Redevelopment of 618-624 Mowbray Road and 25-29 Mindarie Street, Lane Cove North (SSD-71687208)

Biodiversity Development Assessment Report

Homes NSW

4 October 2024

Final

(02) 9868 1933 | PO Box 2474 Carlingford Court NSW 2118 | cumberlandecology.com.au

Report No. 24093RP1

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.

Version	Date Issued	Amended by	Details
001	04/10/2024	MP, KW	Version 001

Approved by:	**Mikael Peck**
Position:	Principal Ecologist
Signed:	
Date:	4 October, 2024

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Declarations

Certification

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*.

Signature: 

Date:04/10/2024

BAM Assessor Accreditation no: BAAS19002

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.
Mikael Peck	Project director, document preparation, PCT analysis, BAM calculations	Master of Marine Science and Management, Macquarie University, 2011 Bachelor of Science. Washington State University, 2005 BAM Accredited Assessor Training. Greencap, 2022	BAAS 19002
Katrina Wolf	Document review, BAM calculations review	Bachelor of Science (Environmental). The University of Sydney, 2007 BAM Accredited Assessor Training. Greencap 2022	BAAS18010
Dr Rohan Mellick	Field surveys, PCT selection	Doctor of Philosophy, Evolutionary Ecology. The University of Adelaide, 2012 Bachelor of Applied Science (Honours) in Natural Resource Management, Southern Cross University, 2000. BAM Accredited Assessor Training. Greencap 2022	BAAS18075
Rebeca Violante	Field surveys	Diploma of Project Management. Australasia International School, Sydney, 2018. Bachelor of Science (Biology). Universidade Paulista, Brazil, 2015. Bachelor of Communication. Universidade Metodista de São Paulo, Brazil, 2008.	-

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
		BAM Accredited Assessor Training. Muddy Boots, 2019	
Michael Davis	GIS mapping	Bachelor of Biodiversity and Conservation. Macquarie University, 2016 BAM Accredited Assessor Training. Muddy Boots, 2017	-

Conflict of Interest

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

Signature: 

Date: 04/10/2024

BAM Assessor Accreditation no: BAAS19002

Glossary

Term / Abbreviation	Definition
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 Biodiversity Conservation Act 2016
BC Regulation	NSW Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DCCEEW (Cwlth)	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW (NSW)	NSW Department of Climate Change, Energy, the Environment and Water
DBH	Diameter at Breast Height
Development Site Footprint	The area subject to the proposed development, including the construction and operational footprint for the project, as shown in **Figure 1**
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EP&A Act	NSW Environmental Planning and Assessment Act 1979
GIS	Geographic Information System
GPS	Global Positioning System
HNSW	Homes New South Wale**s**
IBRA	Interim Biogeographic Regionalisation for Australia
Lane Cove LEP	*Lane Cove Local Environmental Plan 2009*
NSW	New South Wales
PCT	Plant Community Type
the project	The proposed redevelopment of the subject land
SAII	Serious and Irreversible Impact
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SVTM	NSW State Vegetation Type Map
Subject land	The development site footprint (i.e. the construction and operational footprints) (**Figure 1**)
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community

1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Cumberland Ecology on behalf of Homes New South Wales (HNSW) (trading as NSW Land and Housing Corporation) (the 'proponent') for a State Significant Development Application (SSD-71687208) for construction of a five-storey residential flat building with a total of 86 social and affordable housing apartments (the 'project') at 618-624 Mowbray Road and 25-29 Mindarie Street, Lane Cove North (the 'subject land')

The project is seeking approval as a State Significant Development (SSD) under Part 4 Division 4.7 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). Industry Specific Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-71687208) on 18 June 2024 states the following in relation to biodiversity requirements (Item 11 of the SEARs):

- Assess any biodiversity impacts associated with the development are to be assessed in accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method 2020 (BAM), including the preparation of a BDAR, unless a waiver is granted, or the development is on biodiversity certified land; and
- 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.

A waiver has not been granted for the project and the subject land in not on biodiversity certified land. Therefore, this BDAR has been prepared to assess impacts of the project in accordance with the BC Act and BAM, as well as addressing the project's SEARs.

This BDAR has been prepared in accordance with the BAM and forms part of the documentation to support the SSD. Under the BAM, a development can be assessed using the streamlined assessment module for small area development if it involves impacts to biodiversity below a prescribed area threshold, which is based on the minimum lot size as shown in Table 12 of Appendix C of the BAM. In the case of this project, the minimum lot size associated with the project is 540 m^2, which enables the project to be assessed using the streamlined module if the clearing of native vegetation is ≤1 ha. As the project will remove less than 1 ha of native vegetation (including any planted native vegetation), this BDAR has been prepared in accordance with the streamlined assessment module for small areas development in accordance with Appendix C of the BAM. It is further noted that impacts on planted native vegetation have been assessed utilising the streamlined assessment module for planted native vegetation outlined in Section D.1 of Appendix D of the BAM.

Appendix A includes a table demonstrating this BDAR's compliance with Appendix L, Table 27 of the BAM, which details the minimum requirements for a BDAR implementing the streamlined assessment module for small areas. ***Section 4.6*** includes a table containing the details of the decision-making key to determine the application of the streamlined assessment module for planted native vegetation within the subject land**.**

1.1. 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 (SAII);
    - 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**.

1.2. Project Description

1.2.1. Location

The project is located at 618-624 Mowbray Road and 25-29 Mindarie Street, Lane Cove North NSW, and is located entirely within the Lane Cove Local Government Area. The subject land has frontages to Mowbray Road to the north, Kullahh Parade to the east and Mindarie Street to the south, and is located within Lots 17, 18, 19, 20, 64, 65 and 66 in DP 35865, and also extends within road corridors located along Mindarie Street to the south and Mowbray Road to the north associated with infrastructure works and Kullahh Parade to the east associated with vehicular access. A proposed sewer line and pit also extend into a previously cleared area within an adjoining lot (SP89642) in the west,

The subject land currently contains seven single storey dwellings which are currently unoccupied. The subject land is one of the final remaining sites to be developed within the Mowbray Precinct, an area of new residential flat buildings located along Mowbray Road with recent five storey apartment buildings located to the east and west of the subject land. The subject land is located opposite Mindarie Park, which includes children's playgrounds, recreation areas and access to walking paths in Lane Cove National Park. Mowbray Public School

is located to the north of the subject land on Mowbray Road. The subject land is accessible by public transport with services that run along Mowbray Road with frequent services to Chatswood and Sydney central business districts. The subject land is approximately 0.45 ha in area and is zoned primarily 'R4 – High Density Residential' under the *Lane Cove Local Environmental Plan 2009* (Lane Cove LEP). A small area along the northern boundary is zoned 'SP2 – Infrastructure'. It is noted that the subject land (0.45 ha) extends beyond the 'site boundary' identified in other project documents that identify a total area of ~0.42 ha. This is because the BDAR requires assessment of all impacts to vegetation, which extend beyond the 'site boundary'.

A site map and location map have been prepared in accordance with the BAM and are presented in **Figure 1** and **Figure 2**, respectively. The current zoning of the subject land is shown in **Figure 3**.

1.2.2. Project Overview

The project proposes the demolition of existing buildings and construction of a new residential flat building to accommodate 86 social and affordable housing apartments, with five (5) residential storeys, communal areas, and basement car parking including excavation, tree removal and associated landscaping and public domain works.

A figure showing the layout of the project is provided in **Figure 4**.

The project will involve the removal of all vegetation within the subject land, except for two areas of native vegetation in the southwest corner and central-west that will be retained and managed under a landscape plan (Landform 2024). Areas within the subject land to be retained and managed under the landscape plan includes less than 0.01 ha of Planted Native Vegetation and approximately 0.02 ha of Blue Gum High Forest that currently occurs primarily as trees over previously cleared areas comprised of either hardstand or exotic vegetation. These areas will be planted out with native species characteristic of Blue Gum High Forest under the project's landscape plan. Impacts on retained vegetation is anticipated to be negligible (as confirmed by the project's arborist) and the trees are anticipated to survive in the long-term.

1.2.3. Identification of the Development Site Footprint

The development site footprint (i.e. the 'subject land') is approximately 0.45 ha in area and comprises the land that will be directly impacted and/or modified by the proposed development. The development site footprint includes any areas that may be directly impacted and/or modified by either the construction and/or operation of the proposed development. Therefore, the development site footprint is the same as the construction and operational footprints for the project. It is important to note that not all areas of vegetation within the subject land will be entirely cleared to facilitate the project as native trees occurring over hardstand areas and exotic vegetation in the southwest corner and central west will be retained, as confirmed by the project's the project's Tree Protection and Removal Plan (Arterra Design 2024). The extent of the development site footprint (i.e. subject land) is shown in **Figure 1**.

1.2.4. General Description of the Subject Land

The subject land currently contains seven single-storey residential dwellings, associated structures (e.g. sheds), planted vegetation, as well as some native remnant and regrowth vegetation. A review of historical imagery identifies that the majority of the subject land was largely cleared for residential development prior to 1961.

Since this clearing, some regeneration of native canopy species has occurred and retained trees have continued to grow. With the exception of the regeneration and continued growth of a remnant tree, the remaining vegetation is comprised of planted and exotic vegetation typically characteristic of urban residential lots.

In order to facilitate the project, nearly all vegetation within the subject land will need to be cleared, except for an area in the southwest and overhanging canopy in the west of the subject land that are to be retained. The area in the southwest includes what appears to be the only remnant tree on-site (i.e. is visible from historical imagery pre and post 1961) that is mapped as Blue Gum High Forest, as well as a small area of Planted Native Vegetation. The area to be retained in the west is comprised of a single *Eucalyptus saligna* (Blue Gum) that is located on an adjacent lot, but its canopy overhangs cleared land and exotic vegetation within the subject land. These areas will be entirely avoided as confirmed by the project's Tree Protection and Removal Plan (Arterra Design 2024).

The subject land slopes from north to south and is approximately 50m above sea level in the north and 42m above sea level in the south. The subject land is surrounded by development to the west, north and east. To south is Mindarie Park that contains a native canopy, including areas of Blue Gum High Forest, as well as Planted Native Vegetation that have connectivity (limited to overhanging canopy separated by existing roads) to the vegetation within the subject land. No areas of the subject land or adjacent lots are mapped as native vegetation by the NSW State Vegetation Type Map (SVTM) prepared by the former NSW Department of Planning and Environment (DPE 2024); however, the SVTM NSW 1750 PCT mapping identifies that the subject land and immediate surrounds were historically comprised entirely of Blue Gum High Forest (PCT 3136), with parts of Mindarie Park to the south historically comprised of Sydney Coastal Enriched Sandstone Forest (PCT 3592).

Blue Gum High Forest is listed as a Critically Endangered Ecological Community (CEEC) under the BC Act while Sydney Coastal Enriched Sandstone Forest is not listed under the BC Act.

1.3. Information Sources

1.3.1. Databases

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

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

1.3.2. Literature and Spatial Data

This BDAR has utilised the results and/or spatial data from the following documents:

- NSW SVTM (DPE 2024); and
- Tree Protection and Removal Plan: 618-624 Mowbray Rd. & 25-29 Mindarie St, Lane Cove North (Arterra Design 2024).

The aerial imagery used in this BDAR is sourced from NearMap and is dated 22 July 2024. Additional aerial images available on Google Earth Pro and SixMaps were also consulted.

2. Methodology

2.1. Review of Existing Data

Existing information on biodiversity values within the subject land and assessment area was reviewed, which includes:

- Species data that is held in the BioNet Atlas;
- NSW SVTM (DPE 2024);
- BioNet Vegetation Classification database (DCCEEW (NSW) 2024);
- Threatened Biodiversity Data Collection (TBDC) (DCCEEW (NSW) 2024); and
- Tree Protection and Removal Plan: 618-624 Mowbray Rd. & 25-29 Mindarie St., Lane Cove North (Arterra Design 2024).

This existing information was considered and included, where appropriate, into survey design, vegetation mapping and reporting.

2.2. Landscape Features

2.2.1. Landscape Features

Landscape features requiring consideration were initially determined via desktop assessment. Field surveys undertaken on 22 July 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.

2.2.2. Native Vegetation Cover

The native vegetation cover within the assessment area was determined through the use of existing vegetation mapping data, review of recent aerial imagery and field surveys within the subject land and surrounding areas. The existing vegetation mapping data utilised was the NSW SVTM. The polygons of native vegetation within this dataset were revised following review of aerial imagery from 22 July 2024.

2.3. Native Vegetation Survey

2.3.1. Vegetation Mapping

The NSW SVTM prepared by the then NSW Department of Planning and Environment (DPE 2024) covers the subject land and surrounds. No areas of the subject land are mapped as native vegetation under the NSW SVTM. Cumberland Ecology conducted vegetation surveys on 22 July 2024 to verify and update (where

required) the existing vegetation mapping. The vegetation within the subject land was ground-truthed to examine and verify the mapping of the condition and extent of the different PCTs. Mapping of PCTs 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.

Records of plant community boundaries were made using a hand-held Global Positioning System (GPS) and mark-up of aerial imagery. 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.

2.3.2. Plot-based Vegetation Survey and Vegetation Integrity Assessment

A plot-based vegetation survey and vegetation integrity assessment was undertaken concurrently within the subject land 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.

One BAM plot was undertaken within the subject land on 22 July 2024, and its location is shown on **Figure 5**. The BAM plot required the establishment of a 20 x 50 m plot with an internal 20 x 20 m plot. The following data was collected within the 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.

Due to the small size and developed nature of the subject land, the location of the plot was situated in the only area of the subject land that a 20 x 20m plot would fit without including significant areas of built structures as well as capturing the environmental variation of the PCT identified within the subject land. **Table 2** 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 all vegetation zones requiring survey under the BAM.

Table 2 BAM plot survey requirements

Veg. Zone	PCT	Condition	Subject Land (ha)	Minimum Number of Plots Required	Number of Plots Completed	Plot Name
1	3136	Canopy	0.08	1	1	P1
-	0	Planted Native Vegetation	0.04	0	0	-
-	0	Exotic Vegetation	0.22	0	0	-
-	0	Cleared Land	0.11	0	0	-

2.4. Threatened Flora Species Survey

2.4.1. Habitat Constraints

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

2.4.2. Targeted Flora Species Survey

No threatened flora species were assessed as candidate species credit species for further assessment (see ***Section 5.3***). Nevertheless, all vegetated areas of the subject land were surveyed during native vegetation surveys completed on 22 July 2024 and any threatened species present would have been recorded.

2.5. Threatened Fauna Species Survey

No threatened fauna species were assessed as candidate species credit species for further assessment (see ***Section 5.3***).

2.5.1. Habitat Assessment

Desktop assessments and field surveys within the subject land included assessment of habitat constraints and microhabitats for predicted species credit fauna 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 and waterbodies.

2.6. Weather Conditions

Weather conditions during and around the field survey were appropriate for detection of all flora and fauna species. A summary of weather conditions in the wider locality of the subject land (rainfall and temperature: BOM Weather Station 66214 – Sydney (Observatory Hill)) during the field survey (22 July 2024) is provided below:

- 0 mm rain;
- 18.7 °C maximum temperature; and
- 7.6 °C minimum temperature.

3. Landscape Features

3.1. Assessment Area

The subject land is approximately 0.45 ha in area and is shown in **Figure 1**. As the project is being assessed as a site-based 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 749 ha in area and is shown in **Figure 2**.

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 1** and the extent within the assessment area is shown in **Figure 2**.

3.2.1. IBRA Bioregion and IBRA Subregion

The subject land is located within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and the Pittwater IBRA Subregion. The assessment area is entirely within the Sydney Basin IBRA Bioregion and mostly within the Pittwater IBRA Subregion, with some areas in the east falling within the Cumberland IBRA Subregion (see **Figure 2**).

3.2.2. Rivers and Streams

No mapped watercourses occur within the subject land. Watercourses in the assessment area are mapped in **Figure 2** and include 1st, 2nd and 5th order streams. In accordance with Appendix E of the BAM, riparian corridors of 10 m, 20 m and 40 m either side of the waterway applies to first, second, and fifth order streams within the assessment area, respectively.

3.2.3. Wetlands

No wetlands (artificial or natural) occur within the subject land and there are no wetlands included in the DCCEEW (Cwlth) Directory of Important Wetlands in Australia in the subject land or assessment area. However, there are areas mapped as 'Coastal Wetlands' under Chapter 2 – Coastal Management of *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) occurring within the assessment area. Areas mapped as 'Coastal Wetlands' under this SEPP are associated with Lane Cove River located entirely outside of the subject land (see **Figure 2**).

Under Resilience and Hazards SEPP, development consent cannot be granted to developments on land mapped as "proximity area for coastal wetlands" unless the consent authority is satisfied that the proposed development will not significantly impact on the mapped areas. No areas mapped as proximity area for coastal wetlands will be impacted directly or indirectly by the project.

3.2.4. Habitat Connectivity

The subject land contains native vegetation that provides limited connectivity through primarily urban backyard trees with other retained native vegetation in the surrounding properties, including a small parkland (Mindarie Park) to the south of the subject land, which connects with Batten Reserve located further to the south. The habitat within the subject land is considered to form a small area of 'stepping-stone' habitat between Batten Reserve, approximately 85m to the south and Lane Cove National Park, approximately 320m

to the north. The subject land does not provide any direct connectivity between Batten Reserve and Lane Cove National Park as a result of previous development, including Mowbray Road, situated directly to the north of the subject land. Habitat connectivity is shown on **Figures 1** and **2**.

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. BioNet NSW Landscapes

The subject land is located within the Port Jackson Basin 'BioNet NSW Landscape'. The assessment area mostly comprises the same BioNet NSW Landscape, with fringing areas of Pennant Hills Ridges in the northwest and southeast of the assessment area (see **Figure 2**).

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 NSW SVTM. The native vegetation cover within the assessment area is shown in **Figure 2**. It occupies approximately 241 ha, which represents approximately 32% of the assessment area (approximately 749 ha). Therefore, the native vegetation cover value is assigned to the cover class of >30-70%.

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 2** have been identified.

4. Native Vegetation

4.1. Native Vegetation

The subject land was subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. The native vegetation extent within the subject land was determined through field surveys. The native vegetation extent within the subject land (i.e. development site footprint) is shown in **Figure 6**. It occupies approximately 0.12 ha of the subject land, which represents approximately 26% of the subject land.

The native vegetation extent within the subject land comprises scattered native, endemic trees/shrubs over a modified understorey that represent components of an original PCT, as well as areas of planted native vegetation that also exist over a highly modified understorey. The area of planted native vegetation occupies 0.4 ha of the subject land and has been assessed using the streamlined assessment module for planted native vegetation outlined in Section D.1 of Appendix D of the BAM (see ***Section 4.6***). The remaining vegetation within the subject land comprises exotic vegetation and cleared areas totalling approximately 0.33 ha. In accordance with Section 4.1.2 of the BAM, these areas do not require further assessment, unless they provide habitat for threatened species or are proposed for restoration as part of an offset. Therefore, these areas do not require further assessment. No differences between the aerial photographs used in this assessment and the native vegetation extent shown in **Figure 6** have been identified.

4.2. Plant Community Types

The vegetation analysis determined that the native vegetation (non-planted) within the subject land aligned with one PCT held within the BioNet Vegetation Classification database. **Table 3** provides a summary of the PCT identified within the subject land. The distribution of this PCT within the subject land is shown in **Figure 7**. Detailed descriptions of this PCT and the justification for PCT selection is provided in the sections below.

Table 3 PCTs within the subject land

PCT #	PCT	Subject Land (ha)
3136	Blue Gum High Forest	0.08

4.2.1. Blue Gum High Forest

PCT Name: Blue Gum High Forest

Vegetation Formation: Wet Sclerophyll Forests (Shrubby sub-formation)

Vegetation Class: North Coast Wet Sclerophyll Forests

Percent Cleared Value: 99%

4.2.1.1. Condition States

The occurrence of PCT 3136 in the subject land includes mature and regrowth trees/shrubs over an exotic dominated understorey and/or cleared areas. The occurrence of PCT 3136 in the subject land has been mapped as one broad condition state – 'Canopy'. The 'Canopy' condition state is described below.

i. Canopy Condition

A review of historical imagery identifies that the majority of the subject land was largely cleared for residential development prior to 1961. Since this clearing, some regeneration of native canopy species has occurred and what appears to be a single tree in the southwest has continued to grow. With the exception of the regeneration and continued growth of the single tree, the remaining vegetation is comprised of planted native and exotic vegetation typically characteristic of urban residential backyards.

PCT 3136 within the subject land occurs as mature and regrowth trees/shrubs over a mainly exotic/planted native understorey, as well as cleared areas. The native canopy species present include *Eucalyptus saligna* (Sydney Blue Gum), *Eucalyptus piperita* (Sydney Peppermint) and *Eucalyptus haemastoma* (Scribbly Gum). The native sub-canopy and shrub layer includes *Callistemon salignus* (Willow Bottlebrush), *Hymenosporum flavum* (Native Frangipani) and *Melaleuca bracteate* (Black Tea-tree). Native understorey species includes *Microlaena stipoides* (Weeping Grass), *Entolasia stricta* (Wiry Panic), *Rumex brownii* (Swamp Dock), *Oxalis perennans*, *Commelina cyanea* (Native Wandering Jew) and *Calochlaena dubia* (Rainbow Fern). Exotic species present include *Ficus benjamina* (Weeping Fig), *Corymbia citriodora* (Lemon-scented Gum), *Musa acuminata* (Edible Banana), *Morus alba* (White Mulberry), *Ehrharta erecta* (Panic Veldtgrass), *Cardamine hirsuta* (Common Bittercress), *Gamochaeta americana* (Purple Cudweed) and *Poa annua* (Winter Grass).

Examples of this community within the subject land are shown in **Photograph 1** and **Photograph 2**.

Photograph 1 Blue Gum High Forest within the centre of the subject land

Photograph 2 Blue Gum High Forest in the east of the subject land

4.2.1.2. Justification of PCT Selection

The selection of this PCT involved:

- Vegetation Formation: (Wet Sclerophyll Forests (Shrubby sub-formation);
- IBRA Subregion: Pittwater; and
- Species: All native species recorded within the BAM plot.

PCTs were filtered in the BioNet Vegetation Classification Database based on the above selection criteria. Two PCTs had the highest number of matches to the above selection criteria (total of 15 out of 19 matches). An additional PCT (PCT 3592) was also considered due to the presence of a single *Eucalyptus haemastoma* (located outside of the BAM plot), which is characteristic of PCT 3592, noting this PCT is a different formation (dry sclerophyll forest) than PCT 3136 (wet sclerophyll forest). These three PCTS were then further assessed through a comparison of the descriptive attributes provided in BioNet Vegetation Classification Database for each of the three PCTs. Following this analysis, PCT 3136 was selected as the best fit based on the landscape, soils, geographical location and other key diagnostic species.

It is noted that *Eucalyptus haemastoma* (Scribbly Gum) is not typically associated with PCT 3136; however, the subject land is in close proximity to areas mapped as Sydney Coastal Enriched Sandstone Forest (PCT 3592) by the SVTM, which this species is characteristic of. The subject land is likely a transitional area between the PCTs, but with a higher shale influence and therefore the crossover of characteristic species of different PCTs is not uncommon. Considering it is a single individual surrounded by areas containing *Eucalyptus saligna* that are

mapped as PCT 3136 (both within the subject land and offsite) and is located on soils with a higher shale influence, the individual has been mapped as PCT 3136. It is noted that PCT 3592 is not associated with a TEC, while PCT 3136 is a CEEC.

Within the subject land, the vegetation is degraded through the modification of the ground layer and general absence of a naturally occurring native shrub layer. Nevertheless, there are sufficient native species present within the scattered canopy trees and ground layer species, as well as the presence of soils with a higher shale influence, to confidently assign PCT 3136 to the vegetation. It is further noted that the SVTM NSW 1750 PCT mapping identifies that the subject land as historically being comprised entirely of Blue Gum High Forest.

The PCT selection process is shown in **Table 4**.

Table 4 PCT selection

Search Criteria	Results that fit the Criteria
1. IBRA Subregion (Cumberland), vegetation formation (Wet Sclerophyll Forests (Shrubby sub-formation), all natives species recorded in BAM plot.	PCTs with the most matches: 3176 and 3136. 3592 was also considered due to the presence of the single *Eucalyptus haemastoma*.
3. Comparison of the descriptive attributes provided in BioNet, including consideration of landscape, soils, geographical location and other key diagnostic species	PCT 3136 selected as best fit due to the highest match of characteristic species, the presence of characteristic canopy species *Eucalyptus saligna* and *Eucalyptus piperita* and shale soil influence.

i. Alignment with Threatened Ecological Communities

Within the BioNet Vegetation Classification Database, this PCT is associated with the TEC Blue Gum High Forest in the Sydney Basin Bioregion listed under the BC Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The area of Blue Gum High Forest within the subject land conforms to the listing criteria for Blue Gum High Forest under the BC Act due to the canopy species present, the canopy height, the shale soils present and the geographic area where the subject land is located (OEH 2020).

None of the Blue Gum High Forest present on the subject land conforms to the EPBC Act listed CEEC due to fragments of Blue Gum High Forest being less than one hectare in size (DoEE 2005).

4.3. Other Vegetation Types

4.3.1. Planted Native Vegetation

PCT Name: None

BC Act Status: None

EPBC Act Status: None

4.3.1.1. Site Description

Planted Native Vegetation occurs as five separate patches within the subject land. Vegetation within these areas includes *Stenocarpus sinuatus* (Queensland Firewheel Tree), *Lophostemon confertus* (Brush Box), *Ficus rubiginosa* (Port Jackson Fig), *Grevillea robusta* (Silky Oak) and *Casuarina glauca* (Swamp She-Oak). None of the Planted Native Vegetation present is characteristic of a PCT that would naturally occur within the subject land and this community does not conform to a listing under the BC Act or EPBC Act.

Photographs of this community within the subject land are shown in **Photographs 3** and **4**.

Photograph 3 Planted Native Vegetation within the north of the subject land

Photograph 4 Planted Native Vegetation in the east of the subject land

4.3.2. Exotic Vegetation

PCT Name: None

BC Act Status: None

EPBC Act Status: None

4.3.2.1. Site Description

This community occurs on the subject land as area comprising exotic vegetation, including species such as *Corymbia citriodora* (Lemon-scented Gum), *Syagrus romanzoffiana* (Queen Palm), *Lagerstroemia indica* (Crepe Myrtle), *Ligustrum lucidum* (Broad-leaf Prive), *Liquidambar styraciflua* (American Sweetgum), *Nerium oleander* (Oleander), *Magnolia grandiflora* (American Bull Bay Magnolia), *Viburnum odoratissimum* (Sweet Viburnum), *Ehrharta erecta* (Panic Veldtgrass), *Cardamine hirsuta* (Common Bittercress), *Gamochaeta americana* (Purple Cudweed) and *Poa annua* (Winter Grass).

This community does not comprise a defined native vegetation unit and does not conform to a listing under the BC Act or EPBC Act.

A photograph of this community within the subject land is shown as **Photograph 5**.

Photograph 5 Exotic Vegetation within the centre of the subject land

4.3.3. Cleared Land

PCT Name: None

BC Act Status: None

EPBC Act Status: None

4.3.3.1. Site Description

Cleared Land is comprised of existing structures and cleared areas. Cleared Land does not contain native vegetation and does not conform to a listing under the BC Act or EPBC Act.

A photograph of Cleared Land within the subject land is shown in **Photograph 6**.

Photograph 6 Cleared Land within the subject land

4.4. Threatened Ecological Communities

A total of one condition state of the PCT identified within the subject land has been assessed as conforming to a TEC listed under the BC Act. **Table 5** summarises the TEC and associated PCT, and conditions identified within the subject land, whilst the distribution is shown in **Figure 8**.

Table 5 Threatened ecological communities within the subject land

TEC Name	BC Act Status	Associated PCTs – Condition	Subject Land (ha)
Blue Gum High Forest	CEEC	3136 - Canopy	0.08

4.5. Vegetation Integrity Assessment

The native vegetation identified within the subject land was assigned to a vegetation zone based on PCT and broad condition state. Patch sizes were subsequently assigned for each vegetation zone. The extent of the vegetation zone within the subject land are shown in **Figure 9**.

The vegetation zone was assessed using BAM plots (see ***Section 2.3.2***) to determine the vegetation integrity score. A summary of BAM plot data utilised within the BAM calculator (BAM-C) to determine the vegetation integrity score is provided in **Appendix B** and a flora species list from the BAM plot is provided in **Appendix C**.

Vegetation zone, patch size and vegetation integrity scores for the subject land are summarised in **Table 6**.

Table 6 Vegetation integrity of the PCTs within the subject land

Vegetation Zone	PCT #	PCT Name	Condition Name	Subject Land (ha)	Patch Size Class	Vegetation Integrity Score	Hollow-bearing Trees Present?
1	3136	Blue Gum High Forest	Canopy	0.08	>100 ha	29.1 (Composition: 23.1 Structure: 42.2 Function: 25.3)	Yes

4.6. Planted Native Vegetation

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.

Planted native vegetation is present as small, isolated patches of planted trees/shrubs in the north, east, south and central-west of the subject land, as described in ***Section 4.3.1***. **Table 7** below details the application of the decision-making key to the planted native vegetation in the subject land. It was determined that subsection 5 applies, as the relevant vegetation has been planted in urban backyards for privacy and aesthetic value, and does not provide important habitat for threatened species.

Table 7 Decision-making key to determine the application of the streamlined assessment module for planted native vegetation

Assessment Criteria	Response/Action
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?	ii. No..... . Go to 2.
2. Is the planted native vegetation: a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	ii. No..... Go to 3.
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: a. a species recovery project b. Saving our Species project	ii. No..... Go to 4.

Assessment Criteria	Response/Action
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)?	
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	ii. No..... Go to 5.
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or farms?	i. Yes The vegetation has been planted for residential landscape purposes (privacy/aesthetics). Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	This list had not been released at the date of report preparation.
D.2 Assessment of planted Native Vegetation for Threatened Species Habitat. The assessor must assess the suitability of the planted native vegetation for use by threatened species and record any incidental sightings or evidence (e.g. scats, stick nests) of threatened species credit species (flora	The Planted Native Vegetation has the potential to provide foraging habitat for mobile threatened species, but is not considered to be important to any threatened species long-term survival. **Chapter 5** includes an assessment of threatened species habitats and **Chapter 7** and **8** contain further

Assessment Criteria	Response/Action
and fauna) using, inhabiting or being part of the planted native vegetation. If there is evidence that threatened species are using the planted native vegetation as habitat, the assessor must apply Section 8.4 of the BAM to mitigate and manage impacts on these species. Species credits are not required to offset the proposed impacts. The steps taken to assess threatened species habitat and all reasonable measures proposed to be taken to mitigate or minimise impacts must be set out in the BDAR or BCAR.	details on avoidance, impacts and minimisation measures to be implemented.

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: Pittwater;
- Associated PCTs: 3136;
- Percent native vegetation cover in the assessment area: 32%;
- 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 25 ecosystem credit species and four species credit species. These totals include nine 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.

5.2. Ecosystem Credit Species

5.2.1. Overview

Table 8 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 is provided.

5.2.3. Presence of Ecosystem Credit Species

No ecosystem credit species have been located in the subject land.

Table 8 Ecosystem credit species requiring further assessment

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Relevant PCT	Relevant Vegetation Zone	Sensitivity to Gain	Retained in Assessment
Anthochaera phrygia	Regent Honeyeater (foraging)	CE	CE	3136	1	High	Yes
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	3136	1	Moderate	Yes
Callocephalon fimbriatum	Gang-gang Cockatoo (foraging)	V	-	3136	1	Moderate	Yes
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo (foraging)	V	-	3136	1	High	Yes
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	3136	1	High	Yes
Daphoenositta chrysoptera	Varied Sittella	V	-	3136	1	Moderate	Yes
Dasyurus maculatus	Spotted-tailed Quoll	V	E	3136	1	High	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	3136	1	High	Yes
Glossopsitta pusilla	Little Lorikeet	V	-	3136	1	High	Yes
Haliaeetus leucogaster	White-bellied Sea-Eagle (foraging)	V	-	3136	1	High	Yes
Hirundapus caudacutus	White-throated Needletail	V	V	3136	1	High	Yes
Ixobrychus flavicollis	Black Bittern	V	-	3136	1	Moderate	Yes
Lathamus discolor	Swift Parrot (foraging)	E	CE	3136	1	Moderate	Yes
Lophoictinia isura	Square-tailed Kite (foraging)	V	-	3136	1	Moderate	Yes
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	3136	1	High	Yes
Miniopterus australis	Little Bent-winged Bat (foraging)	V	-	3136	1	High	Yes
Miniopterus orianae oceanensis	Large Bent-winged Bat (foraging)	V	-	3136	1	High	Yes
Petaurus australis	Yellow-bellied Glider	V	V	3136	1	High	Yes
Petroica phoenicea	Flame Robin	V	-	3136	1	Moderate	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Relevant PCT	Relevant Vegetation Zone	Sensitivity to Gain	Retained in Assessment
Phoniscus papuensis	Golden-tipped Bat	V	-	3136	1	High	Yes
Pteropus poliocephalus	Grey-headed Flying-fox (foraging)	V	V	3136	1	High	Yes
Ptilinopus superbus	Superb Fruit-Dove	V	-	3136	1	Moderate	Yes
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	3136	1	High	Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	3136	1	High	Yes
Varanus rosenbergi	Rosenberg's Goanna	V	-	3136	1	High	Yes

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

5.3. Species Credit Species

5.3.1. Overview

Table 9 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.

Justification is provided below this table for species that have been removed from the assessment in accordance with Steps 1-3 of Section 5.2 of the BAM. All species not removed from consideration (i.e. retained in the assessment) are by default candidate species credit species that require further assessment. Of the assessed predicted species, none were retained for further assessment and all seven were removed from consideration.

Table 9 Species credit species requiring further assessment

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Relevant PCT	Relevant Vegetation Zone	Sensitivity to Gain	Retained in Assessment
Flora							
Rhizanthella slateri	Eastern Australian Underground Orchid	V	E	3136	1	High	No
Rhodamnia rubescens	Scrub Turpentine	CE	CE	3136	1	Very High	No
Fauna							
Anthochaera phrygia	Regent Honeyeater (breeding)	CE	CE	3136	1	High	No
Lathamus discolor	Swift Parrot (breeding)	E	CE	3136	1	Moderate	No
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	3136	1	Very High	No
Miniopterus australis	Little Bent-winged Bat	V		3136	1	Very High	No
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		3136	1	Very High	No

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

5.3.2. Justification for Removal

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

Habitat assessments of the subject land were undertaken as described in ***Section 2.4.1.1***. 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 following threatened flora and fauna species were ruled out of consideration as candidate species credit species:

- *Rhizanthella slateri* – Habitat Degradation: This species is considered highly unlikely to occur in the subject land as its closest known occurrences to the subject land are in the Blue Mountains and the Wiseman's Ferry Area (NSW Government 2019). Further to this, the vegetation within the subject land does not correspond to any vegetation communities known to overlap the distribution of the species as per the species' Approved Conservation Advice (Department of the Environment 2014). Not only does the subject land not contain suitable vegetation for the species and is not located nearby a known population, the soils and vegetation within the subject land have been highly modified as a result of past land use, and are considered to be not suitable and too degraded to provide potential habitat for the species. It is further noted that there are no known records of the species within 5km of the subject land.
- *Rhodamnia rubescens* – Habitat Degradation: This species is considered highly unlikely to occur in the subject land. Although the species is known to occur in North Coast Wet Sclerophyll Forests (such as PCT 3136), it usually occurs in wet sclerophyll associations in rainforest transition zones (including forests of *Eucalyptus tereticornis* and *Eucalyptus bosistoana* in the Sydney region) (NSW Scientific Committee 2019). The subject land is not within a rainforest transition zone and does not contain *Eucalyptus tereticornis* or *Eucalyptus bosistoana*. Further to this, the species is conspicuous and can be surveyed for year round and was not recorded during surveys of the subject land. The soils and vegetation within the subject land have been highly modified as a result of past land use and are not considered to be suitable. As such, the subject land is considered too degraded to provide potential habitat for the species. It is further noted that there is only one known record of the species within 5km of the subject land, which dates back to 2018.

The following threatened fauna species were ruled out of consideration as candidate species credit species as the habitat constraints listed in the TBDC did not apply to the subject land. These are:

- Regent Honeyeater – Habitat Constraint: Mapped areas;
- Swift Parrot – Habitat Constraint: Mapped areas;

- Large-eared Pied Bat – Habitat Constraint: Cliffs and/or within 2kms of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 kms of old mines or tunnels;
- Little Bent-winged Bat – Caves and/or 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' and/or observation type code 'E nest-roost' and/or with numbers of individuals >500 or from the scientific literature; and
- Large Bent-winged Bat – Caves and/or 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' and/or observation type code 'E nest-roost' and/or with numbers of individuals >500.

5.3.3. Presence of Species Credit Species

No species credit species have been located in the subject land.

6. Prescribed Impacts

6.1. Prescribed Impacts

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). 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 10**. The location of prescribed impacts is shown in **Figure 10**.

Table 10 Relevance of prescribed impacts

Prescribed Impact	Relevance to the Project	Associated Threatened Entities
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.	-
Human-made structures	The seven residential dwellings and associated sheds within the development site footprint will be demolished as part of the proposed development. These have the potential to be roosting habitat for some microchiropteran bats or bird species. Impacts to human-made structures would occur during the construction phase of the project and result in a long-term impact.	Ecosystem credit fauna species which may utilise the habitat.
Non-native vegetation	Non-native vegetation occurring within the development site footprint comprises areas of exotic grasses, shrubs and trees within the Exotic Vegetation community mapped. This vegetation may provide some low-value habitat for native fauna species, including threatened birds and bats,	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.

Prescribed Impact	Relevance to the Project	Associated Threatened Entities
	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 development site footprint contains native vegetation that has some minor connectivity to other retained native and planted vegetation in 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.	Ecosystem credit fauna species which may utilise the habitat as part of a larger foraging range.
Waterbodies, water quality and hydrological processes	Not relevant.	-
Wind farm developments	Not relevant. The project does not comprise a wind farm development	-
Vehicle strikes	Not relevant. The subject land is within a previously developed area and although the project includes an access road to underground parking, these are not considered likely to result in vehicle strikes to threatened species or animals associated with a TEC.	-

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 all areas to be completely cleared and/or modified for the proposed development; however, native vegetation in the southwest and central-west of the subject land will be retained and managed under a landscape plan.

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

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.

7.1.1. Constraints

Opportunities to further avoid impacts on biodiversity within the subject land are considered to be highly constrained due to the following:

- **Topography**: The subject land has a 9m slope from north to south which makes maintaining natural ground levels challenging while still creating accessible communal open spaces required;
- **Stormwater and Sewer**: The site is impacted by two major service routes that must be considered to support the project and ensure continued service to neighbouring properties. These routes include a 523mm concrete-encased stormwater main located within a council-owned easement and a 150mm PVC local sewer line owned by Sydney Water (NS Partners 2024). Both pipelines run through the centre of the site and intersect the root zones of several trees, including a mature *Eucalyptus saligna* (Tree 56, as noted in the project's Tree Protection & Plan (Arterra Design 2024)).

  Although these assets are vital for servicing upstream and downstream properties, their current condition is uncertain, raising concerns about whether the roots of Tree 56 or nearby trees may have already affected the structural integrity of these pipes. It is also important to note that as long as these assets remain within the root zone of Tree 56, there is an inherent risk of future damage and the need for maintenance, excavation, or upgrades that could disturb the tree's roots and threaten its long-term viability.

  An alternative diversion strategy for the sewer and stormwater systems has been proposed (refer to the Water Management Plan prepared by WSP) as part of the development application. However, the existing connection pits along Mindarie Street make it unavoidable for the new routes to encroach into the root zone of Tree 56, and this will also require the removal of redundant sections of pipe within the root zone where pipe crossovers occur. It is also relevant to note that although a preliminary strategy has been proposed, the final location of these assets will be subject to a Section 73 Notice of Requirements from Sydney Water during the detailed design phase (following development approval), and will require ongoing coordination with both Sydney Water and Lane Cove Council.

- **Building Envelope Location**: The proposed building envelope is limited on the eastern side by both the required Development Control Plan (DCP) setback to Hatfield Street and the presence of a 1,350mm sewer tunnel located approximately 27 meters below ground. These constraints leave minimal flexibility to adjust the building footprint away from the root zone of Tree 56 without further encroaching into the sewer's zone of influence or breaching compliance with DCP controls.

- **Housing Units**: The delivery of social and affordable housing is critical community infrastructure, providing significant public benefit, which must be balanced against potential impacts. The proposed bulk and scale of the project has been carefully considered, and is significantly under the total permissible height and Floor Space Ratio (FSR) controls, noting that The proposed development is considered to be underdeveloped, with 86 proposed units out of a possible 120 permissible under current planning controls. This clearly demonstrates that all reasonable measures have been considered to minimise impacts on biodiversity while ensuring the delivery of critical infrastructure on the site.

  This should be considered in light of the NSW Government's commitments under the Housing Accord and the need to balance and mange impacts for the delivery of more affordable housing. This is in accordance with the 'In-fill Affordable Housing Planning Systems Circular (PS 23-003)', which states that consent authorities are remaindered to consider the delivery of market housing and affordable housing when considering the social impact and the public interest of a development, as required under Section 4.15 of the EP&A Act.

  Further modifying the design to preserve Tree 56 would reduce the number of much-needed social and affordable housing units in the Lane Cove area. The proposed development is already considered to be underdeveloped, with 86 proposed units out of a possible 120 permissible under current planning controls.

- **Commercial Impacts**: The project depends on securing funding from the Commonwealth via the Housing Australia Future Fund. The funding application, submitted by the proponent in early 2024, was based on delivering 86 social and affordable housing units in Lane Cove. Any reduction in this number would threaten the commercial viability of the project, potentially making it unfeasible to deliver the social and affordable housing as planned under this program.

- **Safety and Maintenance Concerns**: The close proximity of Tree 56 to the building facade presents potential safety risks for social and affordable housing tenants. There is a possibility of falling branches impacting balconies and the communal roof terrace, as well as causing damage to the property. Retaining Tree 56 would require significant pruning and continuous management to mitigate these risks and ensure safety.

- **Overshadowing Impact**: Alternative designs considered included a reduction of the building footprint from the structural root zone of Tree 56, which would require an additional storey added to the development to deliver the 86 social and affordable housing units required to receive Commonwealth funding. The additional storey would result in greater overshadowing of Mindarie Park and its playground located to the south (between 9am and 1pm), as well as greater solar impacts to neighbouring properties at No. 2 Kullah Parade (between 2 and 3pm) and lower level apartments of No. 2-4 Pinaroo Place (between

9am and 10am) The additional storey would be inconsistent with the established character of the Mowbray Precinct and would create a visual imbalance and detract from the prevailing height and scale of the surrounding developments which are between 4-5 storeys.

7.1.2. Project Location

The development site footprint has been situated within the subject land to allow for the construction and operational requirements of the project while minimising impacts to areas containing biodiversity values as far as practicable while still delivering a commercially viable development. In determining the location of the development site footprint, the project has sought to avoid and minimise direct impacts on native vegetation and habitat by:

- Locating the project (including infrastructure) within areas currently comprising exotic dominated vegetation, planted vegetation and cleared land where possible; and
- Locating the project to retain an area of PCT 3136 containing hollows within the subject land that will be managed under a landscape plan.

7.1.3. Project Design

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

- Avoidance and retention of 0.02 ha of PCT 3136;
- Minimising impacts to native vegetation by placing the development site footprint within exotic dominated and planted vegetation, and previously cleared areas where possible; and
- Minimise impacts to biodiversity through the implementation of a suite of mitigation measures, including weed management, tree protection measures, clearing protocols, nest box installation and implementation of a landscape plan (Landform 2024).

7.1.4. Alternative Designs

At the development feasibility stage, two architectural schemes were initially explored for the site. The first scheme (refer to Design 1 in **Appendix E**) aimed to maximise the allowable FSR and Gross Floor Area (GFA) under the Lane Cove LEP and Housing SEPP. However, after further due diligence and a desktop study conducted by the project arborist, a significant Blue Gum High Forest tree (T56) was identified on the site. This led to the development of a second design (refer to Design 2 in **Appendix E**) that prioritised the retention of the tree over maximisation of FSR and GFA which resulted in a loss of approximately 22 social and affordable dwellings.

The second design was further refined to incorporate a target bedroom mix and affordable housing tenure split, based on the reduced building footprint. This version of the scheme formed the commercial basis of Homes NSW's application to Housing Australia for Commonwealth funding through the Housing Australia Future Fund. While the application was being submitted, the concept continued to evolve into a formal SSD scheme.

At the SSD stage, detailed on-site investigations confirmed the tree's exact location, size, and Tree Protection Zone, and a Tree Protection Area was defined that encroached further into the proposed building footprint than initially anticipated. Additionally, the location of in-ground services was confirmed during this phase, further constraining flexibility to further adjust the design.

Tree avoidance options were explored to offset the building footprint further away from the tree. However, these alternatives either resulted in a further reduction of social and affordable housing units or required the addition of a sixth storey to relocate these units. The impacts of an additional storey were analysed and it was concluded that this would increase overshadowing to surrounding neighbouring buildings and Mindarie Park, particularly affecting the children's playground to the south. Furthermore, adding a sixth storey would significantly depart from the established character and scale of the area, which consists of five storey apartment developments and 1-2 storey detached houses.

Given these constraints, and with the project already tied to the development parameters set in HNSW funding application, retaining the tree was determined to be unfeasible. The decision was made to propose its removal to facilitate the development. The alternative design (i.e. design that incudes adding a sixth storey) and the design currently proposed are detailed in **Appendix E** (refer to 'alternative design and currently proposed design').

A summary of the avoidance and minimising measures considered for this project is outlined in **Table 11**.

Table 11 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 reducing impacts on the Blue Gum High Forest TEC in the subject land. This includes the installation of services away from BGHF located in the southwest corner of the subject land.	During design and approval	Proponent and consultant team	Retention of approximately 0.03 ha of native vegetation within the subject land, comprising 0.02 ha of the TEC Blue Gum High Forest and <0.01 ha of Planted Native Vegetation that will be planted out with native endemic species under a landscape plan.
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 implementation of a landscape plan.	Pre and post construction and during operation phase	Proponent and consultant team	Minimise impacts on biodiversity values of the subject land and adjoining areas.
Design amendments to various elements of the project design	Yes	As part of the design process of the project, careful consideration has been given to reducing impacts on the Blue Gum High Forest TEC in the subject land. This includes the development of multiple development designs (refer to **Appendix E**) in an attempt to avoid the TEC as far as practicable.	During design and approval	Proponent and consultant team	Avoid and minimise impacts on native vegetation and TECs, retain some level of habitat connectivity.

Action	Adopted (Yes/No/In part)	Justification	Timing (if adopted)	Responsibility (if adopted)	Outcome (if adopted)
Partial development of the subject land to avoid/minimise impacts on biodiversity and achieve greater tree retention	Yes	Partial development has been incorporated in the retention of areas of Blue Gum High Forest, noting that the proposed development is considered to be 'underdeveloped' as there are only 86 proposed units out of a possible 120 permissible under current planning controls .	During design and approval	Proponent and consultant team	Avoid and minimise impacts on a TEC and retain habitat connectivity, including a hollow-bearing tree.
'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 (refer to **Appendix E**). The final option selected has consideration to both biodiversity values and the development.	During design and approval	Proponent and consultant team	Retention of approximately 0.02 ha of the TEC Blue Gum High Forest

7.2. Avoid and Minimise Prescribed Impacts

7.2.1. Human-made Structures

The existing residential dwellings and associated sheds will be demolished as part of the proposed development. These have the potential to provide roosting habitat for some microchiropteran bat species as access/egress points are present.

The potential inhabitation of these structures would be limited to ecosystem credit species and non-threatened native species. No species credit species microchiropteran bats are identified for the project in ***Section 5.3***; however, some of the ecosystem credit microchiropteran bat species predicted (***Section 5.2***) are known to utilise human-made structures. As such, it is recommended a pre-clearance survey is undertaken by an experienced ecologist of the structures prior to demolition and any fauna found can be relocated; thus, minimising the impact of removing these structures. Further details are provided in ***Section 8.5.5***.

7.2.2. Non-native Vegetation

Areas of non-native vegetation within the subject includes mown lawns and planted trees, shrubs and groundcovers. 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 nearby the subject land. The proposed development will remove approximately 0.22 ha of non-native vegetation. The development has prioritised the retention of the native vegetation and has therefore predominantly situated the development in the areas of exotic 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 (Landform 2024) which will provide sheltering and foraging resources for native species in the short to long-term.

7.2.3. Habitat Connectivity

The vegetation within the subject land has connectivity, albeit poor, with the treed vegetation in the surrounding properties, though these are separated and fragmented by the residential urban landscape. No habitat corridor connectivity will be broken or fragmented due to the proposed vegetation removal, there will just be a minor reduction in the area of habitat available. This existing habitat connectivity will be retained through the proposed retention of vegetation within the subject land, as well as proposed plantings under the project's landscape plan (Landform 2024).

When considering the requirements associated with the extent of earthworks and services required, it would not be possible to avoid all impacts on native vegetation and meet the aims of the project.

8. Impact Assessment

8.1. Direct Impacts

8.1.1. Native Vegetation Clearing

One PCT, PCT 3136, present in a single condition state will be impacted by the proposed development. A total of 0.06 ha of this vegetation will be completely cleared within the subject land and additional 0.02 ha will be modified (i.e. retained and managed under a landscape plan). A further 0.04 ha of Planted Native Vegetation, 0.22 ha of Exotic Vegetation and 0.11 ha of Cleared Land will also be removed. All 0.08 ha of PCT 3136 to be removed/modified is assessed as conforming to the TEC listing of Blue Gum High Forest under the BC Act.

The direct impact resulting from the proposed development is the loss of vegetation and associated habitat within the subject land. **Table 12** identifies the extent of clearing impacts to vegetation within the subject land, as well as the total area to be modified (retained and managed under a landscape plan).

Table 12 Extent of clearing impacts

Vegetation Zone	PCT #	PCT Condition Class	Subject Land (ha)	Cleared in the Subject Land (ha)	Modified (Retained) in the Subject Land (ha)
1	3136*	Canopy	0.08	0.06	0.02
-	-	Planted Native Vegetation	0.04	0.04	<0.01
-	-	Exotic Vegetation	0.22	0.22	0
-	-	Cleared Land	0.11	0.11	0
Total			0.45	0.43	0.03

Totals may not exactly add up to sum of individual areas due to rounding.
**Serious and Irreversible Impact (SAII) entity.*

8.1.2. Loss of Specific Habitat Features

The main habitat for native fauna in the subject land is in the areas of native vegetation (both PCT 3136 Canopy and Planted Native Vegetation). In addition to native vegetation, specific habitat features identified within the subject land include a total of two hollow-bearing trees and human made structures. One hollow-bearing tree containing one large and one medium hollow will be retained and managed under a landscape plan within an area of PCT 3136 in the southwest corner of the subject land. A second hollow-bearing tree within PCT 3136 containing one small hollow will be removed. The hollow to be removed is small in size and considered unlikely to be utilised by threatened species as it is shallow and considered not suitable for microchiropteran bats, which are the only ecosystem credit species predicted by the BAM-C that would potentially use a hollow of that size. The hollow to be removed is considered most likely to be utilised by common reptile species, if utilised at all.

The project will result in the loss of habitat features within the subject land, comprising one hollow-bearing tree containing one small hollow and seven residential dwellings.

Overall, the removal of these specific habitat features is considered to have relatively minor implications for native fauna species due to the modified ecological context within which the development site occurs, and the high mobility of the species likely to utilise these habitats. As such, the largest impact to native fauna is considered to be the removal of approximately 0.31 ha of foraging habitat in the form of native (both PCT 3136 and Planted Native Vegetation) and exotic vegetation. This will be mitigated through the implementation of a landscape plan that includes the planting of native species that will serve as foraging habitat for native species in the future. Further to this, although the one small hollow to be removed is not considered to be a loss of significant habitat, one nest box will be installed within the retained area of PCT 3136 to offset its removal and appropriate clearing protocols will be implemented to minimise impacts on any resident fauna.

8.2. Change in Vegetation Integrity Score

Table 13 details the change in vegetation integrity score for the vegetation zone and management zones within the subject land. Due to the need to remove all vegetation from the construction footprint, the future vegetation integrity score for this management zone (i.e. cleared management zone) assumes complete removal of all vegetation. Areas within the subject land to have trees retained (i.e. retained management zone) assumes that no native canopy trees will be removed as predicted by the project's arborist. This BDAR assumes entire removal of the shrub and ground layer and the future integrity score for this management zone in the BAM-C was updated to reflect this (i.e. canopy scores retained, and shrub and groundcover scores reduced to '0'). It is important to note that the canopy trees to be retained within the 'retained' management zone currently exist over hardstand and exotic vegetation, and the vegetation integrity score for the 'retained' management zone will likely increase in the future as the area is proposed to be managed under a landscape plan that is to include the planting of species characteristic of PCT 3136. It is further noted that if the future vegetation integrity score of the 'retained' management zone was reduced to '0' (i.e. assumed entire clearance), this has no implications on the number of ecosystem credits required to be retired (i.e. ecosystem credit liability remains '1').

Table 13 Changes in vegetation integrity score for management zones

Zone	Vegetation Zone Name	Management Zone	BRW	Area (ha)	Vegetation Integrity Score			Total VI Loss
					Current	Future	Total Change	
1	3136_Canopy	Cleared	2.5	0.06	29.1	0.00	-29.1	-27.7
		Retained	2.5	0.02	29.1	5.7	-23.5	

BRW = Biodiversity Risk Weighting

8.3. Indirect Impacts

Table 14 outlines the indirect impacts to native vegetation and habitat. Due to the existing modified nature of the vegetation within the development site footprint, the indirect impacts of the project are not considered to be significant. Nevertheless, a suite of mitigation measures will be implemented to minimise indirect (and direct) impacts associate with the project (refer ***Section 8.5***).

Table 14 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 vegetation surrounding the development site footprint, such as increased sedimentation.	Native vegetation surrounding the subject land as well as areas to be retained within the subject land.	Short term (during construction) and potential long term	Ecosystem credit species	Reduced condition of the adjoining vegetation
Reduced viability of adjacent habitat due to edge effects	Minor impact as development site footprint is within a developed area where the habitat is already modified and scattered due to land use. The proposed development would not significantly increase edge effects beyond current conditions.	Native vegetation surrounding the subject land as well as areas to be retained within the subject land.	Long-term	Ecosystem credit species	Reduced condition of the adjoining vegetation
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 and immediately adjacent the development site footprint.	Native vegetation surrounding the subject land as well as areas to be retained within the subject land.	Short term (during construction)	Ecosystem credit species	Short term disruption of fauna habitat usage during construction
Transport of weeds and pathogens from the site to adjacent vegetation	Numerous exotic weeds are known to occur within the development site footprint and may be inadvertently spread to surrounding vegetation.	Native vegetation surrounding the subject land as well as areas to be	Potential long-term	Ecosystem credit species	Reduced condition of adjoining vegetation

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
		retained within the subject land.			
Increased risk of starvation, exposure and loss of shade or shelter	Impact unlikely. The project is unlikely to cause displacement of fauna such that it increases the risk of starvation, exposure and loss of shade or shelter.	-	-	-	-
Loss of breeding habitats	Impact unlikely. The proposed development is unlikely to result in the loss of breeding habitat in adjacent vegetation. One hollow-bearing tree will be retained in the southwest of the subject land that will continue to provide breeding habitat within the subject land.	-	-	-	-
Trampling of threatened flora species	Impact unlikely. No threatened flora species were recorded within the subject land.	-	-	-	-
Inhibition of nitrogen fixation and increased soil salinity	While the proposed development would remove nitrogen fixing species from the disturbance footprint, impacts beyond this on nitrogen fixing species or soil salinity are considered unlikely.	-	-	-	-
Fertiliser drift	Impact unlikely, fertiliser use would be limited to landscaping areas during plant establishment and would not be expected to drift.	-	-	-	-

Indirect Impact	Nature	Extent	Duration	Threatened Entities Likely Affected	Consequences
Rubbish dumping	Construction activities and occupation of the subject land may result in rubbish dumping within adjoining areas of native vegetation.	Native vegetation surrounding the subject land as well as areas to be retained within the subject land.	Potential long term	Ecosystem credit species	Reduced condition of the adjoining native vegetation
Wood collection	Impact unlikely. There is limited fallen logs or timber to be collected.	-	-	-	-
Bush rock removal and disturbance	No bush rock was recorded within the subject land.	-	-	-	-
Increase in predatory species populations	Impact unlikely. The proposed development is considered unlikely to result in an increase in predatory species populations.	-	-	-	-
Increase in pest animal populations	Impact unlikely. The project is considered unlikely to result in an increase in pest animal populations.	-	-	-	-
Increased risk of fire	Impact unlikely. The project is unlikely to increase the risk of bushfire.	-	-		-
Disturbance to specialist breeding and foraging habitat	Construction activities may likely result in a disturbance to breeding and foraging habitat.	Native vegetation surrounding the subject land as well as areas to be retained within the subject land.	Short term (construction)	Ecosystem credit species	Short term disruption of fauna habitat usage during construction.

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. Human-made Structures

8.4.1.1. Nature

Seven existing residential dwellings and associated structures (e.g. sheds) be demolished as part of the proposed development.

8.4.1.2. Extent

The development site footprint of these areas occupied by the structures is approximately 0.11 ha.

8.4.1.3. Duration

Impacts to the human-made structures would occur during the construction phase of the project. The removal is a long-term impact.

8.4.1.4. Threatened Entities Affected

Ecosystem credit microchiropteran bats have the potential to be impacted by the removal of possible roosting habitat.

8.4.1.5. Consequences

The project will result in the removal of these structures that may provide roosting habitat for some threatened species. The impact is unlikely to be significant as suitable 'natural' habitat will be retained within nearby areas, in particular within Batten Reserve to the south and Lane Cove National Park to the north. Further to this, significant numbers of human-made structures will remain within the already urbanised area.

8.4.2. Non-native Vegetation

8.4.2.1. Nature

Non-native vegetation is proposed to be cleared for the project. Non-native vegetation includes areas of exotic vegetation as shown in **Figures 6** and **7**.

8.4.2.2. Extent

The proposed development will clear a total of approximately 0.22 ha of non-native vegetation in the form of exotic grassland, shrub and tree species.

8.4.2.3. 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.

8.4.2.4. 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.

8.4.2.5. Consequences

The project will result in a reduction in non-native vegetation by approximately 0.22 ha. 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 nearby areas, in particular within Batten Reserve to the south and Lane Cove National Park to the north.

8.4.3. Habitat Connectivity

8.4.3.1. Nature

The native woody vegetation within the subject land connects to other native and non-native treed vegetation within surrounding properties. The area of native vegetation is considered to comprise 'stepping-stone' habitat for native species, which will be reduced marginally. The construction of the project would be an impediment to the movement of some fauna species.

8.4.3.2. Extent

Habitat connectivity will be reduced through the removal of 0.09 ha of extant native vegetation (both Planted Native Vegetation and PCT 3136) and 0.22 ha of Exotic Vegetation. Stepping-stone habitat connectivity will remain through the retention of vegetation in the southwest corner of the subject land, as well as through replantings as identified in the project's landscape plan (Landform 2024).

8.4.3.3. 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.

8.4.3.4. 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.

8.4.3.5. Consequences

The project will result in the direct reduction in extant native vegetation (both PCT 3136 and Planted Native Vegetation) by 0.09 ha. Although the 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. 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.

8.5. 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 15**.

8.5.1. 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.

8.5.1.1. 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.

8.5.1.2. Disposal

Due to the weedy nature of the subject land, any vegetation removed from site should be transported to an appropriate green waste facility (via a covered load) and disposed of appropriately. The *Eucalyptus saligna* (Blue Gum) and *Eucalyptus piperita* (Sydney Peppermint) may be mulched and re-used on-site in areas of retained vegetation. No other vegetation should be used as mulch within the subject land.

8.5.1.3. Containment

Follow-up monitoring and maintenance of retained vegetation and replanting areas managed under the project's landscape plan (Landform 2024) should be undertaken to contain any re-emergence of weed species.

8.5.2. Delineation of Clearing Limits

The current limits of clearing will be marked either by high visibility tape on trees or metal/wooden pickets, fencing or an equivalent boundary marker that will be installed prior to clearing. To avoid unnecessary or inadvertent vegetation and habitat removal or impacts on fauna, disturbance must be restricted to the delineated area and no stockpiling of equipment, machinery, soil, rock or vegetation will occur beyond this boundary. Any tree protection measures provided by the project arborist are to be implemented and maintained throughout the duration of construction activities. This is particularly important for areas of vegetation to be retained in the southwest corner of the subject land.

8.5.3. Pre-clearance Surveys

To minimise impacts to fauna species during construction, pre-clearance surveys will be conducted in all areas of vegetation that are required to be cleared and within the two structures to be demolished. Pre-clearing surveys will be undertaken within one week of clearing activities by a qualified ecologist.

Habitat features to be identified include:

- Hollow-bearing trees;
- Rock piles;
- Logs;
- Stags; and
- Nests within tree canopy or shrubs.

Such features have the potential to contain native species. All habitat features will be identified, recorded and flagged with fluorescent marking tape and trees will have an "H" spray painted with marking paint on two sides of the tree. The pre-clearance survey will also determine the presence of any resident native fauna utilising the habitat features identified. Any native fauna found during pre-clearing surveys must be captured and relocated to appropriate nearby habitat proposed to be retained. During pre-clearance surveys, the location of the one nest box to be installed (refer to ***Section 8.5.7***) will be identified and the nest box will be installed under the supervision of an ecologist.

8.5.4. Staging of Clearing

The clearing of any habitat features identified during pre-clearance surveys (refer to ***Section 8.5.4***) will be conducted under the supervision of an ecologist 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 under the supervision of an ecologist to enable isolation of the feature. 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 under the supervision of an ecologist 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;
- All hollows will be investigated by an ecologist for the presence of fauna following felling of the tree; and
- 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;
- The clearing of trees should be avoided in late winter/spring during breeding/nesting period for birds; 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.

8.5.5. Structure Removal Supervision

There is the potential for microchiropteran bats and other mammals (e.g. possums) to roost/refuge within the existing dwellings to be demolished, therefore it is recommended a suitably qualified ecologist inspect existing dwellings over a period of two nights, within three weeks of demolishing the structures. Inspections will include visual inspections of roof cavities with a hand-held torch during the day, as well as roosting surveys utilising an echolocation device to detect any microchiropteran bats. A brief letter report will be provided on completion of these works detailing whether or not individuals are suspected of utilising the structures to be demolished. If it is determined that native fauna are present, the letter will include recommendations on how to best demolish the buildings while minimising risk to resident fauna. This may be in the form of demolishing buildings in steps where roofs are removed initially under the supervision of an ecologist.

8.5.6. 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).

8.5.7. Nest Box Installation

To mitigate any potential impacts on native fauna associated with the removal of one tree containing one small hollow, one nest box is proposed to be installed as part of the project to offset the removal of hollows at a 1:1

ratio. The nest box will be installed in a tree proposed to be retained by the project. The nest box will be suitable for microchiropteran bats and be installed under the supervision of an ecologist at a height greater than 2 meters. The exact location of where the nest box will be installed will be identified by an ecologist during pre-clearing surveys (refer ***Section 8.5.3***).

8.5.8. Landscape Plan

In order to manage the area of PCT 3136 to be retained in the southwest corner of the subject land, a landscape plan (Landform 2024) has been developed that will include the planting of flora species characteristic of the BC Act listed CEEC Blue Gum High Forest within the area of PCT 3136 to be retained. Species included in the landscape plan are to be checked by an ecologist to ensure they are characteristic of Blue Gum High Forest and should be sourced from local provenance (from the same or an adjoining local government area). The landscape plan is to include provisions for replacement plantings for any individuals that do not survive.

Table 15 Summary of mitigation measures

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk and Consequences of Residual Impacts
Weed management	Appropriate weed control activities will be undertaken in accordance with the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022.	Construction	Prior to construction, following vegetation clearing	Contractor	Low	Spread of weeds throughout the subject land and surrounding area.
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/ Arborist	Low	Unnecessary damage to retained trees in the ecological zone or adjacent properties.
Pre-clearance survey	Pre-clearance surveys will be conducted in all areas of vegetation that are required to be cleared and within the two structures to be demolished. Pre-clearing surveys will be undertaken within two weeks of clearing. Habitat features will be marked during the pre-clearing survey.	Construction	Once	Project ecologist	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	Construction	Once	Contractor/ Project ecologist	Moderate	Increased and unnecessary mortality of native fauna.

Mitigation Measure	Proposed Techniques	Timing	Frequency	Responsibility	Risk of Failure	Risk and Consequences of Residual Impacts
	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)					
Structure Removal Supervision	If deemed to be required (refer to ***Section 8.5.5***), an ecologist will be present during the demolition of the human-made structures to catch and relocate any species utilising these buildings	Construction	Once	Contractor/ Project ecologist	Moderate	Increased and unnecessary mortality of native fauna.
Sedimentation control	Construction activities will be undertaken in accordance with "The Blue Book" (Landcom 2004). These include implementation of measures detailed in Preliminary Erosion and Sediment Control Plan (Costin and Roe Consulting 2021)	Construction	Throughout construction period	Contractor	Moderate	Sedimentation into adjoining vegetation.
Nest box installation	Installation of one nest box in retained trees.	Prior to vegetation clearing	Once	Project ecologist	Low	Reduction in available fauna habitat.
Landscape plan implemented	Landscape plan has been developed for the project that will include plantings of characteristic Blue Gum High Forest species within retained areas of PCT 3136 in the southwest corner of the subject land.	After construction (i.e. operational stage)	Once, with replacement plantings as required.	Contractor	Low	Current condition of extant area of PCT 3136 to be retained is maintained and no enhancement of condition is achieved.

8.6. Mitigation of Prescribed Impacts

The following mitigation measures, described in ***Section 8.5***, 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;
- Nest box installation; and
- Implementation of landscape plan.

No additional mitigation measures are proposed for prescribed impacts.

8.7. Adaptive Management for Uncertain Impacts

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

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

No additional biodiversity credits are required for indirect or prescribed impacts.

9. Thresholds of 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. It is noted that under the BAM-C, there is no small area module option for SSDs. Therefore, the Part 4 Development (Small Area) option was selected within the BAM-C in order to progress the small area module.

9.2. Impacts on Serious and Irreversible Impact Entities

One SAII entity, Blue Gum High Forest CEEC, will be impacted by the project. The location of the Blue Gum High Forest in relation to the subject land is shown in **Figure 8**. Approximately 0.06 ha of Blue Gum High Forest will be removed within the subject land and 0.02 ha will be retained. It is noted that the removal of Blue Gum High Forest is limited to the removal of three trees, being a *Eucalyptus saligna* (Blue Gum), *Eucalyptus piperita* (Sydney Peppermint) and *Glochidion ferdinandi* (Cheese Tree) over highly modified understoreys and/or cleared land within urban backyards.

Section 9.1 of the BAM requires the provision of additional information regarding SAII 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 16**. The information presented below indicates that the project is unlikely to result in a serious and irreversible impact to the TEC.

Table 16 Information in relation to the additional impact assessment provision for TECs at risk of an SAII, for Blue Gum High Forest CEEC in the subject land

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 SAII (or reference to where these have been addressed in the relevant section of the BDAR)	Avoidance of impacts to Blue Gum High Forest is addressed 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 Blue Gum High Forest varies depending on the source interrogated. The current extent of Blue Gum High Forest in the TBDC is listed as less than 200 ha in the year 2000, while BioNet Classification System estimates the current area of occupancy of the community as 111 ha. The estimated reduction in the geographic extent of Blue Gum High Forest since 1970 is not available in the TBDC and was not identified from a search of available literature. Nonetheless, the TBDC estimates that there is 4.5% of Blue Gum High Forest remaining compared to its original pre-European extent. The Final Determination for Blue Gum High Forest (NSW Scientific Committee 2011) identifies that the TEC has a very highly restricted geographic distribution and was estimated to have an extant area of less than 200 ha according to mapping by Tozer (2003).

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		The NSW Scientific Committee (2011) states that prior to European settlement, about 200 years ago, Blue Gum High Forest is estimated to have covered an area of approximately 3700 ha.
(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 Blue Gum High Forest (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; -Modification of understory, to be dominated by woody exotic species; -Prevention of recruitment of species, through continued under-scrubbing, frequent burning 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 9 of the NSW Scientific Final Determination for Blue Gum High Forest identifies that the community has a very highly restricted geographic distribution, however it is noted that this is based on an estimated extant area of less than 200 ha, which was established from outdated mapping undertaken by Tozer (2003). Based on current available information it is estimated that the current area of occupancy is approximately 758 ha with an area of occurrence of 21km (north-south) by 18km (east –west). No threat defined location are specifically identified in the TBDC, however the ecological community is critically endangered across its range.

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
(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 Blue Gum High Forest. The TEC does respond to management, with several successful management measures outlined in the Best Practice Guidelines for Blue Gum High Forest (DECC (NSW) 2008).
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 project will remove approximately 0.06 ha and retain approximately 0.02 ha of the community in the subject land. All areas retained within the subject land will be managed under a landscape plan. The extent of the TEC in NSW is 111 ha (DCCEEW (NSW) 2024). Based on this number, the extent of Blue Gum High Forest to be impacted by the project is approximately 0.05% 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 site footprint or equivalent area for other types of proposals	The project is not likely to result in the isolation of an area of Blue Gum High Forest from other areas of Blue Gum High Forest, as this community already occurs as small, isolated patches within the subject land. As a result, the impact on Blue Gum High Forest in the subject land will result in the removal of three small patches of Blue Gum High Forest. However, 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 Criteria	Additional Impact Assessment Provisions	Response
		Based on SVTM mapping as well as mapping undertaken by Cumberland Ecology, there is approximately 0.39 ha of Blue Gum High Forest within 500m of the development site footprint (**Figure 11**). Hence, the removal of 0.06 ha of Blue Gum High Forest in the subject land represents ~15% of the occurrence of the TEC within 500m of the development site footprint.
	Describing the impacts on connectivity and fragmentation of the remaining areas of the TEC measures by: 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	Within 500 m of the subject land there are seven separate isolated patches of BGHF according to surveys undertaken for this BDAR and the NSW SVTM. The current average distance between these patches if the remnants on-site are retained and removed are estimated as follows: Average distance between isolated patches if retained: 101m Average distance between isolated patches if removed: 111m As indicated above, the project will result in a slight increase in the average distance between isolated remnants.
	Estimated maximum dispersal distance for native flora species characteristic of the TEC, and	The main dispersal mechanisms for flora species associated with Blue Gum High Forest are inferred to be by one or a combination of the following: animals, wind, water runoff, and gravity. Eucalypts within the Blue Gum High Forest 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, Brit et al. 2003). The maximum dispersal distance for

BAM Section 9.1.1 Criteria	Additional Impact Assessment Provisions	Response
		native flora species characteristic of the Blue Gum High Forest community is estimated to be at least 1000 m and potentially much further. There is no direct vegetation canopy or understorey connection between the Blue Gum High Forest within the subject land to be removed and other remnants to the south.
	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	As previously described, the project is not considered to significantly affect the connectivity of the TEC, as only small, already isolated areas of Blue Gum High Forest will be removed. As part of the project, 0.02 ha will be retained and managed under a landscape plan, which will continue to facilitate and contribute to the connectivity of the TEC. A small area of the TEC will be removed however no increase in fragmentation of the TEC is expected.
	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 Blue Gum High Forest corresponds to PCT 3136 and only one vegetation zone. The occurrence of the TEC in the subject land is limited to canopy trees/shrubs with a modified understorey. The vegetation integrity score is: 29.1 The composition score is: 23.1 The structure score is: 42.2 The function score is: 25.3
5	The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.	NA

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 in Vegetation Zone 1 as the following criteria is met:

- a vegetation zone that has a vegetation integrity score ≥15 where the PCT is representative of an endangered or critically endangered ecological community.

The PCT and vegetation zone requiring offsets is documented in **Table 17**. This area is mapped in **Figure 12**.

All vegetation within the construction footprint ('cleared management zone') will be entirely cleared and all native vegetation within the 'retention management zone' will be retained. As such, offsetting requirements are calculated on the assumption that the future vegetation integrity score of the 'cleared management zone' will be zero and the future vegetation integrity score of the 'retention management zone' will remain unchanged. As stated previously in ***Section 8.2***, if the future VI score of the 'retained management' zone was reduced to 0 in the BAM-C (i.e. assumed entire clearance), there is no increase in the number of ecosystem credits retired (i.e. ecosystem credit liability remains '1').

Table 17 Native vegetation impacts requiring an offset

Zone	Veg Zone Name	Sensitivity to Loss	Total VI Loss	Biodiversity Risk Weighting	Area (ha)	Credits
1	3136_Canopy*	Very High	-27.7	2.5	0.08	1

**SAII entity*

9.4. Impacts that do not Require an Offset

Impacts on Planted Native Vegetation do not require offsets as this 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 4.6***). Measures recommended to mitigate impacts on native fauna (including threatened species) are detailed in ***Section 8.5***.

9.5. Impacts that do not Require Further Assessment

Impacts to areas identified as Exotic Vegetation and Cleared Land within the development site footprint do not require further assessment. This occupies 0.33 ha within the subject land and is shown in **Figure 12**.

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 18**, whilst the 'like for like' offsetting options for the ecosystem credits are provided in **Table 19**.

Note that a total of 1 ecosystem credit is required to offset the impacts of the project on native vegetation.

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

Table 18 Summary of ecosystem credit liability

Zone	Vegetation Zone Name	Sensitivity to Gain	Area (ha)	Credits Required
1	3136_Canopy	High sensitivity to potential gain	0.08	1

Table 19 Like for like offsetting options for PCT 3136

Class	Containing Hollow-bearing Trees?	In the below IBRA Subregions	Credits
Blue Gum High Forest in the Sydney Basin Bioregion **This includes PCT's: 3136**	Yes	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	1

10. Conclusion

Cumberland Ecology was engaged by the proponent to prepare a BDAR for the subject land. This BDAR forms part of the documentation to support the application for development approval as an SSD under the EP&A Act. Under the BC Act, all proposals for SSD approval of land must be assessed using the BAM with the results presented in a BDAR. This BDAR has been prepared in accordance with the 2020 version of the BAM using the streamlined assessment module for small areas.

To facilitate the project, a total of approximately 0.45 ha of land will be directly impacted and/or modified. This includes

- The removal of ~0.06 ha of PCT 3136 conforming to a BC Act listed CEEC;
- The retention of ~0.02 ha of PCT 3136 conforming to a BC Act listed CEEC and <0.01 ha of Planted Native Vegetation to be managed under a landscape plan;
- The removal of ~0.04 ha of Planted Native Vegetation;
- The removal of ~0.22 ha of Exotic Vegetation; and
- The removal of ~0.11 ha of Cleared Land.

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 project has sought to avoid impacts to biodiversity values as far as practicable, and a suite of mitigation measures will be implemented for the project including weed management, delineation of clearing limits, pre-clearance surveys, nest box installation sedimentation control measures and implementation of a landscape plan (Landform 2024) that includes the ongoing management of retained areas of PCT 3136.

Due to the area of PCT 3136 requiring clearing, and the vegetation integrity scores of the native vegetation within the development site footprint (i.e. the subject land), the biodiversity credit liability of the project has been calculated at one (1) ecosystem credit for PCT 3136. Although a small area of the SAII candidate entity Blue Gum High Forest will be removed, Cumberland Ecology does not consider these impacts to constitute a SAII due to the minor impacts proposed as well as the proposed retention and management of retained areas of the community within the subject land. With the implementation of the proposed mitigation measures and the offsetting described, it is considered that the impacts of this project on biodiversity will be limited and can be appropriately managed.

11. References

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APPENDIX A :
BAM Compliance Table

Table 20 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: operational footprint construction footprint indicating clearing associated with temporary construction facilities and infrastructure		Section 1.2.3
	general description of development/biodiversity stewardship site		Section 1.2.4
	sources of information used in the assessment, including reports and spatial data.		Section 1.3, Section 2.1
	Maps and Data		
	Site Map (as described in Section 4.2)		Figure 1
	Location Map (as described in Section 4.2)		Figure 2
	Digital shape files for all maps and spatial data		To be provided in BOAMs or email
Landscape Features	Information		
	Identification of landscape features at the development/biodiversity stewardship site, including:		

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	IBRA bioregions and subregions, NSW landscape region and area (ha)	Subject land area (ha) IBRA bioregions and subregions BioNet NSW Landscapes	Figure 1
	native vegetation extent in the buffer area		Figure 1
	cleared areas	Cleared areas	Figure 2
	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 2
	wetlands within, adjacent to and downstream of the site	Wetlands within, adjacent to and downstream of the site	Section 3.2.3. Figure 2
	connectivity features	Connectivity of areas of habitat including areas identified as priority investment areas, flyways for migratory species	Section 3.2.4
	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 3.1 (method applied) Section 3.3 (percentage native vegetation cover and justification)
	Maps and Data		

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	IBRA bioregions and subregions (as described in Paragraphs 4.2.1.3–4.2.1.4)	IBRA bioregions and subregions	Figures 1 and 2
	NSW landscape regions (as described in Paragraph 4.2.1.5)	BioNet NSW landscapes	Figures 1 and 2
	Rivers and streams (as described in Paragraph 4.2.1.6)	Rivers, streams (using Strahler stream ordering) and estuaries	Figures 1 and 2
	Wetlands (as described in Paragraph 4.2.1.7)	Wetlands	Figures 1 and 2
	Connectivity of different areas of habitat (as described in Paragraphs 4.2.1.8–4.2.1.11)	Connectivity	Figure 2
	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 1 and 2
	Native vegetation extent (as described in Subsection 4.3.2)	Native vegetation cover	Figure 2
		Boundary of the subject land	Figure 1
		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 6

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Describe PCTs within the development/biodiversity stewardship site, including:	PCTs within the subject land, including:	Section 4.2
	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 3
	species relied upon for identification of vegetation type and relative abundance	species relied upon for identification of vegetation type and relative abundance	Section 4.2.1.2
	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).	Table 4, Section 4.2.1.2
	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	Chapter 4 and Figure 9

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	patch size (development site and biodiversity stewardship site)	patch size for each vegetation zone	Table 6 and Figures 1 and 2
	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
	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 6
		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 6
	Map of PCTs within the development/biodiversity stewardship site (as described in Section 5.2)	Distribution of PCTs within the subject land.	Figure 7

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Map of plot locations relative to PCTs	Plot locations relative to PCTs including GPS coordinates (GDS zone, eastings, northings and bearings)	Figure 5
	Map of TECs	TECs on the subject land	Figure 8
	Plot field data (MS Excel format)		To be provided in BOAMs or email
	Plot field data sheets	Plot field data and sheets	Appendix B
		Vegetation zones	
	Patch size of intact native vegetation (as described in Subsection 5.3.2)	Patch size of intact native vegetation	Table 6 and Figures 1 and 2
	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 6
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

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	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
	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 5.2.3 and 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	N/A
	biodiversity risk weighting for the species	biodiversity risk weighting for the species	N/A
		area of suitable habitat or number of individuals counted	N/A
	threatened species survey		Chapter 2
	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

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	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:	
	identify the relevant species	identify the relevant species or population	N/A
	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		
	Table of habitats or habitat components and their sensitivity classes	Table of habitats or habitat components and their sensitivity classes.	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	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.	Figure 5
	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 10
	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.	N/A

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
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 – 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.	Chapter 7, Appendix E

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	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
		calculating the change in VI score and habitat suitability	Section 8.2
		describing impacts that are uncertain and their management/mitigation	Section 8.7
		evaluating consequences of indirect and prescribed impacts	Sections 8.3 and 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).		N/A
	Maps and Data		
	Table of measures to be implemented before, during and after construction to avoid and minimise the	Table of biodiversity mitigation measures to be implemented before, during and after construction to avoid and minimise the	Table 15

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	impacts of the project, including action, outcome, timing and responsibility	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.	
		Map of alternative locations or sites within the development site that were considered when locating and designing the project including constraints to the final selection.	N/A
	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 10
		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 10
	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 10
Impact Summary	Information		
		Identification of impacts:	
	Identification and an assessment of the impacts which are potential serious and irreversible impacts, in	on entities at risk of a serious and irreversible impact (SAII), including addressing the	Section 9.2

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	accordance with Subsections 10.2.2 for impacts on CEECs and 10.2.3 for threatened species.	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: 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:	

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Map showing the location of serious and irreversible impacts	that support an entity at risk of a serious and irreversible impact (SAII)	Figure 11
	Map of impacts requiring offset	where offsets are required	Figure 12
	Map of impacts not requiring offset	where offsets are not required, and	Figure 12
	Map of areas not requiring assessment	where no further assessment is required.	Figure 12
		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 SAII.	Figure 12
Impact Summary	Information		
		The assessor is required to report on:	
	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 13
	change in vegetation integrity score (Subsection 9.1.3)		Table 13
		the biodiversity risk weighting (BRW) for each ecosystem and species credit requirement generated	Table 13

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	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 17
	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	N/A
	Maps and Data		
	Table of PCTs requiring offset and the number of ecosystem credits required		Tables 17 and 18
	Table of threatened species requiring offset and the number of species credits required		N/A
	Submitted proposal in the Credit Calculator	All digital data must be submitted using the Upload Files function in BOAMS: 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).	To be submitted in BOAMs
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 D

BDAR Section	BAM Requirements	Operational Manual Requirements	Assessment of Compliance and Recommendations
	Maps and Data		
	Table of credit class and matching credit profile		Table 19

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APPENDIX B :

BAM Plot Data and Datasheets

Table 21 BAM import data

plot	pct	Area within Subject Land	Patch Size	Condition Class	Composition – Tree	Composition – Shrub	Composition – Grass	Composition – Forbes	Composition – Ferns	Composition – Other	Structure – Tree	Structure – Shrub	Structure – Grass	Structure – Forbes	Structure – Ferns	Structure – Other	Function – Large Trees	Function – Hollow Trees	Function – Leaf Litter	Function – Length of Fallen Logs	Function – Tree Stem 5 to 9cm	Function – Tree Stem 10 to 19cm	Function – Tree Stem 20 to 29cm	Function – Tree Stem 30 to 49cm	Function – Tree Stem 50 to 79cm	Function – Tree Regeneration	Function – High Threat Exotics
1	3136	0.08	101	Canopy	3	3	6	3	0	1	40.8	15.0	18.7	1.1	0.0	0.8	0	1	40.0	0.0	1	1	1	1	1	0	46.0

Date: 22/7/2024	Project #: 24093	Location	Waypoint	Easting	Northing	cumberland ecology
Personnel: RM RV	Plot ID: P 1	Start:	14	329378	257925	
Photos: 931 - 935	Orientation (°):	End:	15	329389	257884	Sheet: 1 of 2
Dimensions: ☑20x20, ☐10x40	PCT: PCT 3136					

	Species	Cover	Abundance	N, E, HTE	GF Group	Stratum	Voucher
1	Eucalyptus saligna	30	1			C.	
2	Callistemon salignus	5	1			Sc.	
3	Ficus benjamina	50	1				
4	Anredera cordifolia	10	200				
5	Microlaena stipoides v. stipoides	3	150				
6	Ehrharta erecta	30	1500				
7	Lipidium didymum	0.1	10				
8	Sagrus romanazoffiana	2	1				
9	Bromus catharticus	0.6	30				
10	Tradescantia fluminensis	0.2	10				
11	Cargmbia citriodora	50	1			C	
12	Phyllostachys aurea	2	200				
13	Monstera deliciosa	0.4	5				
14	Hymenosporum flavum	5	1			Sc	
15	Lantana stricta	0.2	10				
16	Mosa acuminata	8	20				
17	Asparagus aethiopicus	0.4	20				
18	Morus alba	5	1				
19	Solanum nigrum,	0.4	10				
20	Conyza sumatrensis	0.6	60				
21	Colocasia lubia	0.8	40				
22	Rumex sagittatus	0.4	20				
23	Stellaria media	2	200				
24	Commelina cyanea	0.4	10				
25	Sonchus oleraceus	0.4	20				
26	Hedera helix	0.2	5				
27	Oplismenus aemulos	10	500				
28	Oxalis ~~violacea~~ purpurea	0.8	80				
29	Cadamba hirsuta	5	500				
30	Comachaeta americana	2	200				
31	Oxalis perennans	0.6	100				
32	Poa annua	2	200				
33	Melaleuca bracteata	5	1			Sc	
34	Cyperus gracilis	5	500				
35	Modiola caroliniana	0.6	60				
36	Hypochoeris radicata	0.4	40				
37	Taraxacum officinale	0.2	20				
38	Cerastium glomeratum	0.2	40				
39	Lolium perenne	0.6	30				
40	Veronica persica	0.4	80				

Cover (%): **0.1, 0.2, 0.3**...etc. up to **1, 2, 3**...etc. up to **10, 15, 20, 25**...etc. up to **100**

Abundance (Count): **1, 2, 3**... up to **10, 20, 30**...up to **100, 200**... up to **1,000**...etc.

GF Group: TG=Tree, **SG**=Shrub, **GG**=Grass, **FG**=Forb, **EG**=Fern, **OG**=Other

Stratum: C = Canopy, **SC** = Sub-canopy, **S** = Shrub, **G** = Ground

Cover Note: *0.1% = approx 63 cm² or circle with 71cm diameter, 0.5% = approx 1.4m², 1% = approx 2m², 5% = approx 4.5m², 25% = approx 10m²*

Date: __/__/____	Project #: _____	Location	Waypoint	Easting	Northing	cumberland ecology
Personnel: ___,___,___	Plot ID: P _i__	Start:	_____	_____	_____	
Photos: _____-_____	Orientation (°): ____	End:	_____	_____	_____	
Dimensions: □20x20, □10x40	PCT:					Sheet: 2 of 2

	Species	Cover	Abundance	N, E, HTE	GF Group	Stratum	Voucher
1	Acetosella vulgaris	0.2	20				
2	Stenotaphrum secundatum	1	50				
3	Axonopus fissifolius	1	50				
4	Salvia sessilus	0.1	10				
5	Hypochaeris albiflora	0.2	20				
6	Cynodon dactylon	0.4	40				
7	Romulea rosea	0.1	1				
8	Cyclospermum leptophyllum	0.1	5				
9	Senna pendula v. glabrata	0.1	1				
10	Nothoscordem gracile	1	100				
11	Cyperus eragrostis	0.2	20				
12	Carex inversa	0.1	1				
13	Callistemon viminalis	0.8	1			S.	
14	Grevillea robusta	10	1			C.	
15	Solanum mauritianum	1	1				
16	Ligustrum sinense	0.2	5				
17	Clivia miniata	0.2	10				
18	Cirsium vulgare	0.2	20				
19	Rumex brownii	0.1	5				
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

Cover (%): **0.1, 0.2, 0.3**...etc. up to **1, 2, 3**...etc. up to **10, 15, 20, 25**...etc. up to **100**

Abundance (Count): **1, 2, 3**... up to **10, 20, 30**...up to **100, 200**... up to **1,000**...etc.

GF Group: TG=Tree, **SG**=Shrub, **GG**=Grass, **FG**=Forb, **EG**=Fern, **OG**=Other

Stratum: C = Canopy, **SC** = Sub-canopy, **S** = Shrub, **G** = Ground

Cover Note: *0.1% = approx 63 cm² or circle with 71cm diameter, 0.5% = approx 1.4m², 1% = approx 2m², 5% = approx 4.5m², 25% = approx 10m²*

Date: 22/03/2024	Project #: 21093	cumberland ecology
Personnel: RV. RD.	Plot ID: P01	

Large Trees / Stem Classes / Hollows

DBH[1]	Stem Class Present[2]	Stem Class Count[2,3]	Hollow-bearing Tree Count[4]
80+ cm	Yes ☐ No		
50-79 cm	☒ Yes ☐ No	1	1
30-49 cm	☒ Yes ☐ No		
20-29 cm	☒ Yes ☐ No		
10-19 cm	☒ Yes ☐ No		
5-9 cm	☒ Yes ☐ No		
<5 cm	☐ Yes ☒ No		
Are there hollow-bearing trees within the zone?[5]			☒ Yes ☐ No

1. DBH measured at 1.3m above ground.
2. Only living, native tree species are to be recorded.
3. Exact stem counts must be provided for stems in the following classes: 50-79cm and 80+ cm (or additional classes for a PCT which has a smaller large tree threshold – e.g. heathlands). Include estimates of stem counts of other classes where there is extensive regeneration.
4. Hollow-bearing trees include living and dead native species allocated to the tree and shrub growth form groups. Hollow-bearing trees rooted within the plot with hollows that are visible from the ground must be included.
5. Where there are no hollow-bearing trees within a plot, but they are present within the vegetation zone, a value of 1 is to be entered in the BAMC.

Logs

Length of logs[6,7]	(≥10cm diameter, >50cm in length)
Tally	0
Total (m)	

6. Dead native and exotic species recorded.
7. Logs must be entirely or partially on the ground within the plot, and only the length within the plot is recorded.

Subplots (1x1m)

portion within dwelling

Subplot	Litter Cover (%)[9,10]	Bare Ground Cover (%)	Cryptogram Cover (%)	Rock Cover (%)
1 x 1m Score[8]	80 20 30 50 20	0 40 70 15 35	0 0 0 0 25	0 0 0 0 10
Average Score	40	32	5	2

8. Scores must be provided for litter cover. Include scores for other variables where supplementary information is required.
9. Litter includes leaves, seeds, twigs, branchlets and branches (<10cm diameter) from native and exotic species.
10. Must include all plant material detached from a plant and forms part of the litter layer on the ground surface. Material that is not detached is assessed as growth form foliage cover.

Composition and Structure Summary

Attribute		Value
Count of Native Richness (Composition)	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Native Cover (Structure)	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed Cover		

Additional Notes

APPENDIX C :
BAM Plot Flora List

Table 22 BAM plot flora list

Scientific Name	Common Name	Exotic	HTW	BAM Growth Form Group	Plot1	
					C	A
Acetosella vulgaris	Sheep Sorrel	YES	YES		0.2	20
Anredera cordifolia	Madeira Vine	YES	YES		10.0	200
Asparagus aethiopicus	Asparagus Fern	YES	YES		0.4	20
Axonopus fissifolius	Narrow-leafed Carpet Grass	YES	YES		1.0	50
Bromus catharticus	Praire Grass	YES			0.6	30
Cardamine hirsuta	Common Bittercress	YES			5.0	500
Cerastium glomeratum	Mouse-ear Chickweed	YES			0.2	40
Cirsium vulgare	Spear Thistle	YES			0.2	20
Clivia miniata		YES			0.2	10
Conyza sumatrensis	Tall fleabane	YES			0.6	60
Corymbia citriodora	Lemon-scented Gum	YES			50.0	1
Cyclospermum leptophyllum	Slender Celery	YES			0.1	5
Cyperus eragrostis	Umbrella Sedge	YES	YES		0.2	20
Ehrharta erecta	Panic Veldtgrass	YES	YES		30.0	1,500
Ficus benjamina	Weeping Fig	YES			50.0	1
Gamochaeta americana	Purple Cudweed	YES			2.0	200
Hedera helix	English Ivy	YES	YES		0.2	5
Hypochaeris albiflora	White Flatweed	YES			0.2	20
Hypochaeris radicata	Catsear	YES			0.4	40
Lepidium didymum	Lesser Swinecress	YES			0.1	10
Ligustrum sinense	Small-leaved Privet	YES	YES		0.2	5
Lolium perenne	Perennial Ryegrass	YES			0.6	30
Modiola caroliniana	Red-flowered Mallow	YES			0.6	60
Monstera deliciosa	Fruit Salad Plant	YES			0.4	5
Morus alba	White Mulberry	YES			5.0	1
Musa acuminata	Edible banana	YES			8.0	20
Nothoscordum gracile	Onion Weed	YES			1.0	100
Oxalis purpurea		YES			0.8	80
Phyllostachys aurea	Fishpole Bamboo	YES	YES		2.0	200
Poa annua	Winter Grass	YES			2.0	200
Romulea rosea	Onion Grass	YES	YES		0.1	1
Rumex sagittatus	Rambling Dock	YES	YES		0.4	20
Senna pendula var. glabrata		YES	YES		0.1	1
Solanum mauritianum	Wild Tobacco Bush	YES			1.0	1
Solanum nigrum	Black-berry Nightshade	YES			0.4	10

Scientific Name	Common Name	Exotic	HTW	BAM Growth Form Group	Plot1	
					C	A
Soliva sessilis	Bindyi	YES			0.1	10
Sonchus oleraceus	Common Sowthistle	YES			0.4	20
Stellaria media	Common Chickweed	YES			2.0	200
Stenotaphrum secundatum	Buffalo Grass	YES	YES		1.0	50
Syagrus romanzoffiana	Cocos Palm	YES			2.0	1
Taraxacum officinale	Dandelion	YES			0.2	20
Tradescantia fluminensis	Wandering Jew	YES	YES		0.2	10
Veronica persica	Creeping Speedwell	YES			0.4	80
Commelina cyanea	Native Wandering Jew			Forb (FG)	0.4	10
Oxalis perennans				Forb (FG)	0.6	100
Rumex brownii	Swamp Dock			Forb (FG)	0.1	5
Carex inversa	Knob Sedge			Grass & grasslike (GG)	0.1	1
Cynodon dactylon	Common Couch			Grass & grasslike (GG)	0.4	40
Cyperus gracilis	Slender Flat-sedge			Grass & grasslike (GG)	5.0	500
Entolasia stricta	Wiry Panic			Grass & grasslike (GG)	0.2	10
Microlaena stipoides	Weeping Grass			Grass & grasslike (GG)	3.0	150
Oplismenus aemulus				Grass & grasslike (GG)	10.0	500
Calochlaena dubia	Rainbow Fern			Other (OG)	0.8	40
Callistemon salignus	Willow Bottlebrush			Shrub (SG)	5.0	1
Hymenosporum flavum	Native Frangipani			Shrub (SG)	5.0	1
Melaleuca bracteata	Black Tea-tree			Shrub (SG)	5.0	1
Callistemon viminalis	Weeping Bottlebrush			Tree (TG)	0.8	1
Eucalyptus saligna	Sydney Blue Gum			Tree (TG)	30.0	1
Grevillea robusta	Silky Oak			Tree (TG)	10.0	1

C=% cover, A=abundance (total number), HTW=high threat weed under BAM

APPENDIX D :
BAM Credit Reports

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00051248/BAAS19002/24/00051249	SSD-71687208	14/03/2024
Assessor Name	Report Created	BAM Data version *
Mikael Peck	04/10/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS19002	Finalised	04/10/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (Small Area)	Test of significance

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

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

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

Blue Gum High Forest												
1	3136_Canopy	Blue Gum High Forest in the Sydney Basin Bioregion	29.1	27.7	0.08	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
											Subtotal	**1**
											Total	**1**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00051248/BAAS19002/24/00051249

Proposal Name
SSD-71687208

BAM data last updated *
14/03/2024

Assessor Name
Mikael Peck

Assessor Number
BAAS19002

BAM Data version *
67

Proponent Names

Report Created
04/10/2024

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
04/10/2024

BOS entry trigger
Test of significance

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3136-Blue Gum High Forest

Species
Nil

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
3136-Blue Gum High Forest	Blue Gum High Forest in the Sydney Basin Bioregion	0.1	1	0	1

BAM Biodiversity Credit Report (Like for like)

3136-Blue Gum High Forest	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Blue Gum High Forest in the Sydney Basin Bioregion This includes PCT's: 3136	-	3136_Canopy	Yes	1	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

APPENDIX E :
Design and Avoidance Impact Assessment

Design 1

DKO Architecture (NSW) Pty Ltd
42 Davies Street
Surry Hills, NSW 2010
ABN: 81956706590

T +61 2 8346 4500
info@DKO.com.au
www.DKO.com.au

PRELIMINARY

INFORMATION ONLY

Project Name	618 - 624 Mowbray road
Project Number	000000
Date	27/03/2023
Scale	1:250@A3
Drawing Name	Ground Floor
Drawing Number	FS202
Revision	

Design 2

DKO Architecture (NSW) Pty Ltd
42 Davies Street
Surry Hills, NSW 2010
ABN: 81956706590

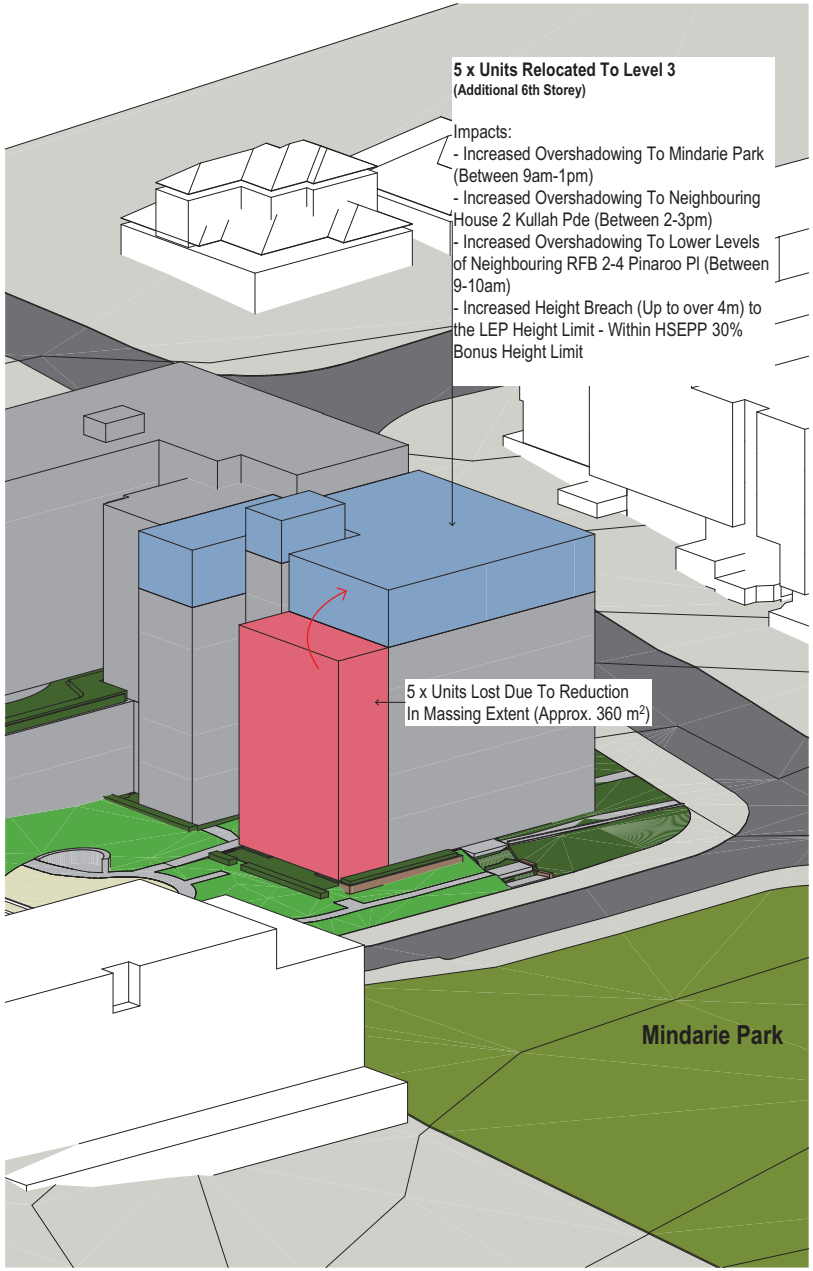
T +61 2 8346 4500
info@DKO.com.au
www.DKO.com.au

PRELIMINARY

INFORMATION ONLY

Project Name	618 - 624 Mowbray road
Project Number	000000
Date	27/03/2023
Scale	1:250@A3
Drawing Name	Ground Floor
Drawing Number	FS202
Revision	

Alternative Design Vs Proposed Design



- All works to be in accordance with authority & statutory approvals.
- Refer to site survey for all information relating to existing site conditions.
- All survey information to be confirmed by registered surveyor before commencing works on site.
- Refer to Arborist Report and Landscape Documentation for all information relating to trees and their retention/removal, and all landscape works.
- Drawings to be read in conjunction with all Specifications and Schedules; all discrepancies to be reported to Architect before any work is put in hand.
- Minor changes to building form & configuration may be required after Development Consent.
- Do not scale from drawing, figured dimensions only to be used.
- Building Contractor to verify all dimensions before commencing work.

Rev	Date	By	Chk	Description

- Tree Protection Area
- T56 TPZ
- Reduced Massing Extent
- Updated Unit Layout
- Extent of New Building Line
- 10-20% Incursion into TPZ
- Encroachment into TPA
- Relocated Massing Extent

DEVELOPMENT APPLICATION

Auckland
Brisbane
Ho Chi Minh
Melbourne
Perth
Sydney

dko.com.au
info@dko.com.au
T +61 2 8346 4500

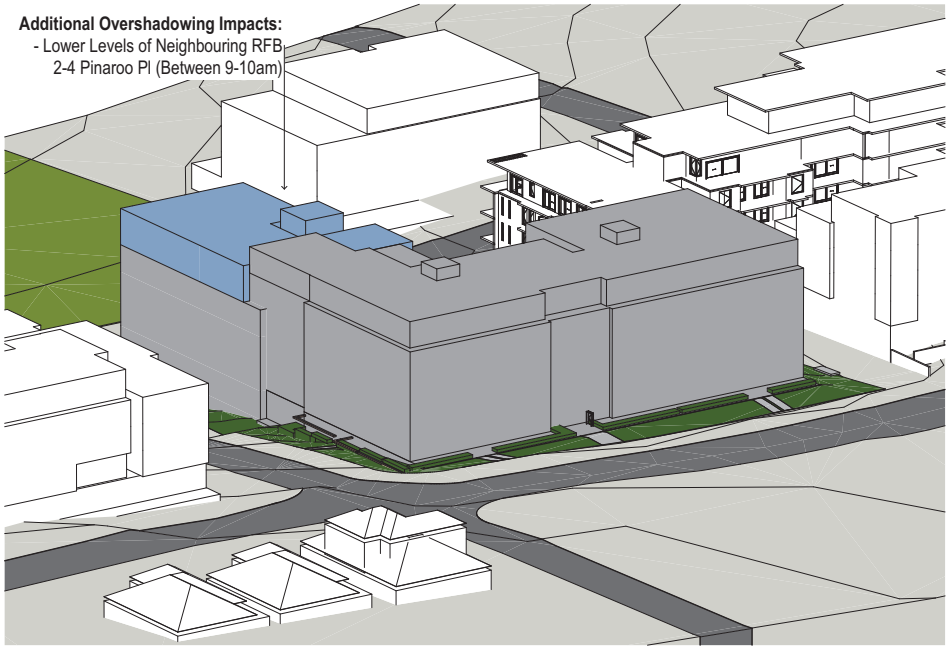
DKO

Project Name	Mowbray Road, Lane Cove
Project Number	13293
Project Address	618-624 Mowbray Rd & 25-29 Mindarie St Lane Cove North NSW 2066
Country	Cammeraygal Country

Drawing Name
Tree Avoidance Scenario

Drawing Scale 1:200 @ A1
Drawing No. DA515
Revision

Additional Overshadowing Impacts:
- Lower Levels of Neighbouring RFB
2-4 Pinaroo Pl (Between 9-10am)



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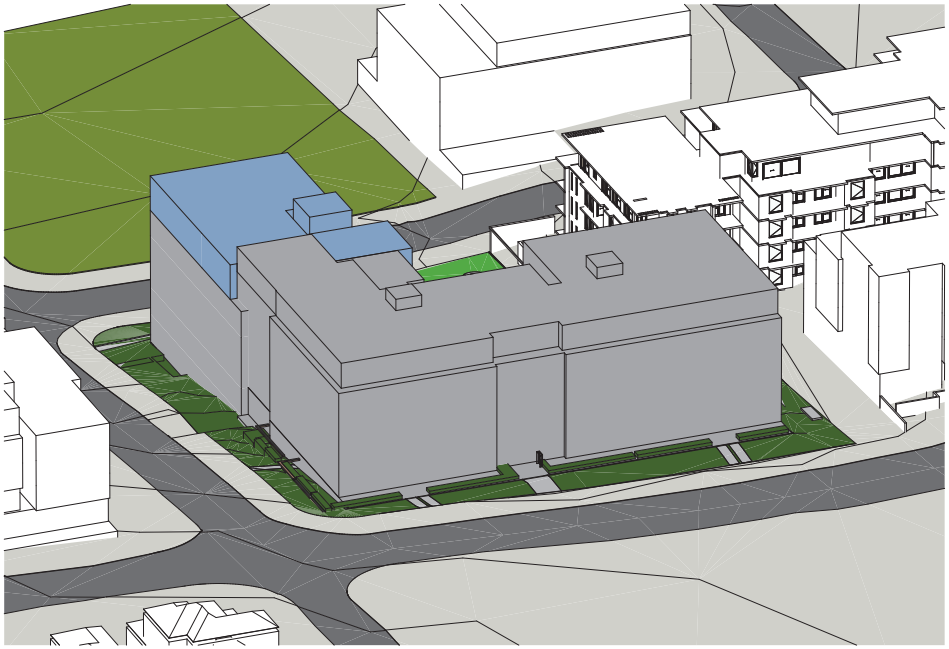

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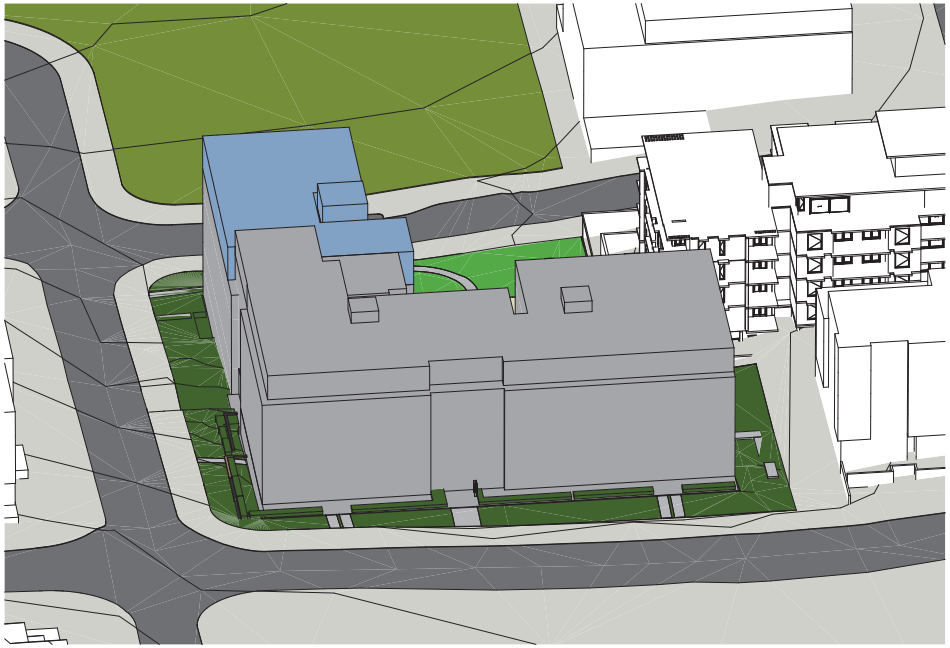

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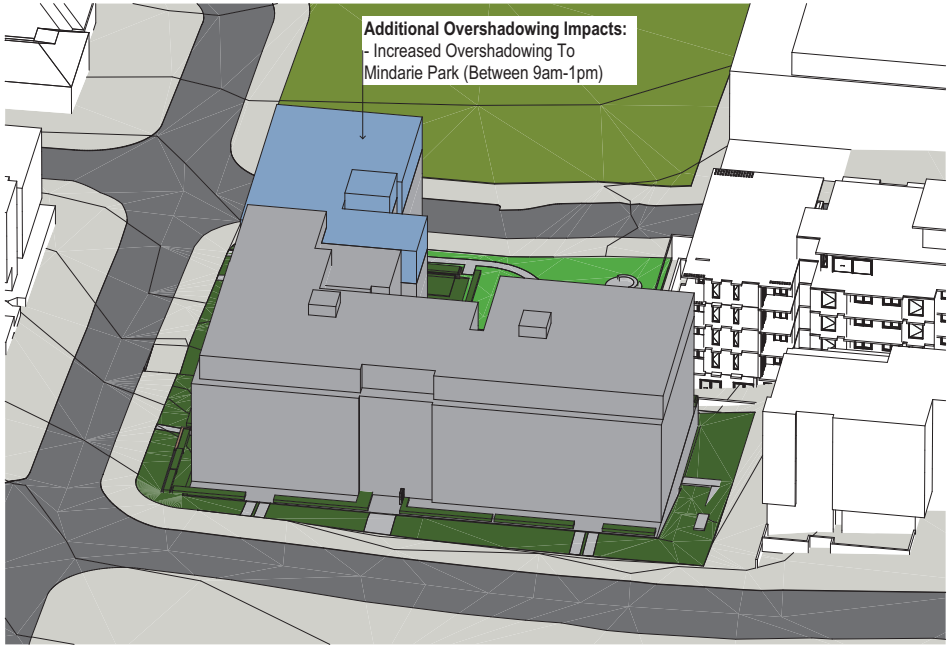
Additional Overshadowing Impacts:
- Increased Overshadowing To
Mindarie Park (Between 9am-1pm)



04 12:00 pm

- All works to be in accordance with authority & statutory approvals.
- Refer to site survey for all information relating to existing site conditions.
- Survey & setout information to be confirmed by registered surveyor before commencing works on site.
- Refer to Arborist Report and Landscape Documentation for all information relating to trees and their retention/removal, and all landscape works.
- Drawings to be read in conjunction with all Specifications and Schedules; all discrepancies to be reported to the Architect before any work is executed.
- Minor changes to building form & configuration may be required after Development Consent.
- Do not scale from drawing, figured dimensions only to be used.
- Building Contractor to verify all dimensions before commencing work.

Rev	Date	By	Chk	Description

DEVELOPMENT APPLICATION

Auckland
Brisbane
Ho Chi Minh
Melbourne
Perth
Sydney

dko.com.au
info@dko.com.au
T +61 2 8346 4500

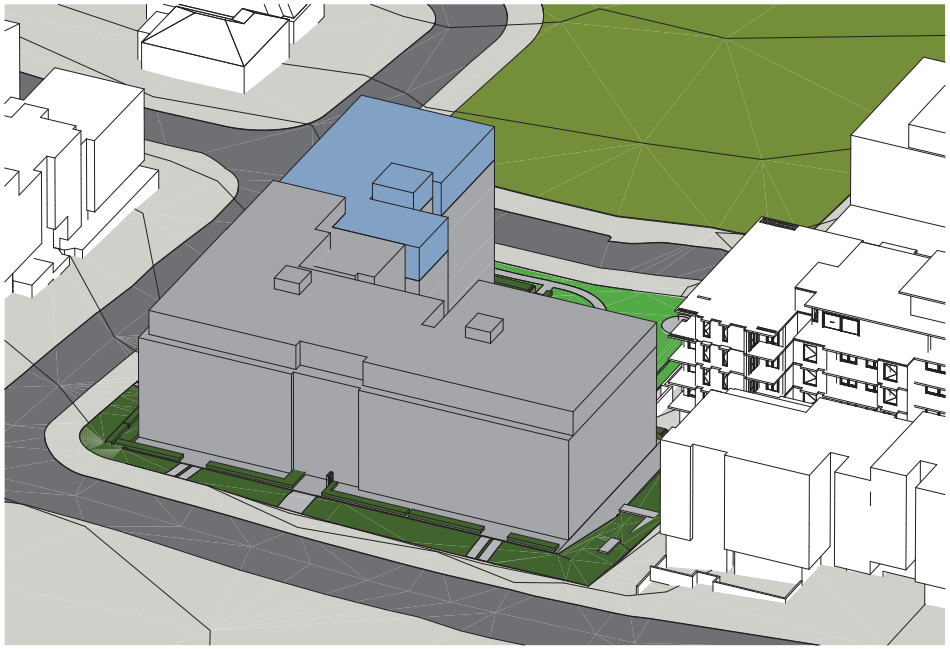
DKO

Project Name	Mowbray Road, Lane Cove
Project Number	13293
Project Address	618-624 Mowbray Rd & 25-29 Mindarie St Lane Cove North NSW 2066
Country	Cammeraygal Country

Drawing Name
Eye of the Sun - Tree Avoidance Scenario

Drawing Scale 1:300 @ A1

Drawing No. Revision
DA516



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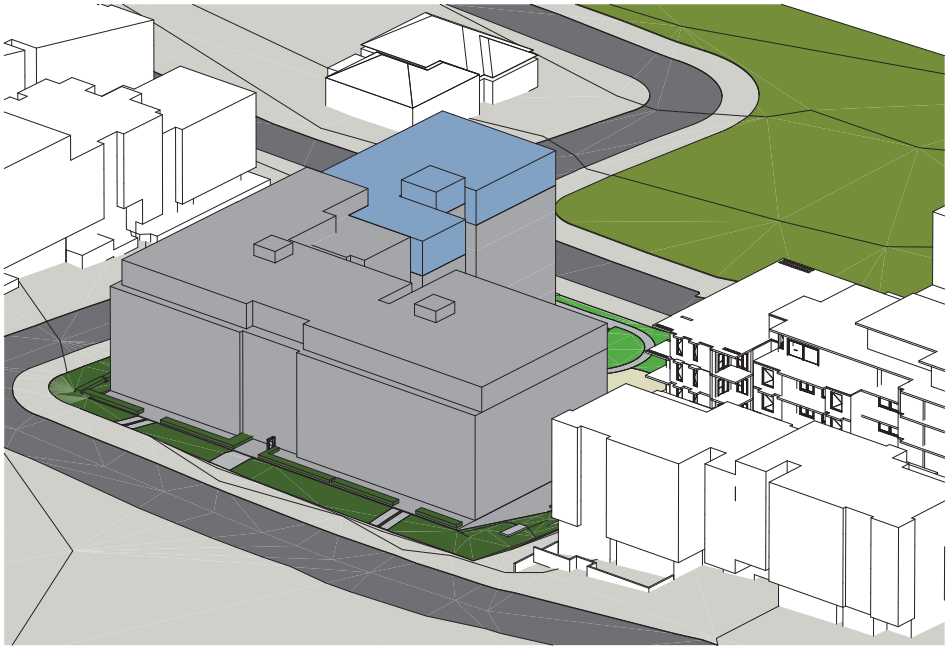

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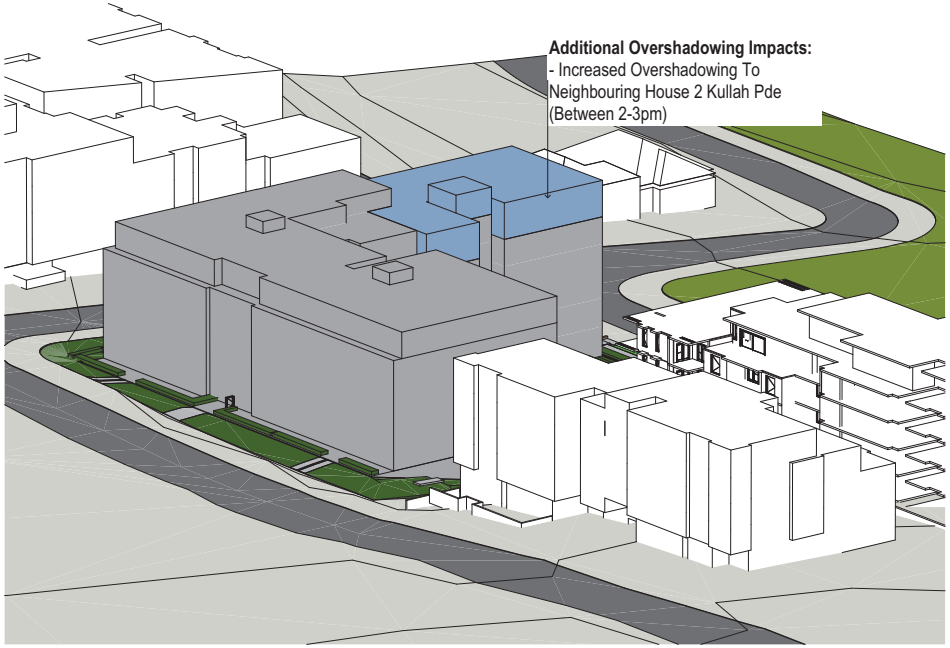

Additional Overshadowing Impacts:
- Increased Overshadowing To Neighbouring House 2 Kullah Pde (Between 2-3pm)

03 03:00 pm

- All works to be in accordance with authority & statutory approvals.
- Refer to site survey for all information relating to existing site conditions.
- Survey plan and all information to be confirmed by registered surveyor before commencing works on site.
- Refer to Arborist Report and Landscape Documentation for all information relating to trees and their retention/removal, and all landscape works.
- Drawings to be read in conjunction with all Specifications and Schedules; all discrepancies to be reported to the Architect before any work is executed.
- Minor changes to building form & configuration may be required after Development Consent.
- Do not scale from drawing, figured dimensions only to be used.
- Building Contractor to verify all dimensions before commencing work.

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DA517

FIGURES

Figure 1. Site map

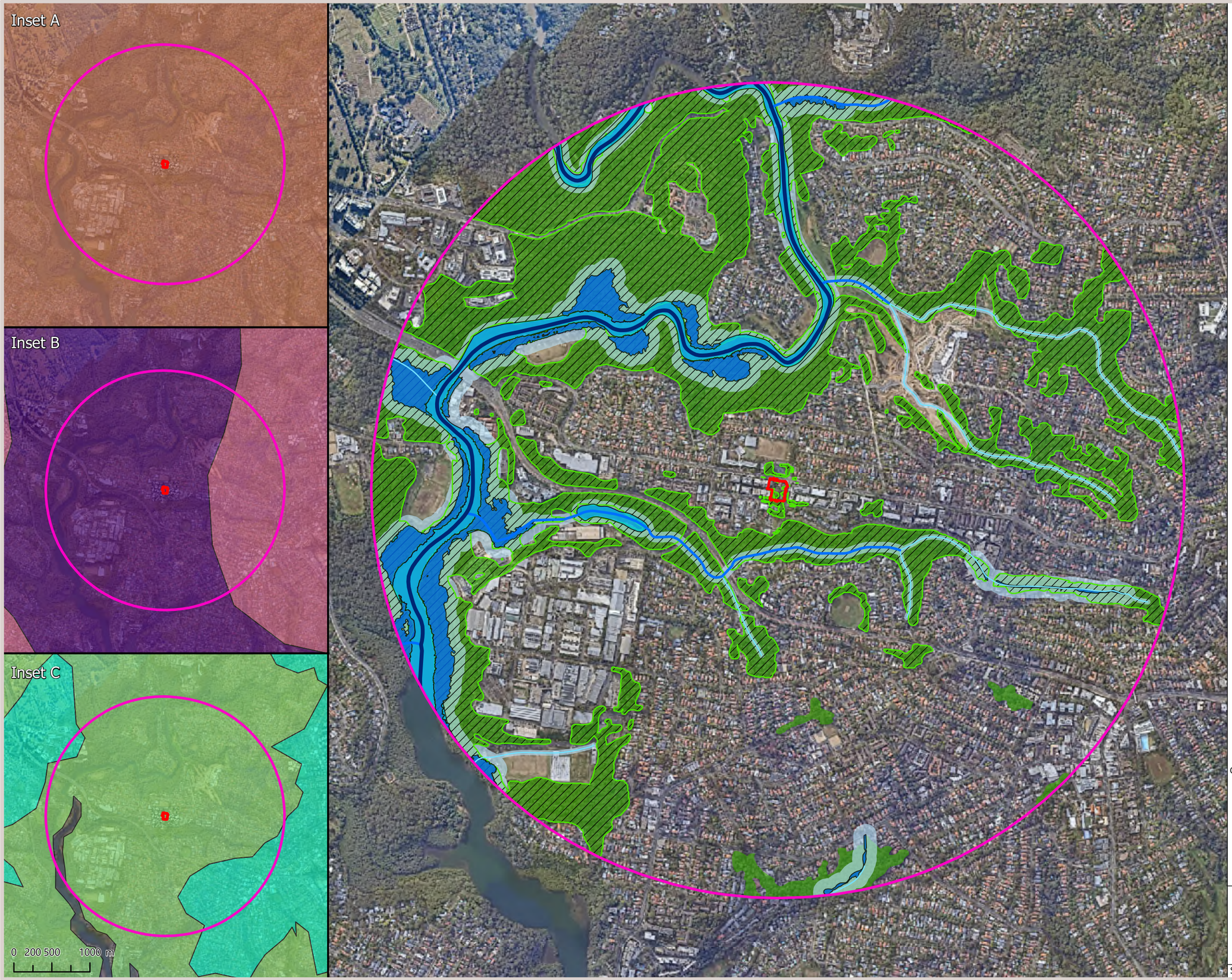

Figure 2. Location map

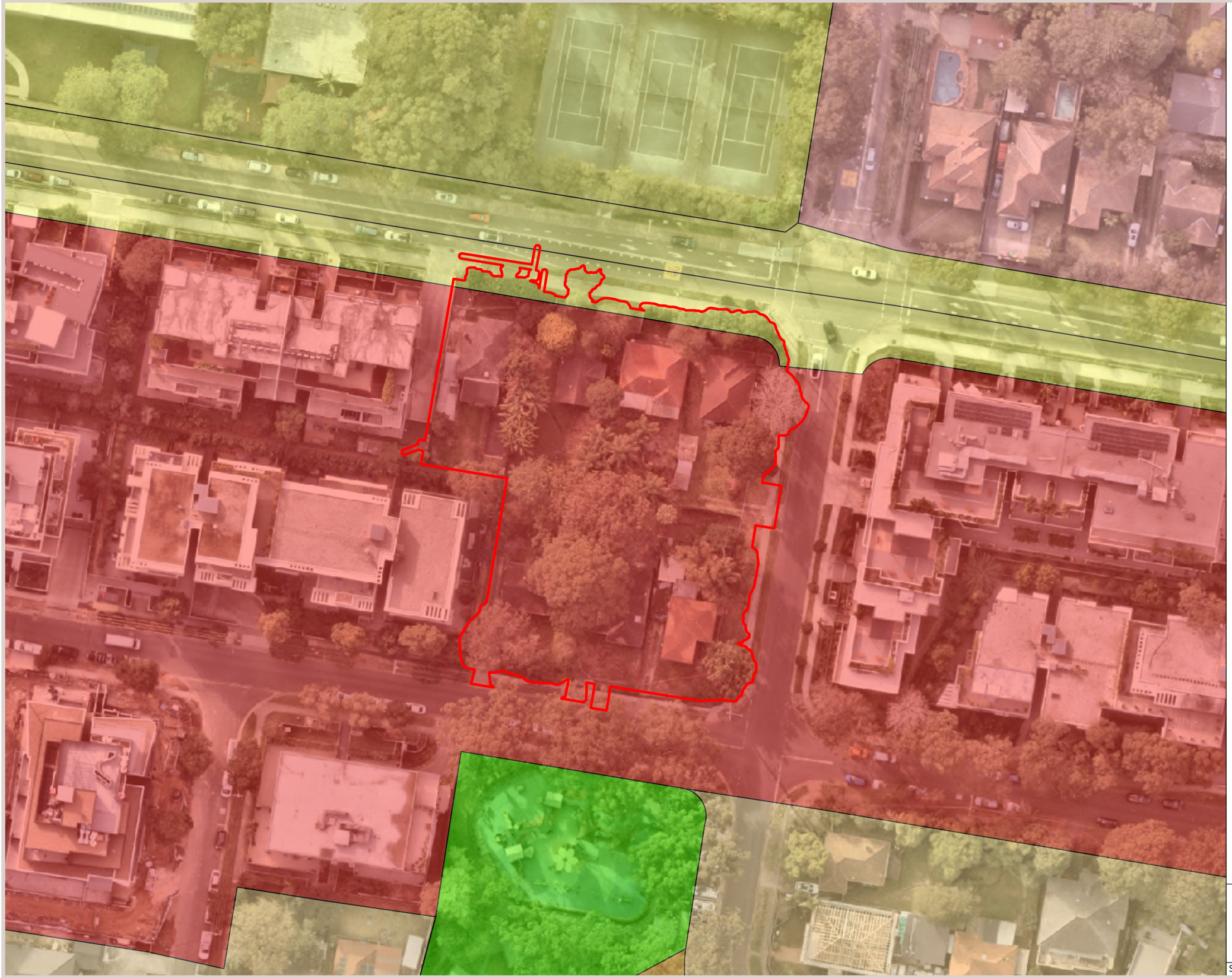

Figure 3. Zoning of the subject land

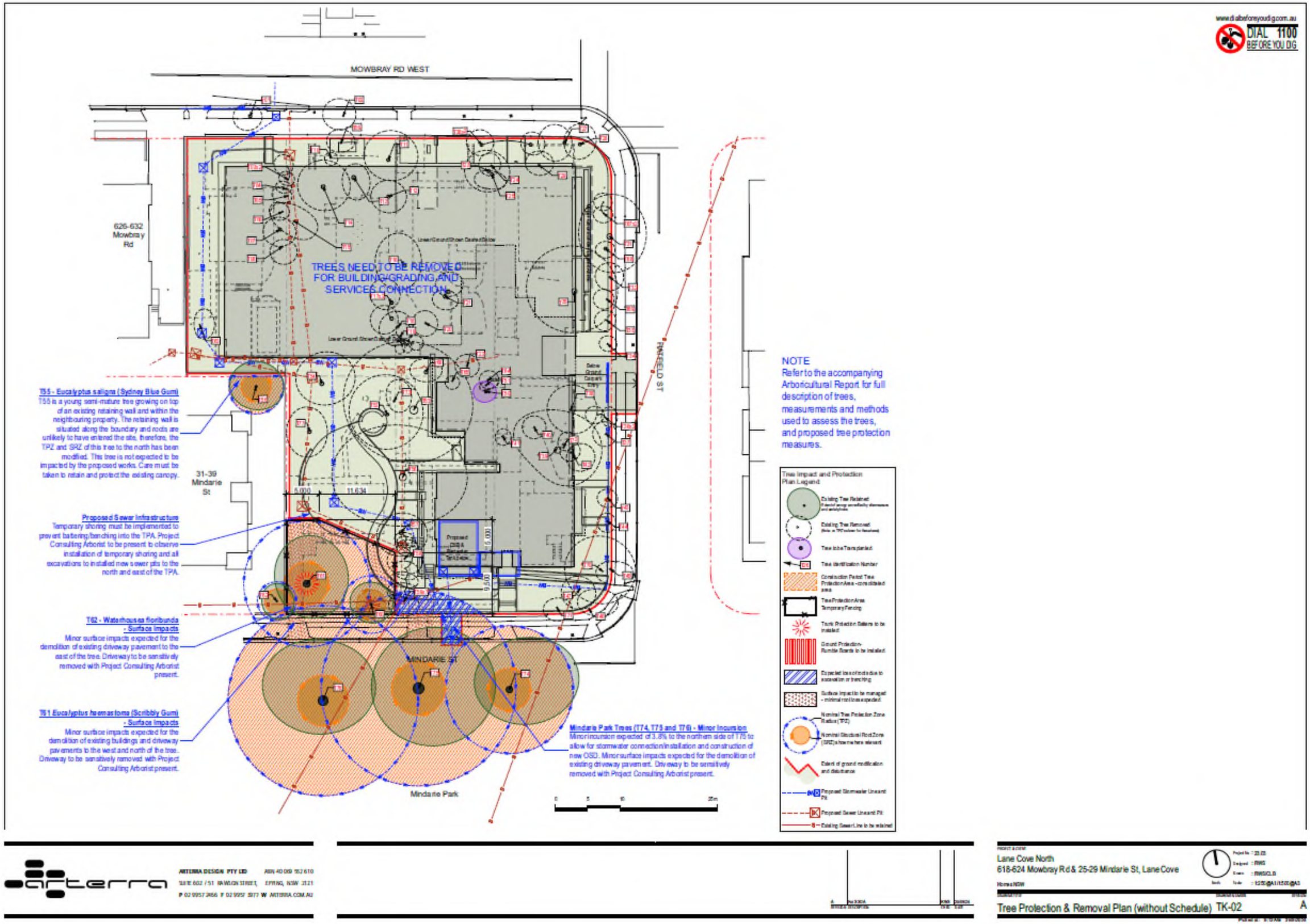

Image Source: Arterra (2024)

Figure 4. The project layout

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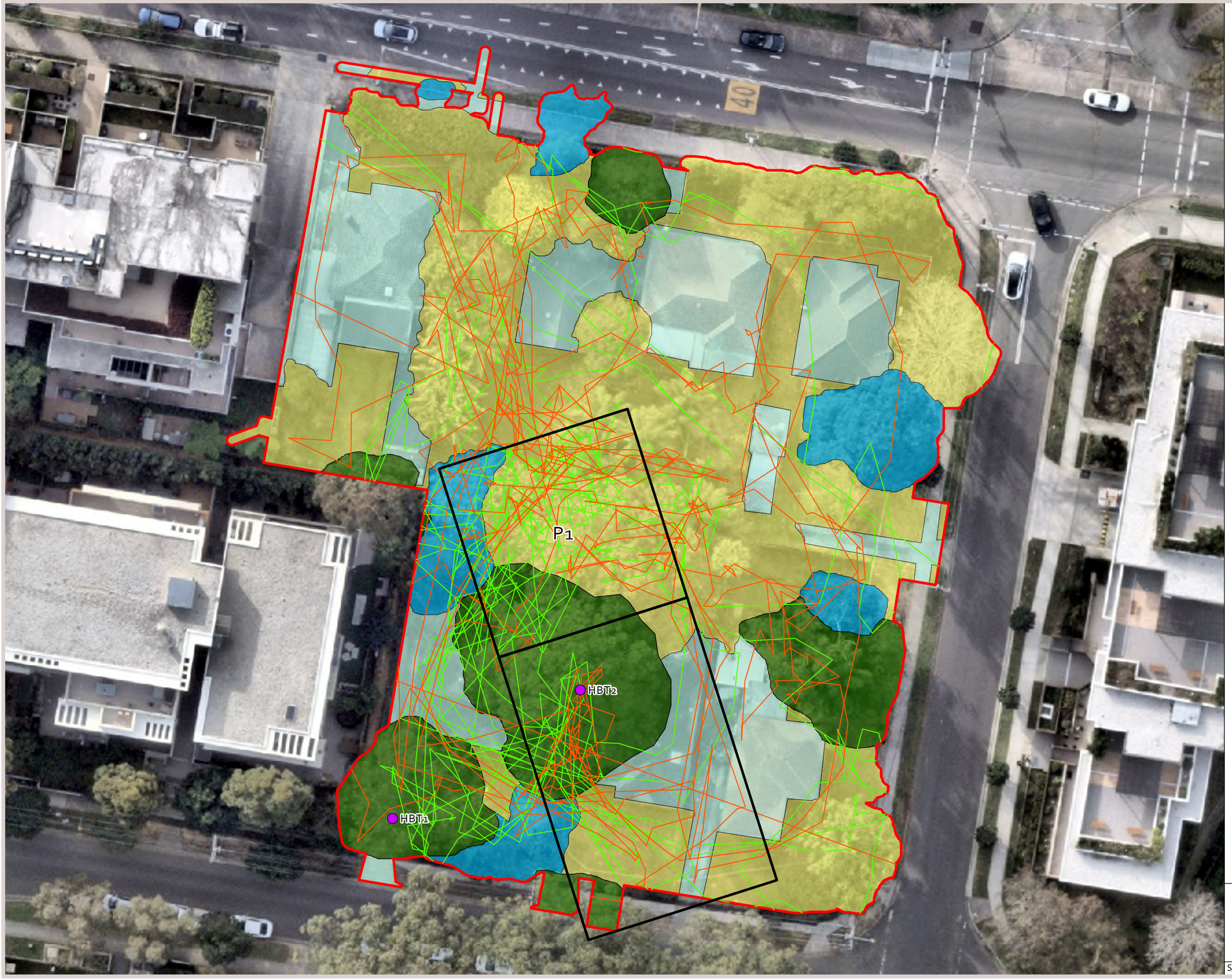

Legend

- Subject Land
- BAM Plot
- Hollow-bearing Tree
- Fauna Survey Tracks
- Flora Survey Tracks

Plant Community Type

- 3136 Blue Gum High Forest (Canopy)

Other Map Units (Non-PCTs)

- Planted Native Trees
- Exotic Vegetation
- Cleared Land

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services
Environmental Planning
Instrument - Land Zoning
© State Government of NSW and NSW
Department of Planning, Housing and
Infrastructure 2024

cumberland ecology

Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 5. Flora and Fauna survey locations

Legend

- Subject Land
- Native Vegetation
- Exotic Vegetation
- Cleared Land

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services NSW Department of Customer Services

cumberland ecology

Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 6. Native vegetation extent within the subject land

Legend

Subject Land

Plant Community Type

3136 Blue Gum High Forest (Canopy)

Other Map Units (Non-PCTs)

Planted Native Trees

Exotic Vegetation

Cleared Land

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services

cumberland ecology

Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 7. Plant community types within the subject land

Legend

Subject Land

Threatened Ecological Communities

Blue Gum High Forest in the Sydney Basin Bioregion

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services NSW Department of Customer Services

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Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 8. Threatened ecological communities within the subject land

Legend

Subject Land

Vegetation Zone

3136_Canopy

Management Zone

Complete Clearance

Retention

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services
NSW Department of Customer Services

cumberland ecology

Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 9. Vegetation zones within the subject land

Legend

Subject Land

Prescribed Impacts

Human made structures

Non-native Vegetation

Habitat Connectivity

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services NSW Department of Customer Services

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Spatial Reference: GDA 1994 MGA Zone 56

0 3 5 10 20 20 m

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Figure 10. Extent of prescribed impacts

Figure 11. Serious and irreversible impacts

Legend

Subject Land

Areas requiring an offset

3136_Canopy

Areas not requiring an offset

Planted Native Trees

Areas not requiring further assessment

Exotic Vegetation

Cleared Land

Image Source: Nearmap © (2024) Dated: 22/07/2024
Data Source: Sixmaps Clip & Ship, DCS Spatial Services NSW Department of Customer Services

cumberland ecology

Spatial Reference: GDA 1994 MGA Zone 56

0 2 4 8 10 20 m

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Figure 12. Thresholds for assessment