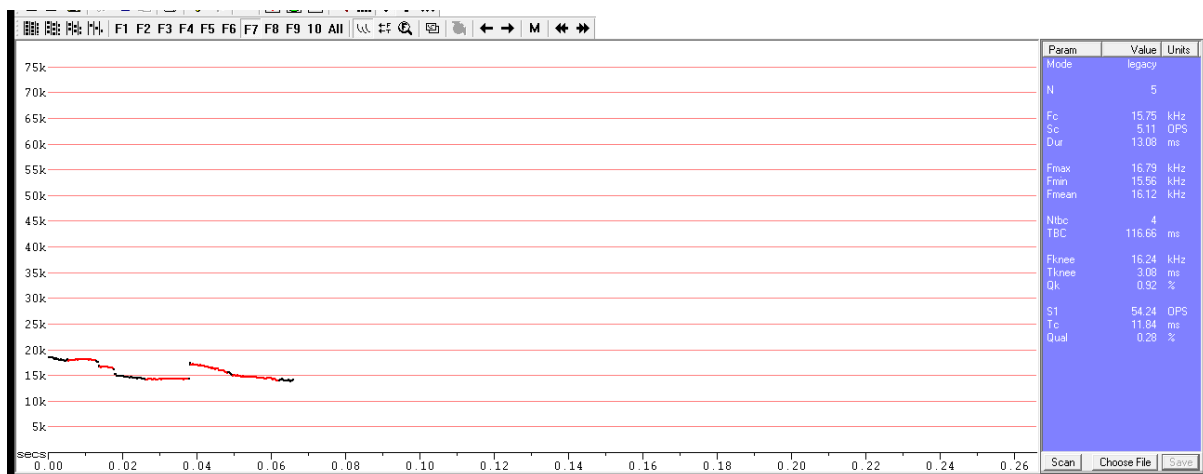
Example calls



Chalinolobus gouldii



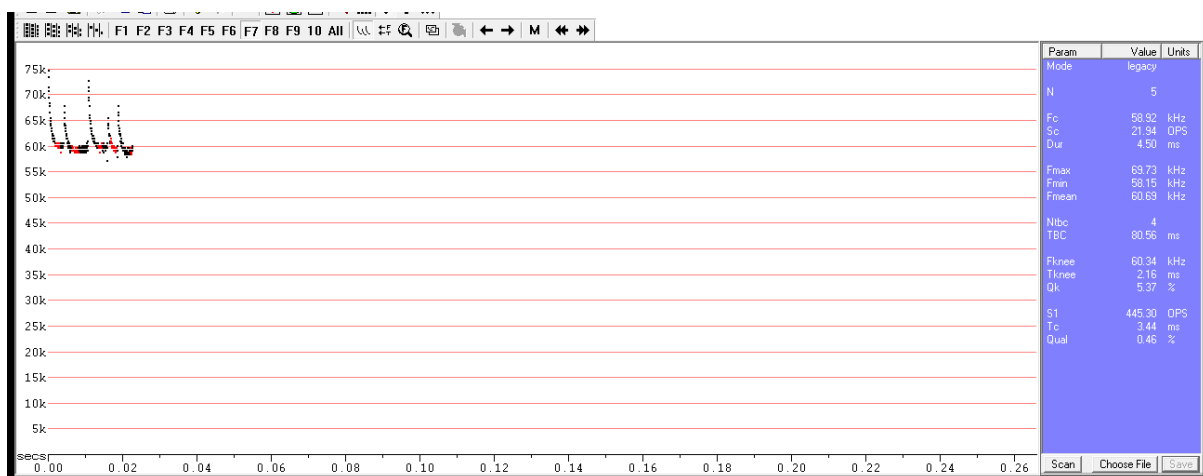
Chalinolobus morio



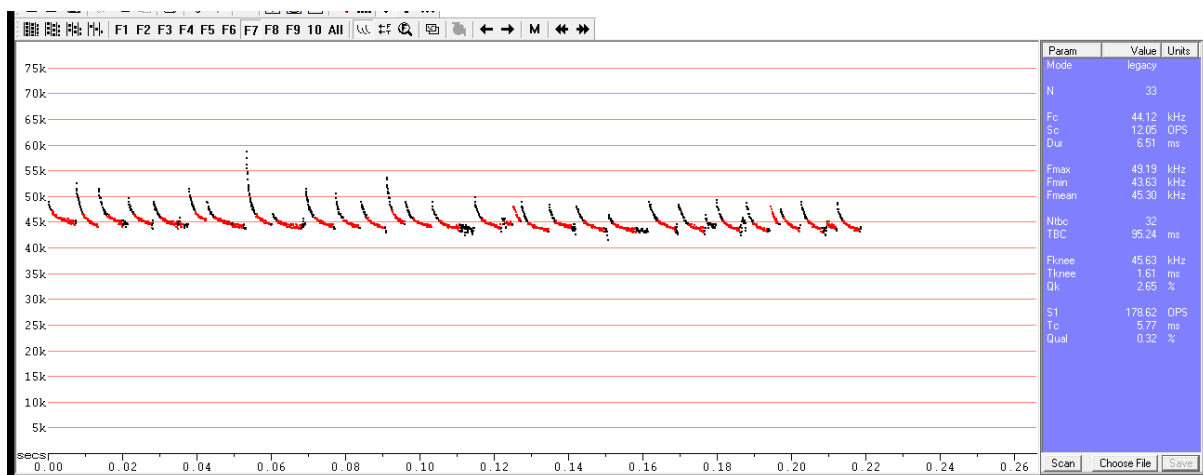
Austronomus australis



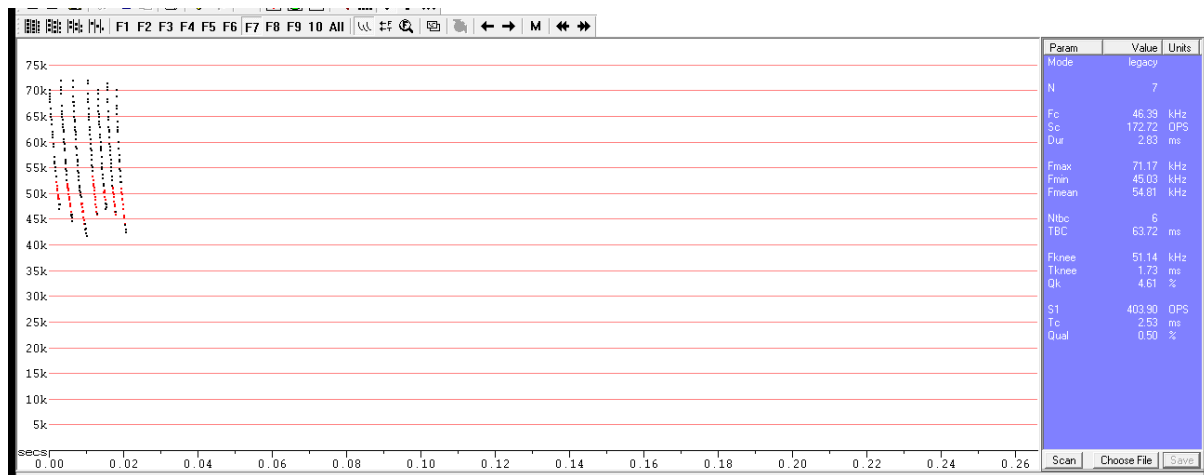
Ozimops ridei



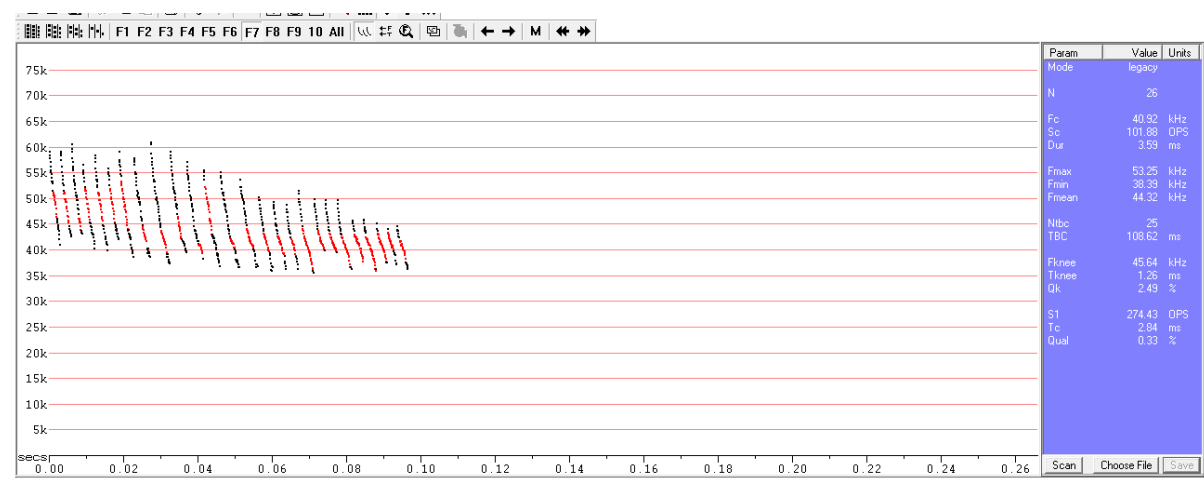
Miniopterus australis



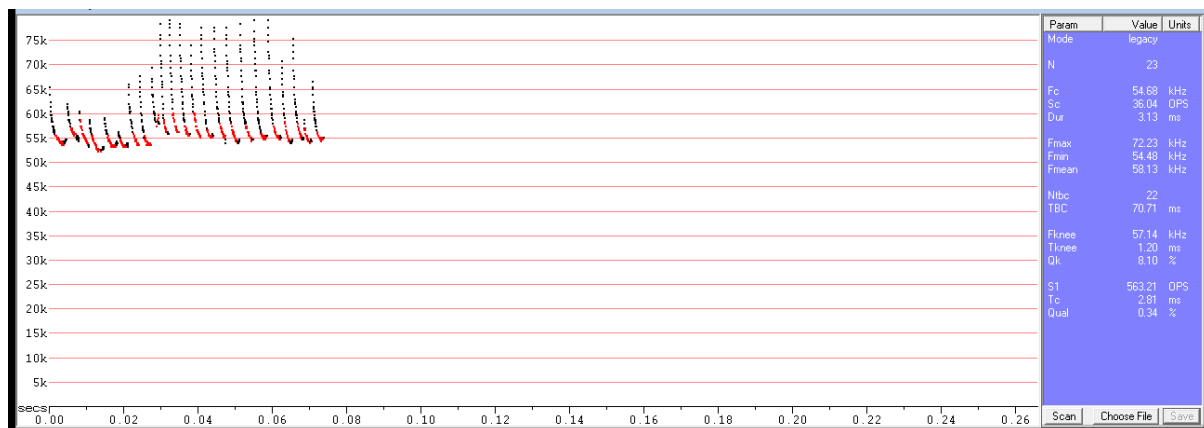
Miniopterus orianae oceanensis



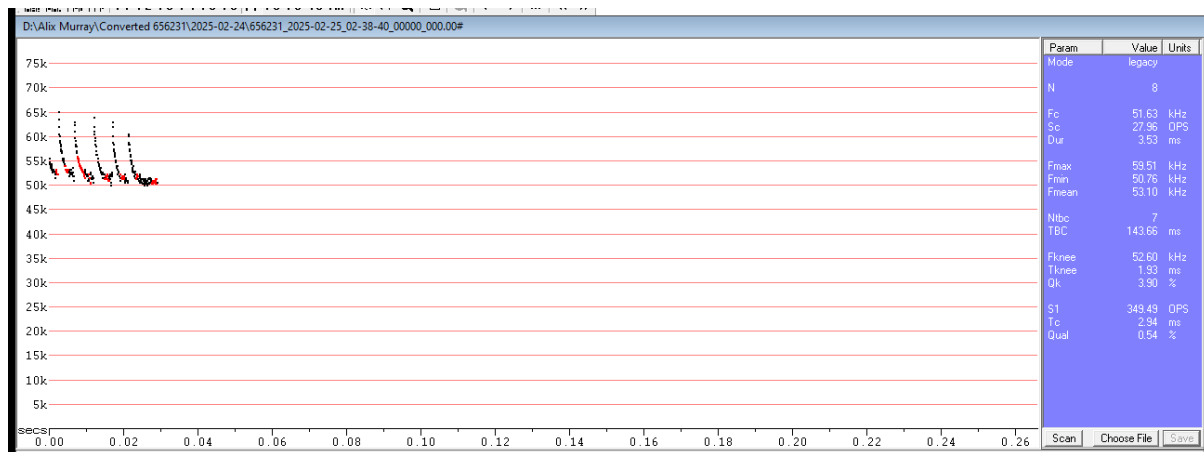
Myotis macropus



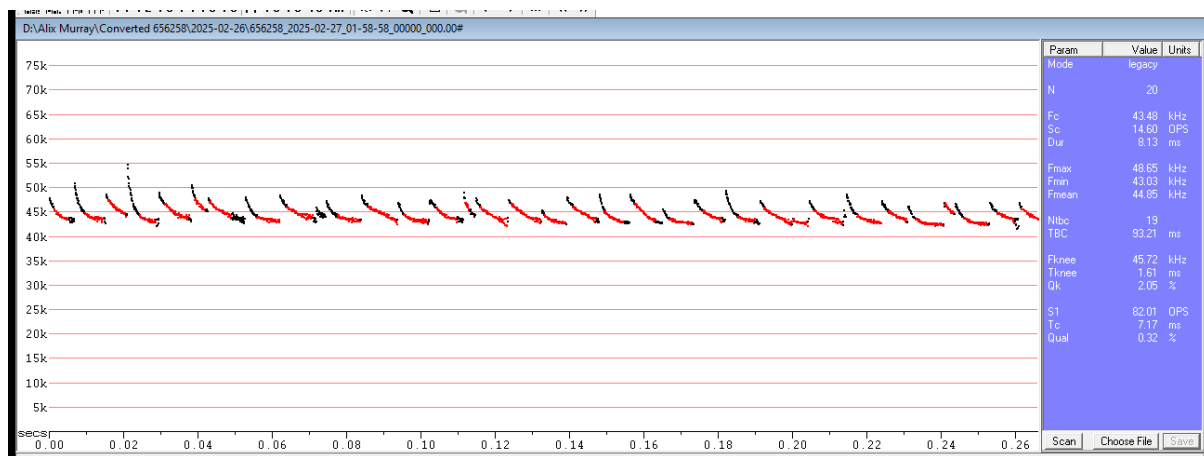
Nyctophilus species



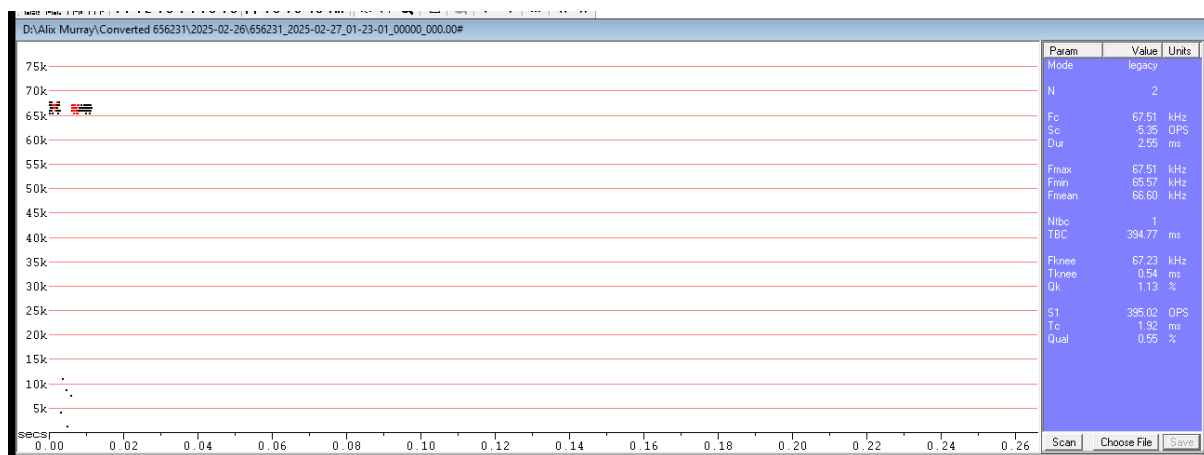
Vespadelus pumilus or *V.roughtoni* or *V.vulturnus*



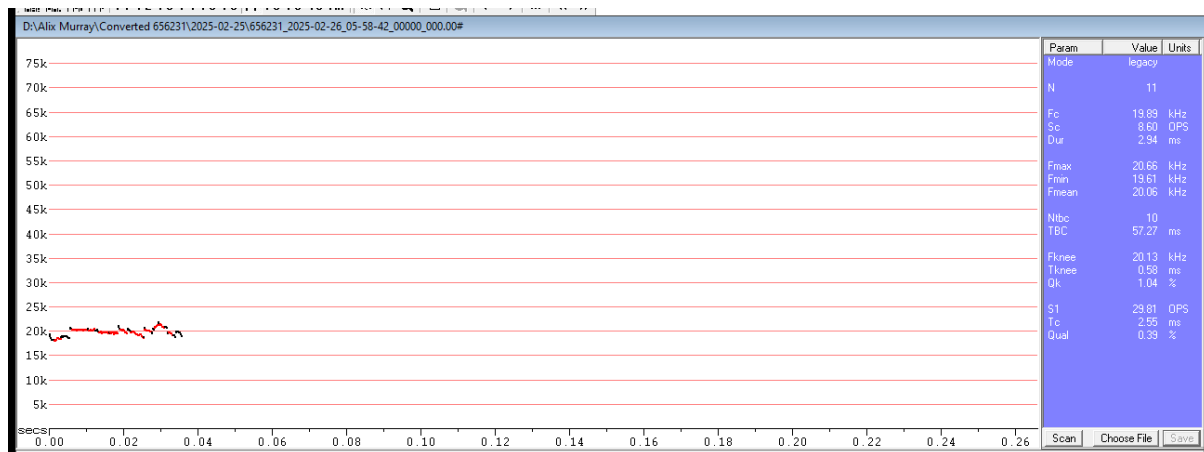
Vespadelus trougtoni or *V. pumilus* or *V. vulturnus*



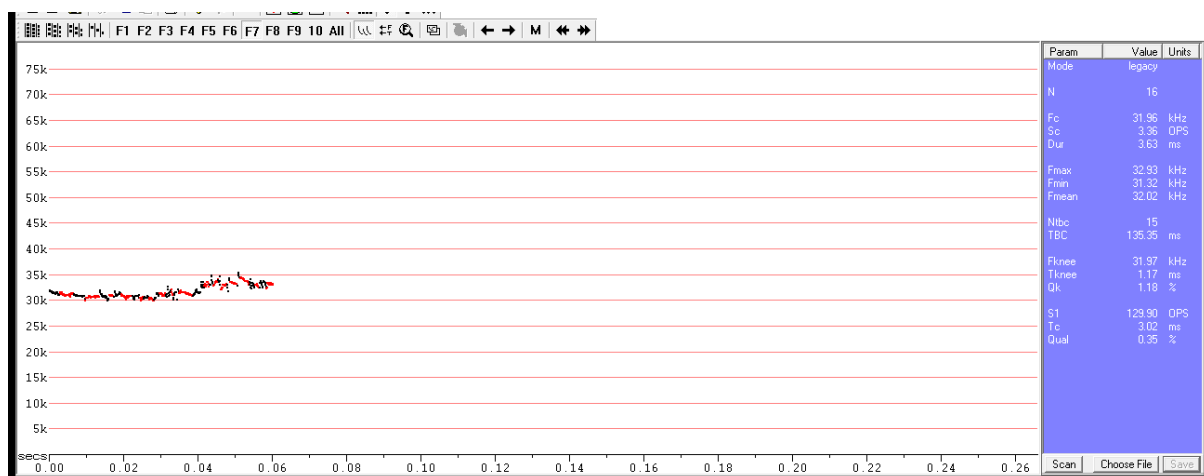
Vespadelus darlingtoni or *M. o. oceanensis*



Rhinolophus megaphyllus (poor quality call)



Saccolaimus flaviventris (probable)



Micronomus norfolkensis or *C. gouldii*

APPENDIX C :

BAM-C Credit Report



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00059474/BAAS19052/25/00059475	Western Sydney University Milperra Campus - Masterplan	09/04/2026
Assessor Name	Assessor Number	BAM Data version *
Cecilia Eriksson Pinatacan	BAAS19052	Current classification (live - default) (94)
Proponent Names	Report Created	BAM Case Status
	10/06/2026	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
2		Major Projects
Date 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.	
10/06/2026		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3320-Cumberland Shale Plains Woodland
Species		
Nil		

BAM Biodiversity Credit Report (Like for like)

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3320-Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	1.1	5	7	12
4025-Cumberland Red Gum Riverflat Forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.1	1	0	1

BAM Biodiversity Credit Report (Like for like)

3320-Cumberland Shale Plains Woodland	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_Canopy	No	7	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_Mown	Yes	1	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
4025-Cumberland Red Gum Riverflat Forest	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_ExoticGround	Yes	4	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Like for like)

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4042, 4058, 4138	-	4025_Canopy	Yes	1	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Acacia pubescens / Downy Wattle	3320_ExoticGround	0.3	3.00
Myotis macropus / Southern Myotis	4025_Canopy	0.1	1.00

Credit Retirement Options

Like-for-like credit retirement options

Acacia pubescens / Downy Wattle	Spp	IBRA subregion

BAM Biodiversity Credit Report (Like for like)

	Acacia pubescens / Downy Wattle	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00059474/BAAS19052/25/00059475	Western Sydney University Milperra Campus - Masterplan	09/04/2026
Assessor Name	Report Created	BAM Data version *
Cecilia Eriksson Pinatacan	10/06/2026	Current classification (live - default) (94)
Assessor Number	BAM Case Status	Date Finalised
BAAS19052	Finalised	10/06/2026
Assessment Revision	BOS entry trigger	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

Cumberland Red Gum Riverflat Forest												
4	4025_Copy	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	30.8	30.8	0.06	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1
											Subtotal	1
Cumberland Shale Plains Woodland												
1	3320_Copy	Cumberland Plain Woodland in the Sydney Basin Bioregion	23.4	19.5	0.6	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	7
2	3320_Mown	Cumberland Plain Woodland in the Sydney Basin Bioregion	54.6	0.0	0.15	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1

BAM Credit Summary Report

3	3320_ExoticGround	Cumberland Plain Woodland in the Sydney Basin Bioregion	54.2	18.0	0.34	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	4
											Subtotal	12
											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 SAI	Species credits
Acacia pubescens / Downy Wattle (Flora)									
3320_ExoticGround	18.0	18.0	0.34	Rate of decline	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	3
								Subtotal	3
Myotis macropus / Southern Myotis (Fauna)									
4025_Canopy	30.8	30.8	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	1

APPENDIX D :

Flora List

Scientific Name	Common Name	Exotic
<i>Acacia decurrens</i>	Black Wattle	
<i>Acacia implexa</i>	Hickory Wattle	
<i>Allocasuarina littoralis</i>	Black She-Oak	
<i>Anredera cordifolia</i>	Madeira Vine	*
<i>Araujia sericifera</i>	Moth Vine	*
<i>Arctotheca calendula</i>	Capeweed	*
<i>Aristida vagans</i>	Threeawn Speargrass	
<i>Arthropodium sp. South-east Highlands</i>		
<i>Asparagus aethiopicus</i>	Asparagus Fern	*
<i>Asparagus asparagoides</i>	Bridal Creeper	*
<i>Bidens pilosa</i>	Cobbler's Pegs	*
<i>Bothriochloa decipiens var. decipiens</i>	Pitted Bluegrass	
<i>Brassica fruticulosa</i>	Twiggy Turnip	*
<i>Briza maxima</i>	Quaking Grass	*
<i>Briza minor</i>	Shivery Grass	*
<i>Briza subaristata</i>		*
<i>Bromus catharticus</i>	Prairie Grass	*
<i>Brunoniella australis</i>	Blue Trumpet	
<i>Bursaria spinosa</i>	Native Blackthorn	
<i>Caesia parviflora var. parviflora</i>		
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	*
<i>Cardamine hirsuta</i>	Common Bittercress	*
<i>Cenchrus clandestinus</i>	Kikuyu Grass	*
<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	*
<i>Cheilanthes sieberi subsp. sieberi</i>	Rock Fern	
<i>Cirsium vulgare</i>	Spear Thistle	*
<i>Clematis glycinoides</i>	Headache Vine	
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	*
<i>Conyza sumatrensis</i>	Tall fleabane	*
<i>Cotula australis</i>	Common Cotula	
<i>Crassula sieberiana</i>	Australian Stonecrop	
<i>Cynodon dactylon var. dactylon</i>	Common Couch	
<i>Cyperus eragrostis</i>	Umbrella Sedge	*
<i>Cyperus gracilis</i>	Slender Flat-sedge	
<i>Davidsonia johnsonii</i>	Smooth Davidson's Plum	
<i>Daviesia ulicifolia</i>	Gorse Bitter Pea	
<i>Dianella caerulea var. caerulea</i>		
<i>Dianella caerulea var. producta</i>		
<i>Dianella longifolia</i>	Blueberry Lily	

Scientific Name	Common Name	Exotic
<i>Dichondra repens</i>	Kidney Weed	
<i>Digitaria parviflora</i>	Small-flowered Finger Grass	
<i>Ehrharta erecta</i>	Panic Veldtgrass	*
<i>Ehrharta longiflora</i>	Annual Veldtgrass	*
<i>Einadia trigonos</i>	Fishweed	
<i>Entolasia marginata</i>	Bordered Panic	
<i>Eragrostis curvula</i>	African Lovegrass	*
<i>Eragrostis leptostachya</i>	Paddock Lovegrass	
<i>Eucalyptus amplifolia</i> subsp. <i>amplifolia</i>		
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	
<i>Eucalyptus moluccana</i>	Grey Box	
<i>Eucalyptus tereticornis</i>	Forest Red Gum	
<i>Exocarpos cupressiformis</i>	Cherry Ballart	
<i>Fumaria muralis</i>	Wall Fumitory	*
<i>Gahnia aspera</i>	Rough Saw-sedge	
<i>Gamochaeta americana</i>	Purple Cudweed	*
<i>Glycine clandestina</i>	Twining glycine	
<i>Glycine microphylla</i>	Small-leaf Glycine	
<i>Glycine tabacina</i>	Variable Glycine	
<i>Gomphrena celosioides</i>	Gomphrena Weed	*
<i>Hardenbergia violacea</i>	False Sarsaparilla	
<i>Hibbertia aspera</i>	Rough Guinea Flower	
<i>Hypochaeris radicata</i>	Catsear	*
<i>Indigofera australis</i>	Australian Indigo	
<i>Lactuca serriola</i>	Prickly Lettuce	*
<i>Lepidosperma laterale</i>	Variable Sword-sedge	
<i>Leucopogon juniperinus</i>	Prickly Beard-heath	
<i>Lobelia purpurascens</i>	whiteroot	
<i>Lolium perenne</i>	Perennial Ryegrass	*
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Matt-rush	
<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		
<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	Many-flowered Mat-rush	
<i>Lotus uliginosus</i>	Birds-foot Trefoil	*
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	*
<i>Malva parviflora</i>	Small-flowered Mallow	*
<i>Medicago minima</i>	Woolly Burr Medic	*
<i>Medicago polymorpha</i>	Burr Medic	*
<i>Megathyrsus maximus</i>		*
<i>Melaleuca nodosa</i>		

Scientific Name	Common Name	Exotic
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	
<i>Modiola caroliniana</i>	Red-flowered Mallow	*
<i>Notelaea longifolia</i> f. <i>longifolia</i>		
<i>Nothoscordum gracile</i>	Onion Weed	*
<i>Ochna serrulata</i>	Mickey Mouse Plant	*
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	*
<i>Olearia viscidula</i>	Wallaby Weed	
<i>Oxalis perennans</i>		
<i>Ozothamnus diosmifolius</i>	White Dogwood	
<i>Paronychia brasiliana</i>	Chilean Whitlow Wort, Brazilian Whitlow	*
<i>Parsonsia straminea</i>	Common Silkpod	
<i>Paspalidium distans</i>		
<i>Paspalum dilatatum</i>	Paspalum	*
<i>Plantago lanceolata</i>	Lamb's Tongues	*
<i>Poa annua</i>	Winter Grass	*
<i>Poranthera microphylla</i>	Small Poranthera	
<i>Ranunculus sceleratus</i>	Celery Buttercup	*
<i>Rytidosperma racemosum</i>	Wallaby Grass	
<i>Senecio madagascariensis</i>	Fireweed	*
<i>Setaria parviflora</i>		*
<i>Sida rhombifolia</i>	Paddy's Lucerne	*
<i>Solanum nigrum</i>	Black-berry Nightshade	*
<i>Solanum prinophyllum</i>	Forest Nightshade	
<i>Solanum sisymbriifolium</i>		*
<i>Soliva sessilis</i>	Bindyi	*
<i>Sonchus asper</i>	Prickly Sowthistle	*
<i>Sonchus oleraceus</i>	Common Sowthistle	*
<i>Sporobolus africanus</i>	Parramatta Grass	*
<i>Stachys arvensis</i>	Stagger Weed	*
<i>Stellaria media</i>	Common Chickweed	*
<i>Taraxacum officinale</i>	Dandelion	*
<i>Themeda triandra</i>		
<i>Trifolium repens</i>	White Clover	*
<i>Verbena bonariensis</i>	Purpletop	*
<i>Vernonia cinerea</i> var. <i>cinerea</i>		*
<i>Veronica arvensis</i>	Wall Speedwell	*
<i>Veronica plebeia</i>	Trailing Speedwell	
<i>Vulpia bromoides</i>	Squirrel Tail Fesque	*

Scientific Name	Common Name	Exotic
<i>Wahlenbergia communis</i>	Tufted Bluebell	
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	
<i>Zieria smithii</i>	Sandfly Zieria	

FIGURES

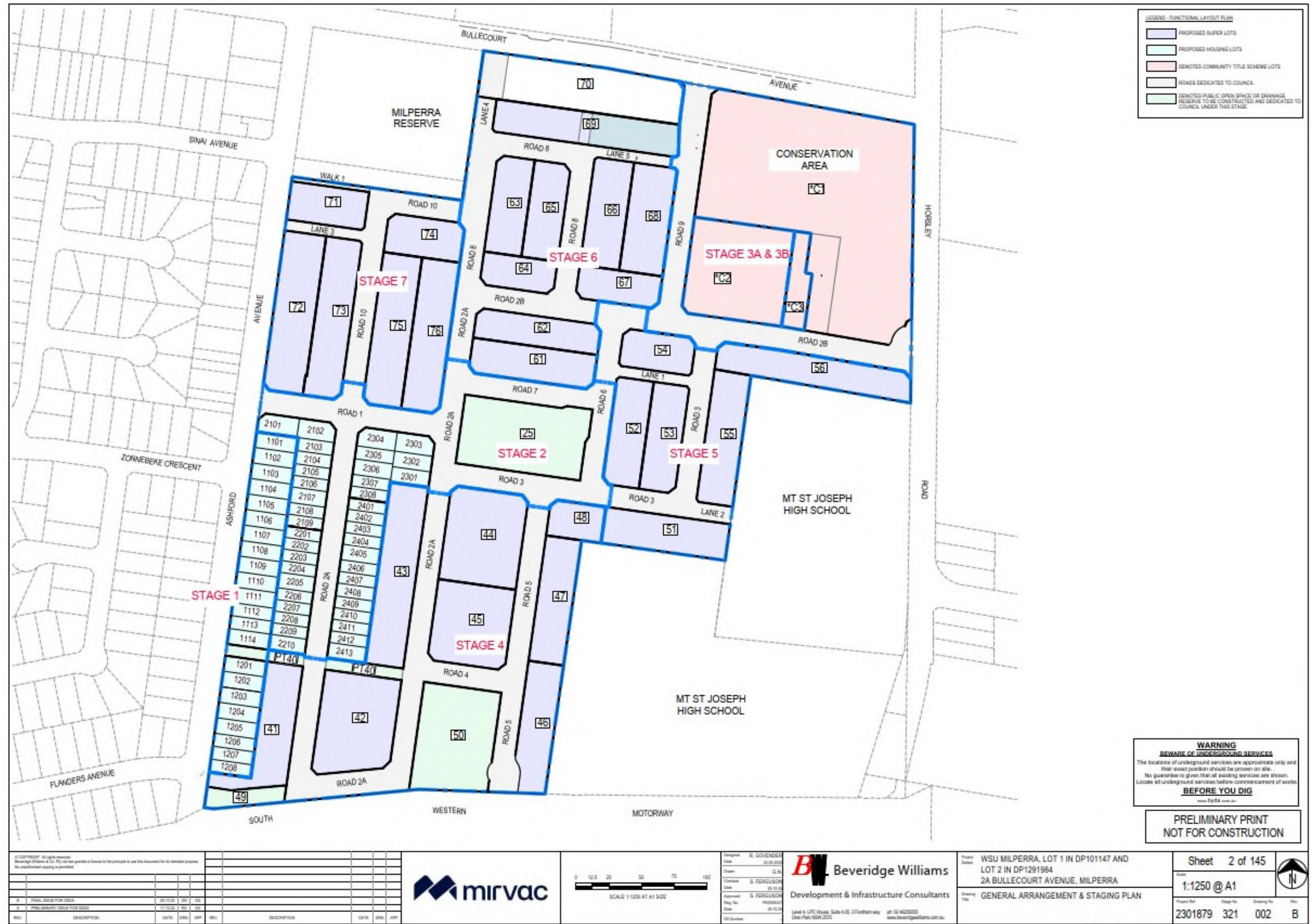


Figure 1. The WSU Milperra Campus redevelopment masterplan



Figure 2. Site map

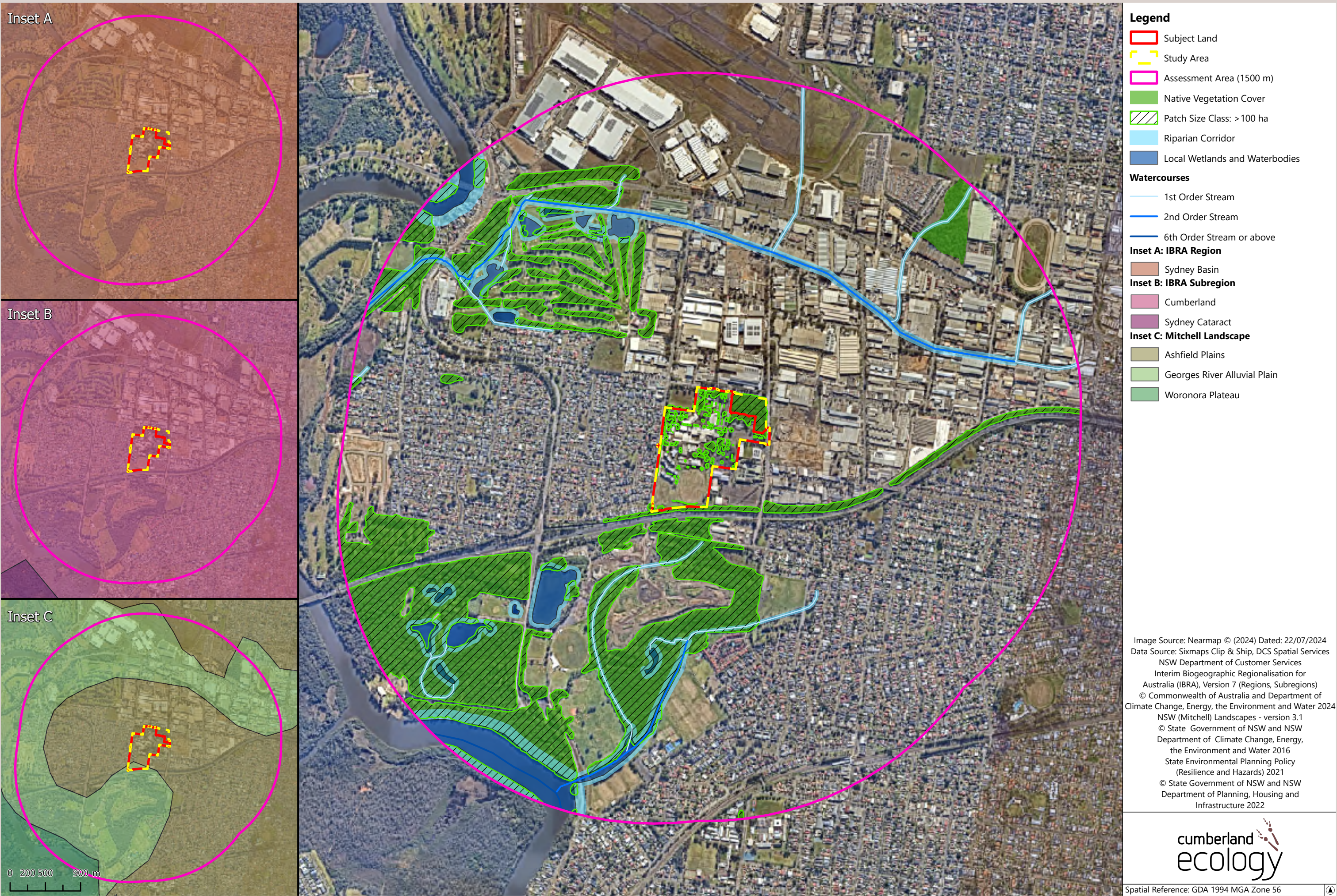


Figure 3. Location map

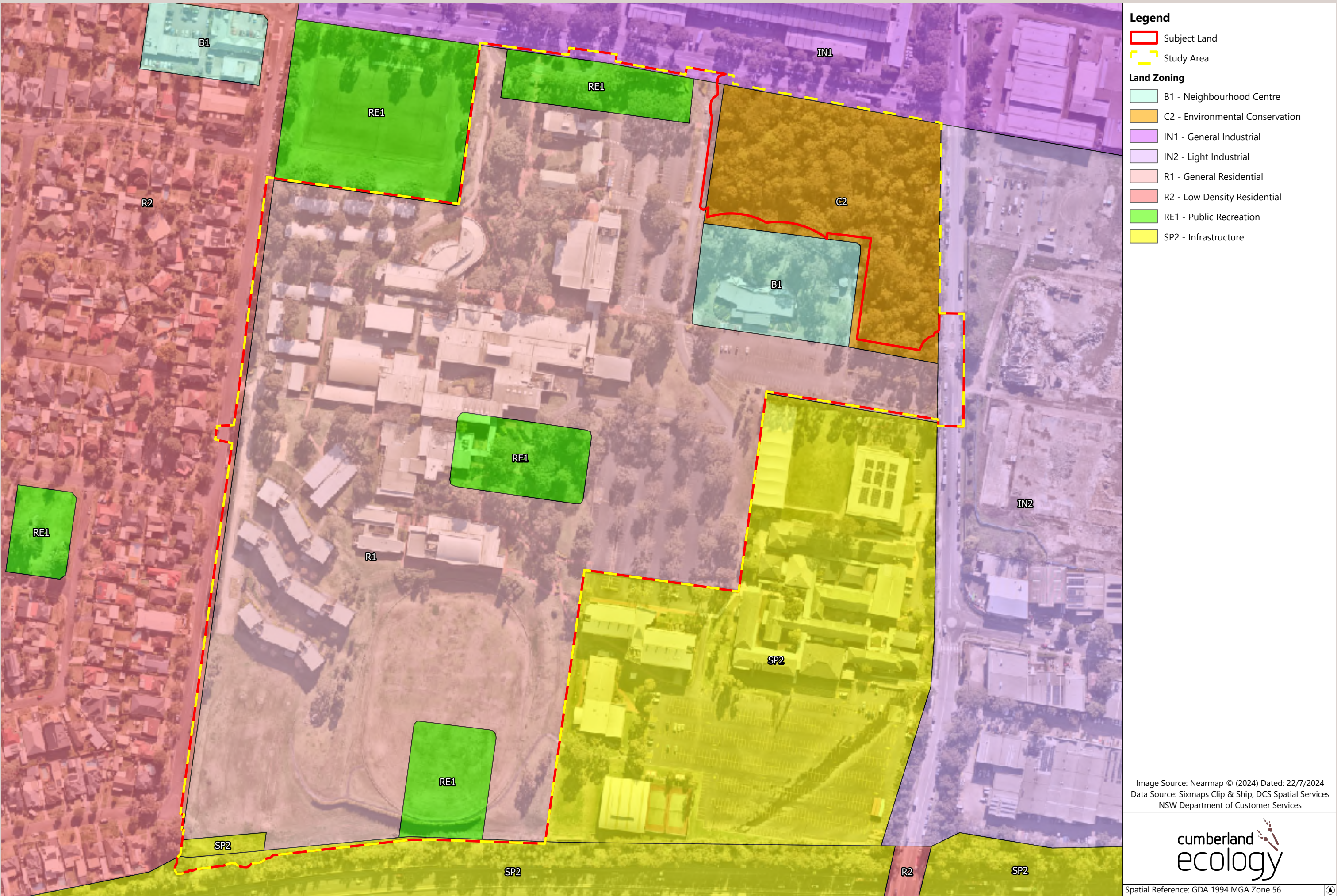


Figure 4. Land zoning of the WSU Campus

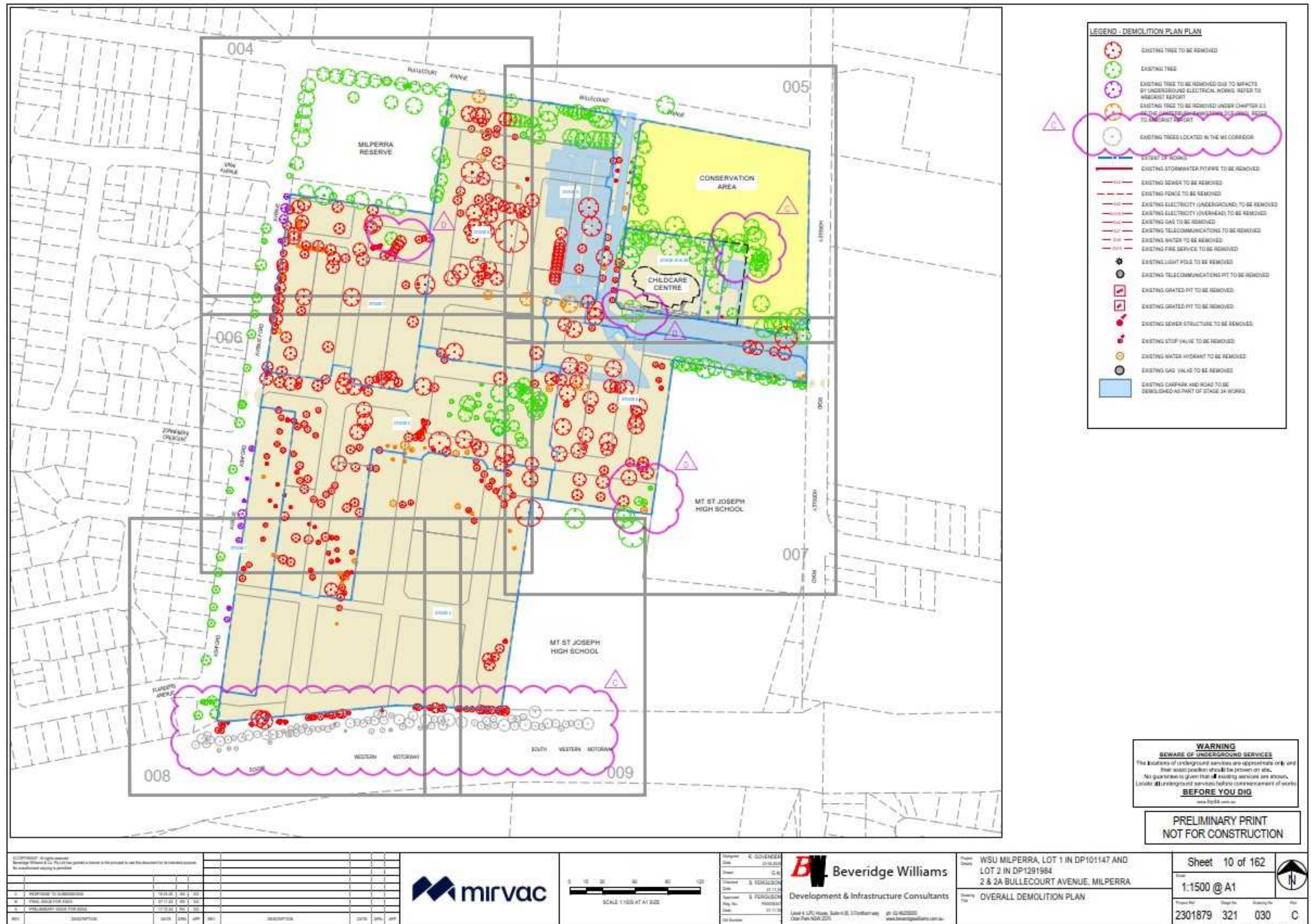


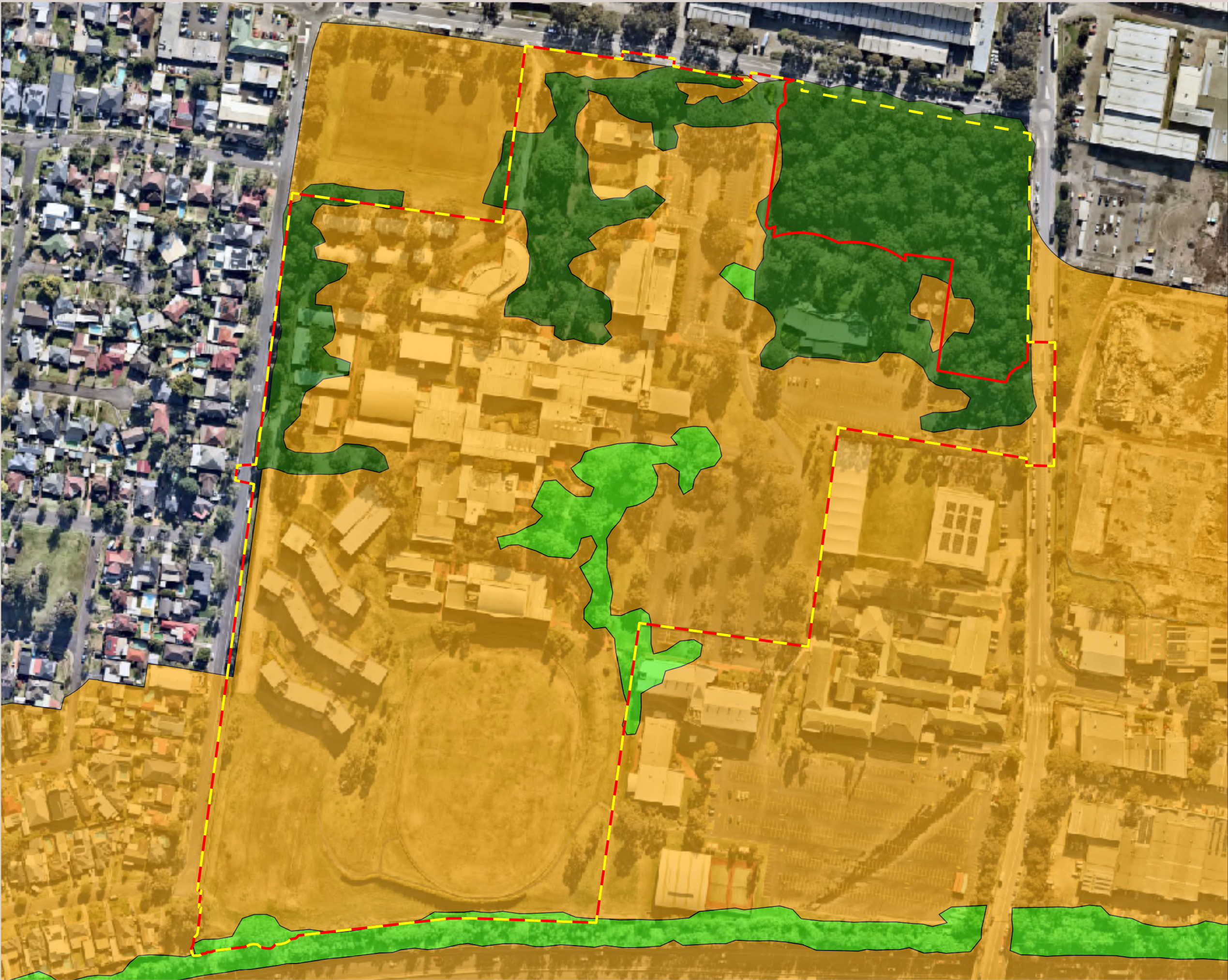
Figure 5. Layout of the project



Figure 6. Flora survey locations within the subject land



Figure 7. Fauna survey locations within the subject land



Legend

Subject Land

Study Area

Connected Corridor Category

Priority Habitats

Supporting Habitats

Supporting Areas

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services
Connected Corridors for Biodiversity
© Commonwealth of Australia and Southern Sydney
Regional Organisation of Councils (SSROC) 2025



Spatial Reference: GDA 1994 MGA Zone 56

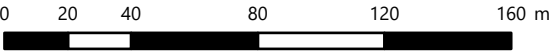


Figure 8. Connected Corridors for Biodiversity Mapping

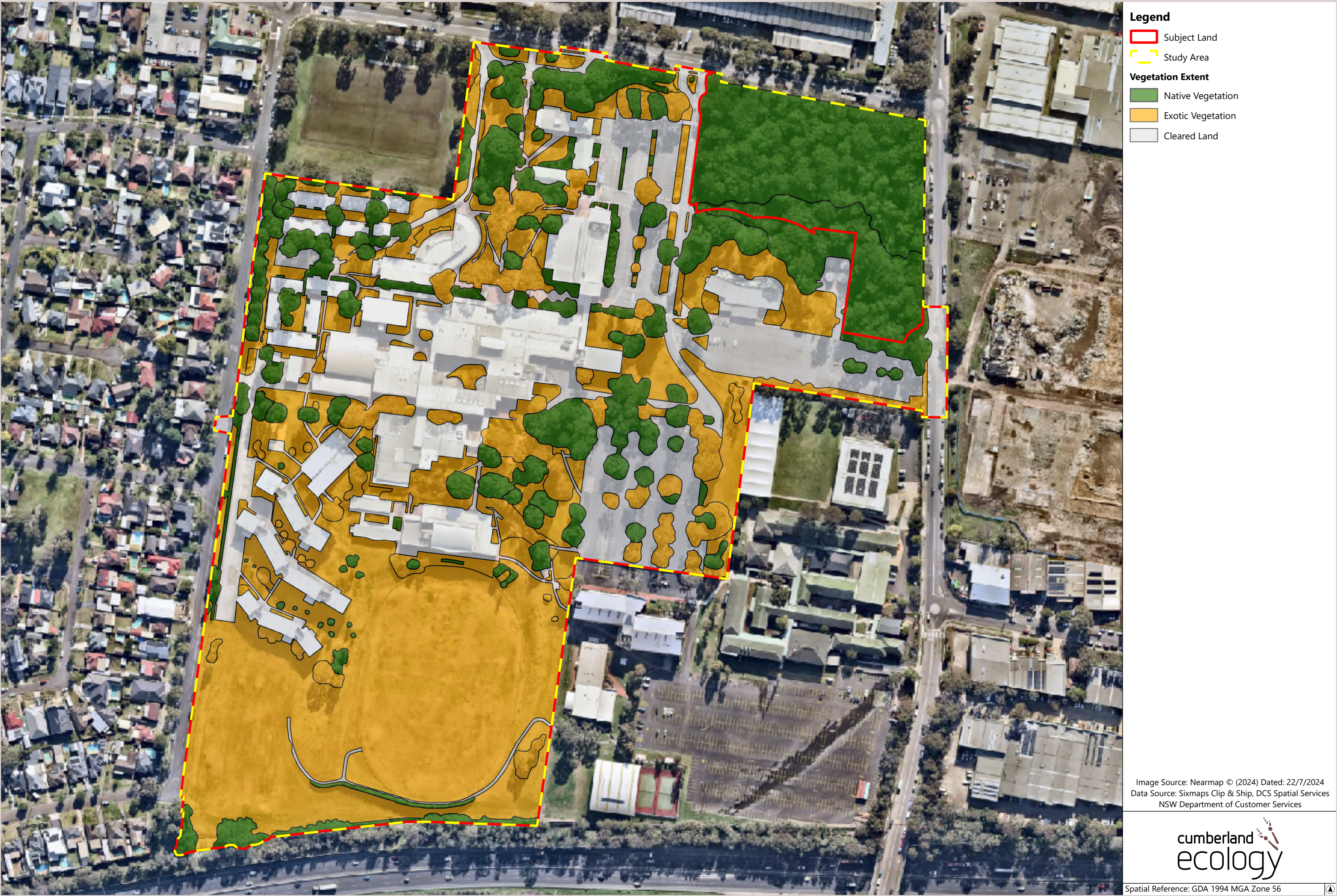


Figure 9. Native vegetation extent



Figure 10. Plant Community Types

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Legend

- Subject Land
- Study Area

Image Source: NSW Spatial Services, Dated: 1978
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services



Spatial Reference: GDA 1994 MGA Zone 56

0 20 40 80 120 160 m

Figure 11. Aerial photography from 1978



Legend

- Subject Land
- Study Area

Threatened Ecological Community

- Cumberland Plain Woodland in the Sydney Basin Bioregion
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services



Spatial Reference: GDA 1994 MGA Zone 56

0 20 40 80 120 160 m

Figure 12. Threatened Ecological Communities

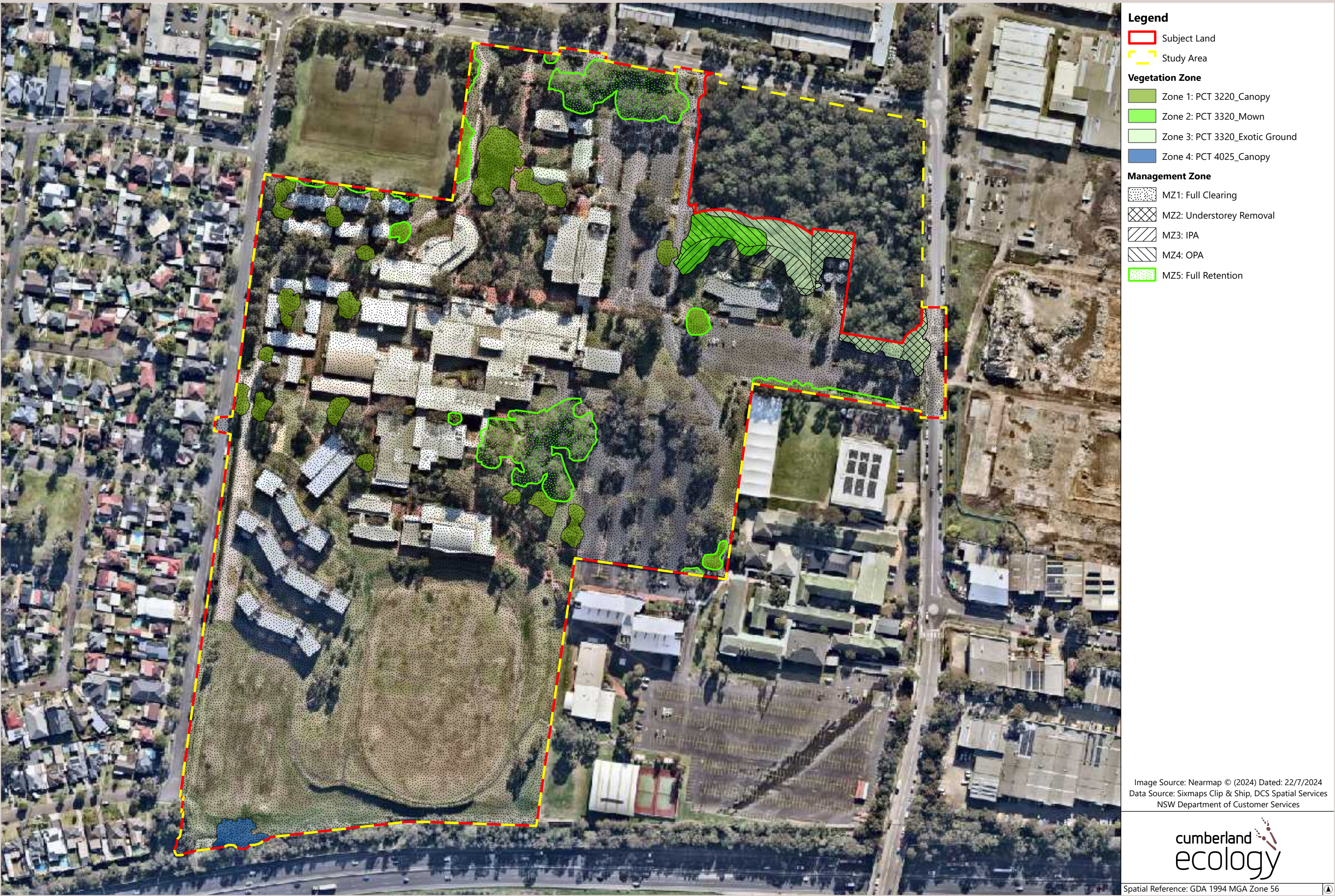


Figure 13. Vegetation zones



Figure 14. Habitat features within the Study Area



Figure 15. Species credit species polygon



Legend

Subject Land

Study Area

Prescribed Impact

Non-native Vegetation

Vehicle Strike

↔ Habitat Connectivity

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services



Spatial Reference: GDA 1994 MGA Zone 56

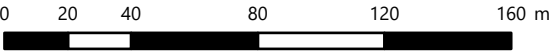


Figure 16. Prescribed impacts

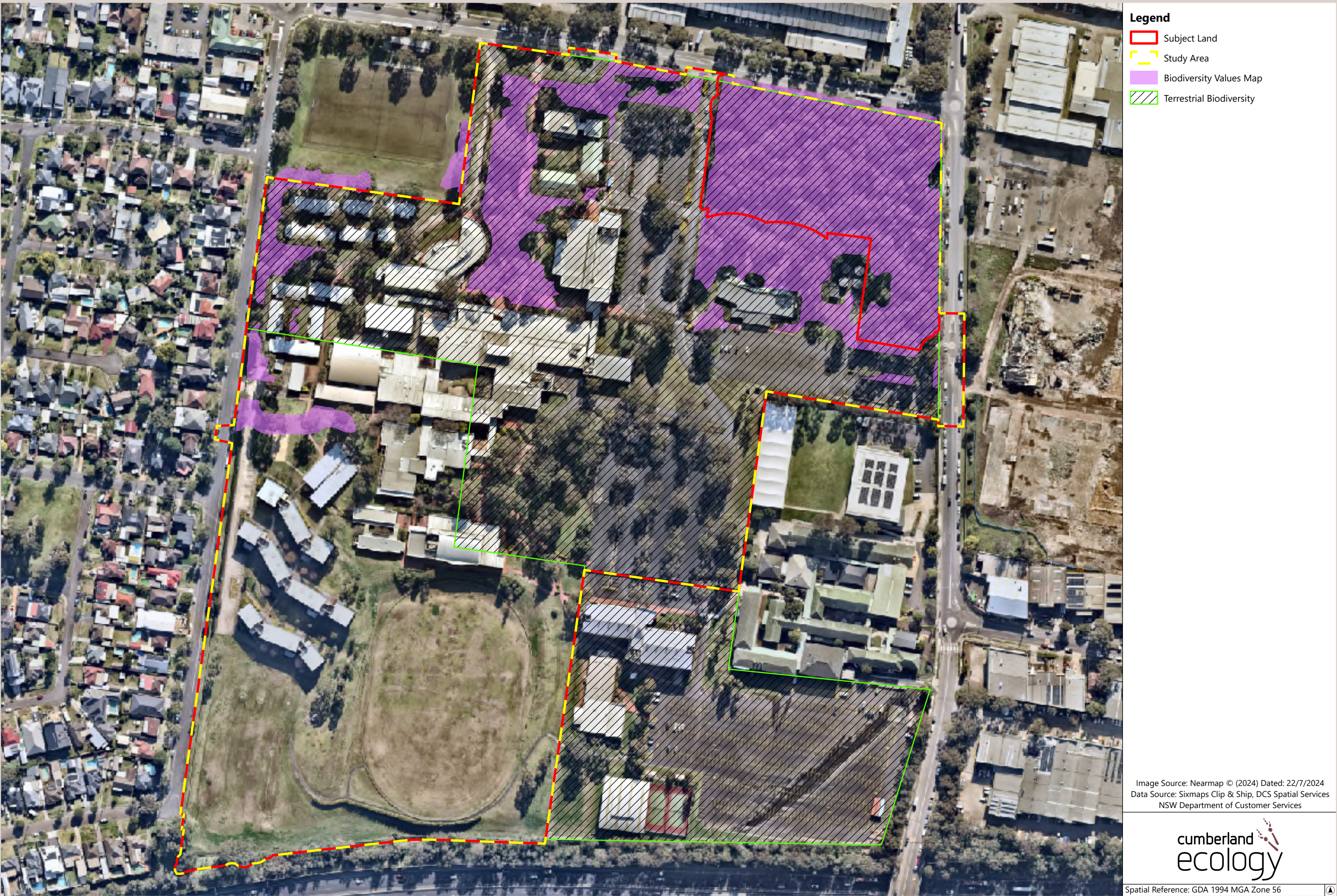


Figure 17. Biodiversity Values Map and Canterbury-Bankstown LEP 'Biodiversity' mapping



Figure 18. Proposed landscaping connectivity plan

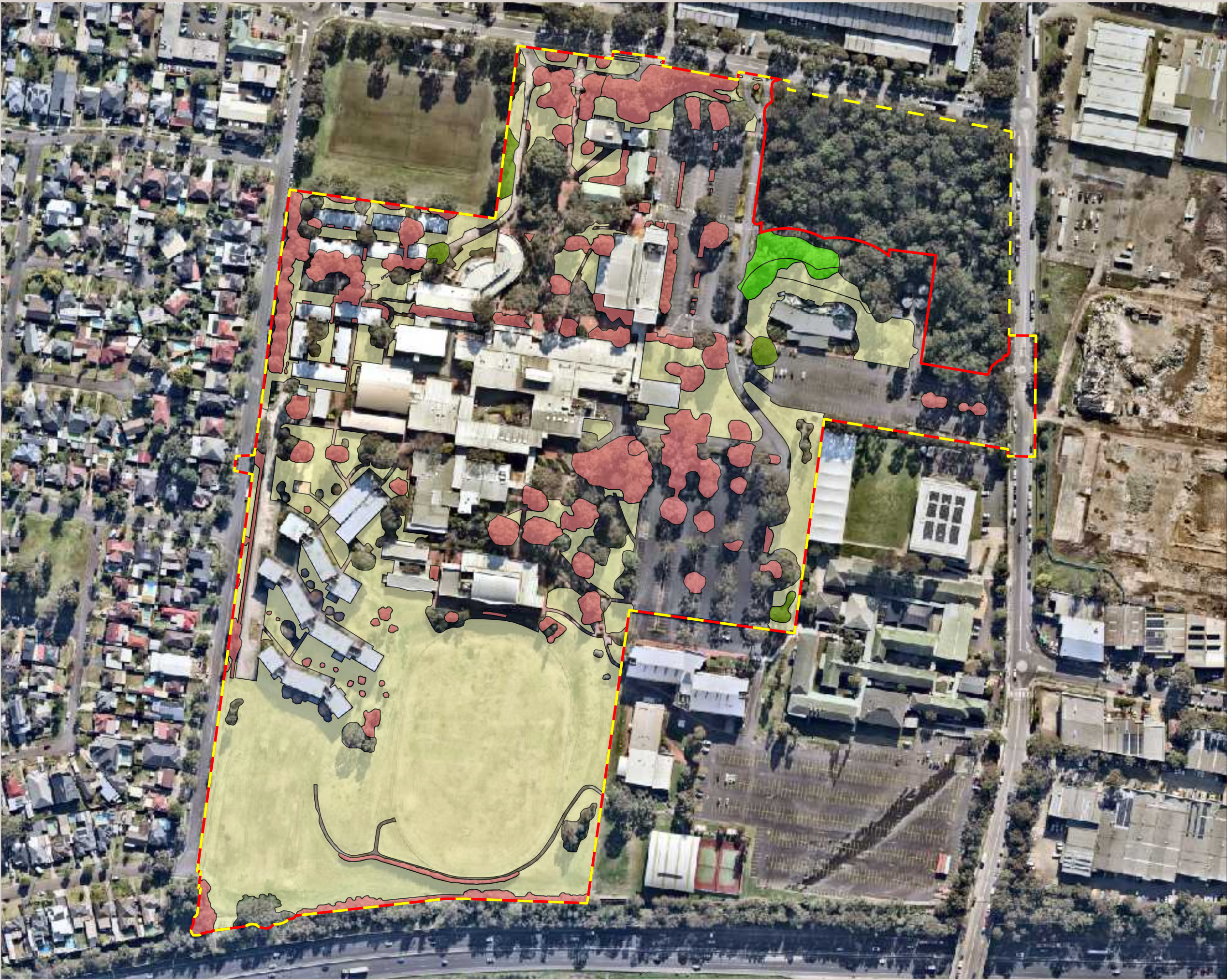
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Figure 19. Serious and Irreversible impacts



Figure 20. Areas Requiring an Offset



Legend

- Subject Land
- Study Area

Areas Not Requiring an Offset

- Zone 1: PCT 3220_Canopy
- Zone 2: PCT 3320_Mown
- Planted Native Vegetation
- Planted Native and Exotic Dominated Grassland

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services



Spatial Reference: GDA 1994 MGA Zone 56

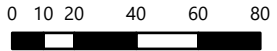
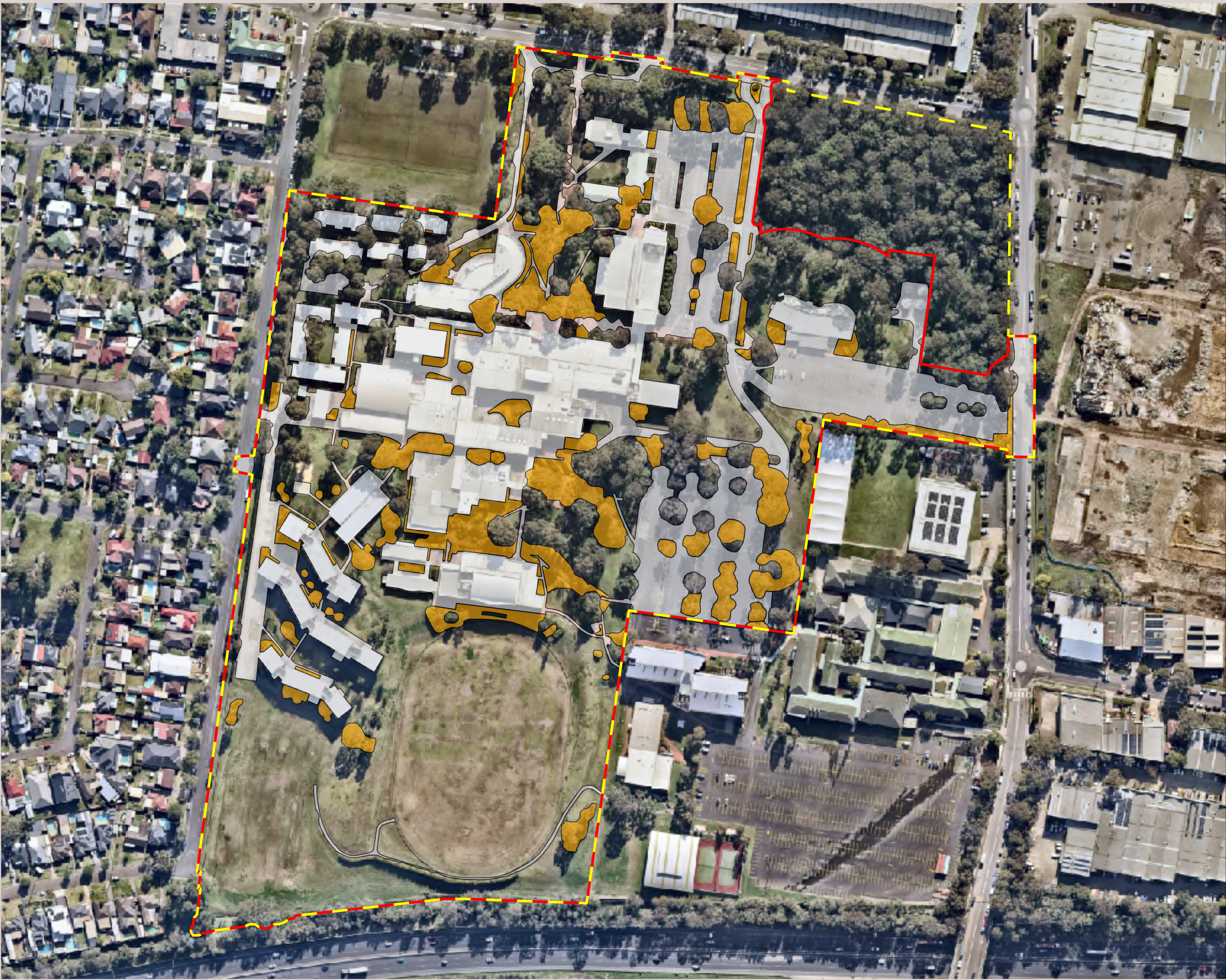


Figure 21. Areas Not Requiring an Offset



Legend

Subject Land

Study Area

Areas Not Requiring Further Assessment

Exotic Vegetation

Cleared Land

Image Source: Nearmap © (2024) Dated: 22/7/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services



Spatial Reference: GDA 1994 MGA Zone 56

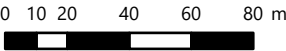


Figure 22. Areas Not Requiring Further Assessment

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