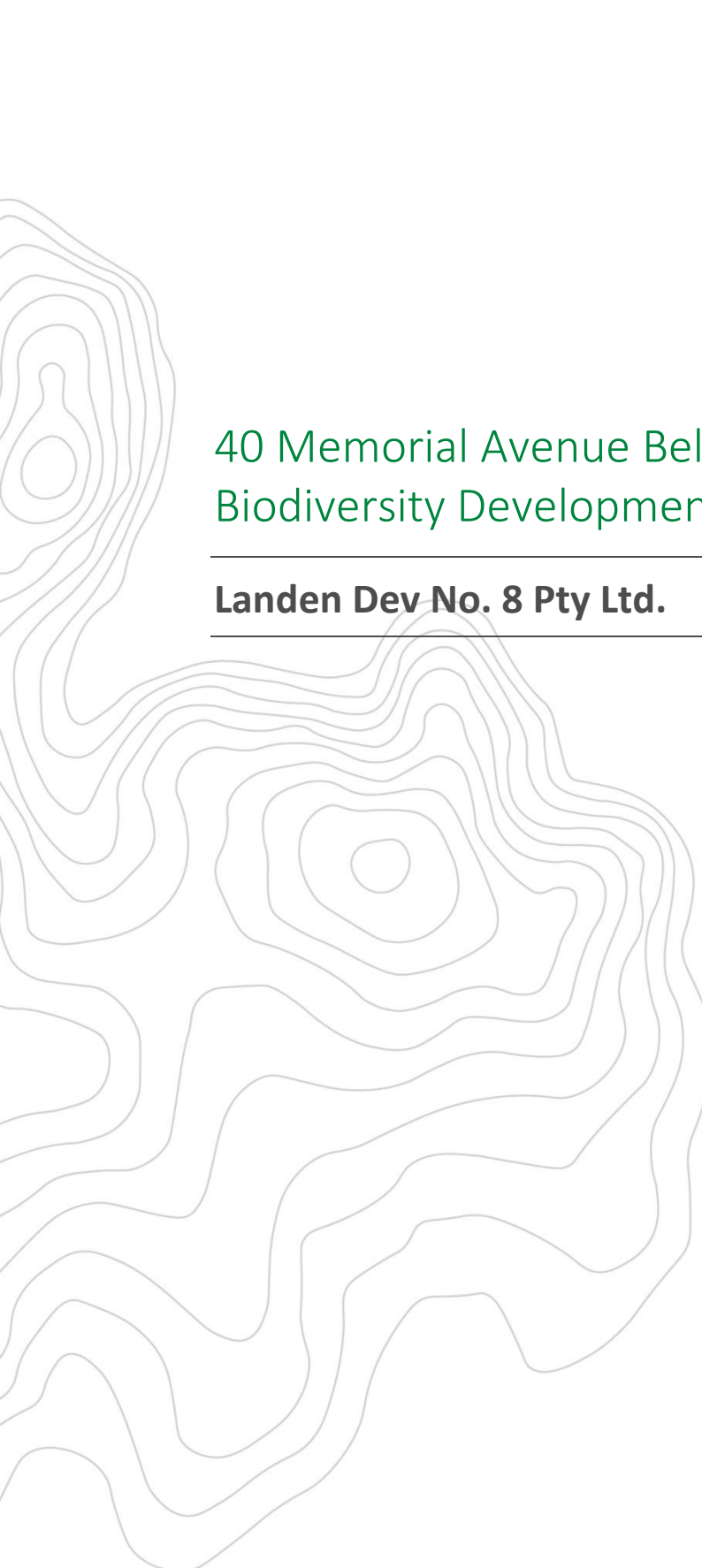


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40 Memorial Avenue Bella Vista Biodiversity Development Assessment Report

Landen Dev No. 8 Pty Ltd.

DOCUMENT TRACKING

Project Name	40 Memorial Avenue Bella Vista - Biodiversity Development Assessment Report
Project Number	22SYD10555
Project Manager	Hamish Pritchard
Accredited Assessor Certification	 BAAS17056 S. 6.15(1) of the <i>Biodiversity Conservation Act 2016</i> states that: <i>A biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted.</i> This Biodiversity Development Assessment Report has been prepared by Stacey Wilson and Daniel McDonald on the basis of the requirements of (and information provided under) the biodiversity assessment method (BAM 2020). No actual, perceived, or potential conflict of interest exists between it or between any one or more of the author's employees, consultants or agents and the project client, or is likely to arise in relation to the report that is submitted for this project.
Prepared by	Joseph Gleeson, Bronwyn Callaghan and Hamish Pritchard
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Approved by	Stacey Wilson (version 1), Daniel McDonald (version 2)
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Template 2.8.1

Executive Summary

Eco Logical Australia (ELA) was engaged by Landen Dev No.8 Pty Ltd (the proponent) to prepare a Streamlined (small area) Biodiversity Development Assessment Report (BDAR) for 40 Memorial Avenue, Bella Vista (the development site) within The Hills Shire local government area.

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

The development site (Lot 1 DP1237055 and Lot 1 DP1298513) contains an existing dwelling, a garden shed and a chicken coop. The site is extensively disturbed from previous land clearing, creation of landscape gardens and weed invasion. Elizabeth Macarthur Creek is located to the east of the development site. The site also contains a dam which receives water from overland flow. The proposed development involves removal of vegetation, the construction of residential flat buildings, internal roads, and services. The proposed works include the following:

- demolition of existing dwelling and sheds
- draining and filling of existing dam
- clearing of vegetation within the development footprint
- retention of some of the native vegetation (0.05 ha) within a restricted development area (RDA) at the southern end of the development site
- earthworks to create residential flat buildings, internal road and drainage.

Field survey was undertaken to validate and map vegetation, survey the required vegetation integrity plots and assess habitat values. Native vegetation was mapped within the subject land, consisting of the following:

- 0.22 ha of planted native vegetation.
- 0.36 ha of PCT 3320 Cumberland Shale Plains Woodland.

PCT 3320 was present in one condition state – degraded. The understorey of the PCT 3320 patch appeared to be regularly mowed, so it contained no shrubs and a very short layer of grasses and forbs. Despite this regular disturbance, there was a relatively high cover of native grasses and forbs. Approximately 0.14 ha of this PCT will be affected by the proposed development.

The remaining vegetation within the development site was either gardens containing exotic and planted native species, or cleared land dominated by exotic grasses and weeds.

Measures to avoid and minimise impacts have been applied to the development footprint and 0.05 ha of PCT 3320 will be retained within the development site as part of the RDA. The RDA arose after discussion with council, in which council ecologists wanted to see more avoidance of native vegetation within the development site. Additionally, another 0.17 ha is to be avoided by the proposed works. Therefore, a total of 0.22 ha of PCT 3320 will be avoided by the proposed works. Following review of the proposal by The Hills Shire Council, the road in the southern part of the development site was redesigned at the request of Council to meet traffic safety standards. The final design of the road intersects the patch of remnant woodland, therefore, further avoidance of this vegetation zone was not possible.

A summary of credit requirements to offset impacts to PCT 3320 are shown in the table below.

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

PCT ID	PCT Name	Condition	Vegetation Zone	Direct impact area (ha)	Credits
Ecosystem credits					
3320	Cumberland Shale Plains Woodland	Degraded	1	0.14	5

Removal of 0.22 ha of planted native vegetation was assessed against *Appendix D: Streamlined assessment module - planted native vegetation* of the BAM 2020 and does not require offsetting.

PCT 3320 forms a part of the threatened ecological community (TEC) *Cumberland Plain Woodland in the Sydney Basin Bioregion*. This vegetation community is listed as Critically Endangered under the *Biodiversity Conservation Act 2016* (BC Act). PCT 3320 also forms a part of the federally listed TEC *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, the vegetation within the subject land did not meet any of the required condition classes and as such, is not recognised under the EPBC Act.

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

Foraging habitat for the EPBC Act list species *Pteropus poliocephalus* (grey-headed flying-fox) will be affected. This species is listed as vulnerable under the EPBC Act. An Assessment of Significance for this species concluded that the proposed development is unlikely to cause a significant impact to grey-headed flying-fox.

A dam dewatering plan is recommended to ensure animal welfare if native fauna (e.g. turtles) are present. A preclearance survey of the sheds contained at 40 Memorial Avenue is recommended to ensure no microbat species are present prior to demolition. Sediment and erosion control measures are recommended to prevent stormwater pollution or movement of soils from the development site.

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Abbreviations

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

Abbreviation	Description
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VIS	Vegetation Information System

1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Joseph Gleeson, Bronwyn Callaghan and Hamish Pritchard. It has been reviewed by Stacey Wilson (BAAS22030) and Daniel McDonald (BAAS17056), who are both accredited to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act). All credit calculations have been undertaken using the BAM Calculator (BAMC) version 82 in case number 00057205/BAAS17056/25/00060015.

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

1.1. General description of the development site

The proposed development is located at 40 Memorial Avenue, Bella Vista NSW, Lot 1 DP1237055 and Lot 1 DP1298513 (herein referred to as the development site). The development site is located approximately 30 km north west of the Sydney CBD and 3 km north west of Parramatta, in the Hills Shire local government area (LGA).

The site is two large residential lots with a dwelling with attached carports and a garden shed located in the central section of the site. Elizabeth Macarthur Creek, a second order Strahler stream, traverses to the east of the site, approximately 50 m from the boundary. The lot is largely cleared and regularly maintained with patches of planted native and exotic vegetation throughout. Some remnant native vegetation is present in the southern section of the site which is proposed to be retained. Exotic grassland covers the majority of the site. Riparian vegetation along Elizabeth Macarthur Creek is also present within the development site.

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

1.2. Brief description of the proposal

The proposed development consists of four residential flat buildings and two blocks of townhouses. The proposed development will also result in the construction of a road and basement carpark to access these homes. The proposed works will involve the following:

- demolition of existing dwelling and sheds
- draining and filling of existing dam
- clearing of vegetation within the development footprint
- vegetation retention area containing some of the native vegetation (0.05 ha) within a restricted development area (RDA) at the southern end of the development site, which was established following discussion with council about requiring more avoidance measures.
- earthworks to create residential flat buildings, internal road and drainage
- construction of access road along the parallel and close to the southern boundary and along the western boundary of the development site

The development is proceeding as a state significant development (SSD) under Part 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The project was submitted to the NSW

major planning portal under application number SSD-80102979 and issued the Secretary's Environmental Assessment Requirements (SEARs). The SEARs outlined the following required assessments relating to biodiversity:

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

OR

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

As the development does not occur on biodiversity certified land, this BDAR has been prepared for submission with the SSD application.

1.3. Development site footprint

The development site has a total area of approximately 2.04 ha. The construction and operational footprint are wholly within the development footprint (Figure 2) and has a total area of 1.20 ha. Some of the remnant native vegetation in the southern section of the development site and within Elizabeth Macarthur Creek is located outside of the development footprint and is proposed to be retained. The subject land boundary (which is equivalent to the development site) and final development footprint, are presented in Figure 2.

For the purposes of this BDAR, the proposal construction footprint and operational footprint will be considered as the same boundary and will be referred to as the 'development footprint'. This approach allows the assumed worst-case scenario to be considered when assessing the impacts of the proposal. The development site is the whole of Lot 1 DP1237055 and Lot 1 DP1298513 and comprises the proposed buildings and infrastructure and the proposed vegetation retention area.

The following terminology is used throughout the report to describe areas related to the proposal:

- Subject land: the entirety of Lot 1 DP1237055 and Lot 1 DP1298513 (approximately 2.55 ha).
- Development site: the envelope of future works for the proposal, including areas likely of indirect impacts.
- Development footprint: proposed construction footprint of where future buildings and infrastructure will be developed.

1.4. Sources of information used

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

- BioNet Vegetation Classification System Version 3.1
- BioNet / Atlas of NSW Wildlife 5 km database search (Department of Planning, Industry and Environment (DPIE) 2022a) (accessed May 2025)

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool 5 km radius database search (Department of Agriculture, Water and Environment (DAWE) 2021a) (accessed May 2025)
- NSW Government ePlanning Spatial Viewer
- National Flying-fox Monitoring data (DAWE 2020b) (accessed May 2025)
- Biodiversity Assessment Method 2020
- Biodiversity Assessment Methodology Calculator (BAMC) version 80
- NSW Government Biodiversity Values Map (DPIE 2021b) (accessed May 2025)
- Threatened species profiles and recovery plans (DAWE 2022c and DPIE 2022c)
- The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage (OEH), 2016), Version 2.0
- Remnant Vegetation of the western Cumberland subregion, 2013 Update. VIS_ID 4207 (Department of Planning, Industry and Environment (DPIE) 2015)
- Additional Geographic Information System (GIS) datasets including soil, topography, geology and drainage
- The Hills Local Environment Plan 2019
- The Hills Development Control Plan 2012.
- Eco Logical Australia (ELA), 2022. *40 Memorial Avenue Riparian and Aquatic Assessment*. Prepared for Landen Dev No 8 Pty Ltd.
- Eco Logical Australia 2024. *40 and 38Z Memorial Avenue Bella Vista - Biodiversity Development Assessment Report*. Prepared for Landen Dev No.8 Pty Ltd.

Species searches from both the NSW BioNet database and the Commonwealth Protected Matters Search Tool (PMST) were performed around the co-ordinates, UTM Zone 55, 309270m E, 6266872m S on 30 May 2022. The results of these searches were combined to produce a list of threatened species, populations and communities either previously recorded or considered likely to occur within the subject land. The likelihood of occurrences for threatened species, populations and communities in the subject land was then determined based on location of database records, the likely presence or absence of suitable habitat in the subject land, and knowledge of the species' ecology. This information informed the subsequent field assessment.

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

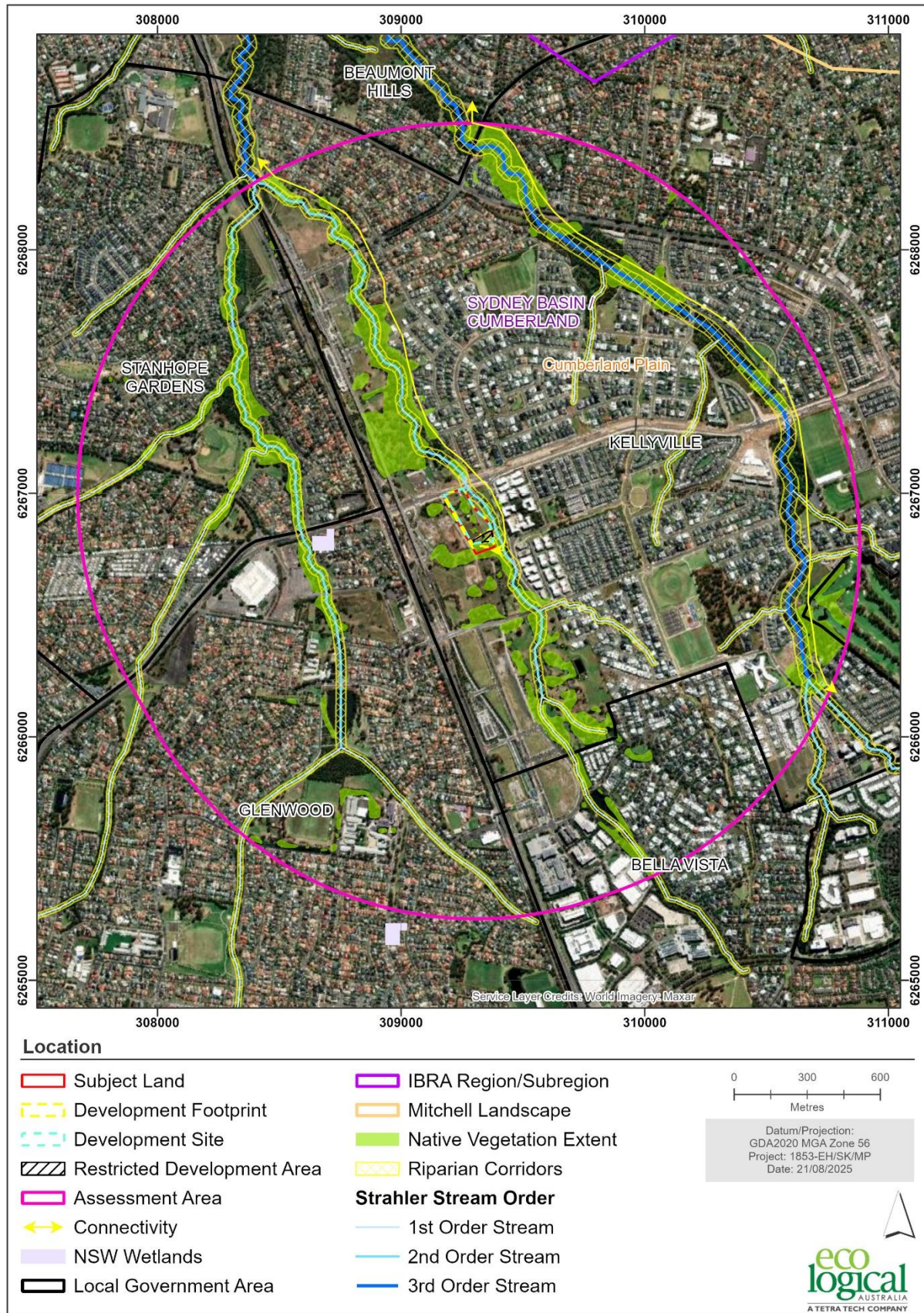


Figure 1: Location Map



Figure 2: Site Map

1.5. Legislative context

Legislation relevant to the development site is outlined in Table 1.

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Matters of National Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.
State	
<i>Environmental Planning and Assessment Act 1979</i>	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposed development is State Significant Development and is to be assessed under Part 4.7 of the EP&A Act. Secretary's Environmental Assessment Requirements (SEARs) have been issued on the 20 February 2025 (SSD-80102979) and require assessment that: <i>'unless a waiver has been granted, provide a Biodiversity Development Assessment Report (BDAR) that assesses any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020.'</i>
<i>Biodiversity Conservation Act 2016</i>	The proposed development does not occur on biodiversity certified land and does not have a waiver granted. Therefore, as per the SEARs, requires the submission of a BDAR. The area of native vegetation clearing is less than 1 hectare, therefore the streamlined assessment module small area under appendix C of the BAM 2020 has been carried out. Additionally, the development footprint also contains an area of planted native vegetation and so the streamlined assessment module planted native vegetation under appendix D of the BAM 2020 has also been undertaken.
<i>Local Land Services Amendment Act 2016</i>	The LLS Act does not apply to areas of the state to which the Chapter 2 of the Biodiversity and Conservation SEPP applies. Chapter 2 of the Biodiversity and Conservation SEPP applies to The Hills local government area.
<i>Fisheries Management Act 1994</i>	Elizabeth Macarthur Creek traverses the eastern section of the development site. However, the proposed design does not indicate any works on key fish habitat (below top of bank), therefore, permits or consultation under Part 7 of the FM Act are not required.
<i>Water Management Act 2000</i>	The works are on waterfront land and would require a Controlled Activity Approval under s91 of the WM Act. The objectives of the WM Act are addressed in a riparian assessment conducted for the proposed development (ELA 2022).
Environmental Planning Instruments	
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>	This new SEPP came into effect on March 1 2022 and consolidates a number of SEPPs including the Coastal Management SEPP 2018. This SEPP applies to land in the coastal zone. The subject land is located outside of this zone therefore this SEPP does not apply.
<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)</i>	This new SEPP came into effect on March 1 2022 and consolidates the following SEPPs: • Sydney Drinking Water Catchment SEPP 2011 • The Vegetation in Non-Rural Areas SEPP 2017 • Koala Habitat Protection SEPP 2021. The Vegetation in Non-Rural Areas SEPP 2017 aimed to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. The provisions of this SEPP have been included

Name	Relevance to the project
	in the Biodiversity and Conservation SEPP in Chapter 2. Chapter 2 applies to development that does not require consent. As this project requires consent under the EP&A Act, this section of the Biodiversity and Conservation SEPP is not relevant. Chapter 4 contains the land-use planning and assessment framework for Koala habitat within the Metropolitan Sydney and Central Coast. The Hills LGA is not considered land to which the Koala Habitat Protection applies. Chapter 6 contains provisions relating to development undertaken in four water catchments listed in Part 6.1. The subject site occurs on land mapped within the Hawkesbury-Nepean Catchment. Therefore, development controls listed under Part 6.2 of this SEPP apply to the proposed development.
The Hills Local Environment Plan (LEP) 2019	The project is a State Significant Development and will comply with the EP&A Act and all relevant State Planning Instruments. The proposed development will aim to comply with LEP requirements and objectives. The subject site is zoned R1 General Residential under The Hills LEP 2019. The subject site is located within an Urban release area and is adjacent to the Bella Vista Station State Significant Site which is currently under assessment. The site is not mapped on the terrestrial biodiversity layer.

2. Streamlined assessment modules

Two streamlined assessment modules were utilised in this BDAR. These include specific requirements that must be met to assess the impacts on biodiversity values.

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

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

Appendix C of the BAM also does not specify that it cannot be used with other modules such as Appendix D Streamlined assessment module – planted native vegetation. The planted native vegetation module therefore been used as set out in Section 4.2.1.

2.1. BAM Appendix C – Small area

Appendix C of the BAM 2020 outlines a streamlined assessment module for assessing small areas. The streamlined assessment module can be applied where the area clearing limits are under a certain threshold, outlined below in Table 2. The minimum lot size for the property is 1,800 m² and the area of native vegetation to be cleared is less than 1 ha, therefore, the small area module has been applied to part of this assessment in accordance with Appendix C of the BAM 2020.

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

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

¹ shown in the lot size maps made under the relevant local environmental plan (LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

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

This assessment has applied the hierarchy of avoiding and minimising impacts on biodiversity before considering offsetting residual impacts through retention of remnant native woodland in the southern section of the development site.

3. Landscape features

The subject land has been highly disturbed due to clearing and ongoing maintenance and the construction of residential houses, sheds and gardens. Most of the vegetation on-site is planted native and exotic vegetation and exotic grassland. The southern section of the subject land contains remnant native woodland, but the understorey has been cleared and is regularly mown. A small dam is in the central section of the subject land. The subject land is relatively flat with a slight 3% slope towards Elizabeth Macarthur Creek which traverses the eastern section of the site. The elevation of the subject land is 58 – 63 metres above sea level.

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

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

Table 3: Landscape features

Landscape feature	Subject Land/Development Site	Assessment Area	Data source
IBRA Region(s)	Sydney Basin	Sydney Basin	Interim Biogeographic Regionalisation for Australia (IBRA), Version 7
IBRA subregion(s)	Cumberland	Cumberland	IBRA, Version 7
Rivers and streams	There are no rivers or streams mapped within the subject land. However, the riparian buffer for Elizabeth Macarthur Creek does intersect on the eastern boundary of the subject land.	Elizabeth Macarthur Creek, a second order Strahler stream, is located approximately 50 m to the east of the development site. In addition to this, first, second and third order Strahler streams are also present within the assessment area (Figure 1).	NSW LPI Waterway mapping
Estuaries and wetlands	The development site does not contain any mapped important or local wetlands.	The assessment area does not contain any mapped important wetlands.	NSW directory of important wetlands
Connectivity of different areas of habitat	Connectivity to large tracts of habitat has been disconnected by residential development and roads surrounding the development site. Some fragmented connectivity may remain for highly mobile species such as birds and bats. This may include flyways for migratory birds and bat species moving through the landscape.	There is limited connected within the assessment area due to the residential and urban land use in the locality. Some fragmented connectivity remains through the central portion of the assessment area (through the subject land) and along the eastern edge of the assessment area.	Aerial imagery

Landscape feature	Subject Land/Development Site	Assessment Area	Data source
Geological features of significance and soil hazard features	The development site does not contain areas of geological significance (i.e. karst, caves, crevices, cliffs) and soil hazard features.	The assessment area does not contain areas of geological significance (i.e. karst, caves, crevices, cliffs) and soil hazard features.	Aerial imagery and field survey
Areas of Outstanding Biodiversity Value (AOBV)	As there are not AOBV on site, this trigger does not apply.	There are no AOBV within the assessment area.	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2022)
NSW (Mitchell) Landscapes	Cumberland Plain	Cumberland Plain	NSW (Mitchell) Landscapes - version 3.1 (DPIE 2016)
Percent (%) native vegetation extent	The development footprint is approximately 1.2 ha and contains approximately 0.59 ha of native vegetation, including the planted native vegetation. The subject land accounts for approximately 0.07 % of the native vegetation extent for the assessment area.	There are differences between the mapped vegetation extent and the aerial imagery. The aerial shows large tracts of native vegetation that has been removed for residential development within the Bella Vista and Kellyville regions. The actual area of native vegetation is much less than what is mapped. The BAM assessment area is approximately 817.18 ha and contains approximately 64 ha of native vegetation (7.83%).	Calculated using aerial imagery and ArcGIS software

4. Native Vegetation

Vegetation across most of the subject land was cleared areas of mown lawn, along with landscaping and gardens around the existing house consisting of predominantly exotic species. Remnant vegetation was present in a small patch in a southern section of the development site (Figure 4). Three vegetation zones were validated on the development site including one native plant community type (PCTs) which corresponds with threatened ecological communities (TECs) listed under the BC Act and EPBC Act. These are outlined in Table 4 and shown in Figure 4.

Table 4: Vegetation zones within the development site

PCT ID	Vegetation Community	Listing under the BC Act	Listing under the EPBC Act
3320	Cumberland shale plains woodland	CEEC: Cumberland Plain Woodland in the Sydney Basin Bioregion	CEEC: Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
-	Planted vegetation	-	-
-	Exotic	-	-

4.1. Survey Effort

Vegetation survey was undertaken within the development site by Bronwyn Callaghan and Joseph Gleeson on 23 May 2022 (Figure 6). Following the extension of the development footprint to include the bridge over the creek, the development site was revisited by ELA Senior Restoration Ecologist Dr Paul Gibson-Roy and Ecologist Joseph Gleeson on 30 May 2023 to assess the condition of the vegetation within the riparian corridor of Elizabeth Macarthur Creek.

A total of two full-floristic vegetation plots were surveyed to identify Plant Community Types (PCTs) and Threatened Ecological Communities (TECs) on the development site (Table 5). A total of two vegetation integrity survey plots were undertaken on the development site to assess the composition, structure and function components of each vegetation zone in accordance with the BAM.

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

Table 5: Full-floristic PCT identification plots

PCT ID	PCT Name	No. of plots required	Number of plots surveyed
3320	Cumberland shale plains woodland	1	1
-	Exotic	0	1
		Total	2

4.2. Native vegetation extent on the subject land

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

Table 6: Extent of native vegetation on the development site

PCT ID	PCT/vegetation name	Subject land (ha)	Development footprint (ha)
3320	Cumberland shale plains woodland	0.36	0.14
-	Planted native vegetation	0.22	0.22
Total		0.58	0.36

About 0.22 ha of vegetation within the development footprint was identified to be planted native vegetation. The 0.22 ha of planted vegetation has been assessed against *Appendix D: Streamlined assessment module - planted native vegetation* of BAM 2020. The decision-making process for this module is outlined below in Section 4.2.1. The remaining native vegetation (0.14 ha) within the development footprint has been assessed using the standard BAM.

4.2.1. Decision-making key for planted native vegetation (Appendix D BAM 2020)

Due to the presence of planted native vegetation within the development footprint, part of this BDAR was prepared under the streamlined assessment module for the planted native vegetation consistent with Appendix D of BAM 2020. This appendix contains a decision-making key which provides a framework for the assessment of planted native vegetation.

4.2.1.1. Description of planted native vegetation within the development site

Along the boundaries of the subject land adjacent to the existing house were areas not mown or intensively managed as gardens. These included planted native trees, such as *Eucalyptus microcorys* (tallowwood), *Eucalyptus robusta* (swamp mahogany), *Eucalyptus saligna* (Sydney blue gum), and *Eucalyptus scoparia* (Wallangarra white gum). Underneath these on the eastern boundary was a dense understorey consisting almost entirely of *Bambusa* sp. (dwarf bamboo). On the western boundary underneath the native trees there was dense layer of the high threat weed trees *Cinnamomum camphora* (camphor laurel) and *Ligustrum lucidum* (large-leaved privet) supporting weedy climbers such as *Asparagus asparagoides* (bridal creeper), *Ipomoea indica* (morning glory), *Solanum seaforthianum* (climbing nightshade) and *Vinca major* (periwinkle). In addition to these two mapped patches, a line of four *Casuarina cunninghamiana* (river oak) trees on the bank of the small dam to the south of the existing house have also been mapped as planted native vegetation. These patches were determined to be planted, and not remnant, native vegetation, for the following reasons:

- the location and regular spacing pattern of the trees suggested these had been planted in these locations for specific purposes, being screening along the property boundaries, and for bank stabilization and shading around the dam.
- some of the species were not native to the Sydney region, e.g. *Eucalyptus microcorys* (tallowwood), which naturally occurs on the north coast of NSW and Qld, and *Eucalyptus scoparia* (Wallangarra white gum), which naturally occurs in a very restricted range in the Northern Tablelands of NSW.

- All the *Eucalyptus* spp. found in these patches are species which are popular for garden and street plantings in the Sydney region.



Figure 3: Planted native trees on western boundary of the site

The planted native vegetation framework is applied to the proposal in Table 7.

Table 7: Decision making tool for Planted Native Vegetation in accordance with Appendix D of the BAM 2020

Question	Response and justification
1) Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	No, the planted vegetation does not occur in a mosaic of planted and remnant vegetation. The location and regular spacing pattern of the trees suggested these had been planted in these locations for specific purposes, being screening along the property boundaries, and for bank stabilization and shading around the dam.
i Yes – the planted native vegetation must be allocated to the best-fit PCT and the BAM must be applied.	The native trees are among heavily managed gardens are not consistent with the remnant PCT 3320 Cumberland Shale Plains Woodland dominated by <i>Eucalyptus crebra</i> in the southern section of the site. All <i>Eucalyptus</i> species found in these planted patches are species which are popular for garden and street plantings in the Sydney region. Some plants are not endemic to this IBRA subregion such as <i>Eucalyptus microcorys</i> and <i>Eucalyptus scoparia</i> , however they are native to NSW.
ii No – Go to 2.	
2. Is the planted native vegetation:	No – the planted native vegetation was not representative of a PCT. There was a range of planted eucalypt species and a largely exotic understorey with the primary purpose of landscaping. These included <i>Eucalyptus saligna</i> (Sydney blue
a. Planted for the purpose of environmental rehabilitation or restoration under an existing	

Question	Response and justification
conservation obligation listed in BAM Section 11.9(2.), and b. The primary objective was to replace or regenerate a plant community type of a threatened plant species or its habitat? i Yes – the planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM ii No – Go to 3.	gum), <i>E. microcorys</i> (tallowwood) and <i>E. scoparia</i> (Wallangarra white gum).
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. <i>Saving our Species</i> project c. Other types of government funded restoration project d. Condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat e. Legal obligation as part of a condition of 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 <i>Water Management Act 2000</i>)? i Yes – the planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM • No – Go to 4.	No – the tree species present are commonly used as street or landscaping trees and are not representative of a PCT or TEC, therefore it is unlikely that they were planted or translocated for any of the purposes listed.
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration within a legal obligation to secure or provide for management of the native vegetation? i Yes – 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) • No – Go to 5.	No, the planted native vegetation was not undertaken as part of any conservation or rehabilitation projects or to satisfy a legal obligation.
5. Is the planted native vegetation (including individuals of a threatened flora species) planted for functional,	Yes, the planted native vegetation was established for landscaping for specific purposes including, being screening

Question	Response and justification
aesthetic, horticultural or plantation forestry purposes? This includes examples such as; windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	along the property boundaries, and for bank stabilization and shading around the dam.
i Yes – 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)	
ii No – Go to 6.	
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	N/A
i Yes – 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)	
ii No – There may be other types of occurrences of planted native vegetation that do not easily fit into the decision-making key above.	

4.3. Plant Community Types present

A single PCT was identified within the development footprint and is presented in Table 8 and Figure 4.

The development footprint also contained 0.22 ha of planted native vegetation for landscaping purposes which does not conform to a native PCT.

Table 8: Plant Community Types

PCT ID	PCT Name	Vegetation Class		Vegetation Formation	Development Footprint Area	Percent cleared ²
3320	Cumberland shale plains woodland	Coastal	Valley	Grassy Woodlands	0.14 ha	93
		Grassy Woodland				

4.3.1. Plant Community Type selection justification

In determining the PCT for the development site, various attributes were considered in combination to assign vegetation to the best fit PCT. Attributes included dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT

² The extent to which a PCT is estimated to have been cleared in NSW (DPIE 2022).

descriptions in the BioNet Vegetation Classification and the final scientific determinations for TECs. Possible PCT options are provided in **Error! Reference source not found.**

4.3.1.1. PCT 3320 Cumberland Shale Plains Woodland

The patch of remnant woodland in the south of the subject land was found to be consistent with PCT 3320 Cumberland Shale Plains Woodland. This patch consisted of a small stand of moderately mature *Eucalyptus crebra* (narrow-leaved ironbark) trees. Whilst this species is not listed in the PCT description as an indicative species, it is listed in the Profile Source for this PCT (GW p29, Tozer *et al.* 2010). Additionally, mature individuals of *E. tereticornis* (forest red gum), one of the two tree species listed for this PCT, were observed in the blocks adjacent to the subject land. This indicates that the lack of the two *Eucalyptus* spp. indicative for this PCT in the patch within the subject land is a localised phenomenon, either a small natural variation or a result of past land use.

The understorey of the PCT 3320 patch appeared to be regularly mowed so contained no shrubs and a very short layer of grasses and forbs. Despite this regular disturbance, there was a relatively high cover of native grasses and forbs, including *Aristida vagans* (threeawn speargrass), *Dichondra repens* (kidney weed), *Microlaena stipoides* var. *stipoides* (weeping grass), *Oxalis perennans* and *Paspalidium distans*. These were interspersed with a high diversity, and moderate cover, of exotic grasses (e.g. *Axonopus fissifolius* (carpet grass), *Cenchrus clandestinus* (kikuyu) and *Setaria parviflora*) and other weeds (e.g. *Cirsium vulgare* (spear thistle), *Scutellaria racemosa*, *Senecio madagascariensis* (fireweed) and *Solanum pseudocapsicum* (madeira winter cherry)).

4.4. Threatened Ecological Communities

Threatened ecological communities within the development footprint are present in Table 9.

Table 9: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
3320	Critically Endangered	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.14	Critically Endangered	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	0

The PCT 3320 vegetation within the subject land is associated with the TEC *Cumberland Plain Woodland in the Sydney Basin Bioregion*, listed as a Critically Endangered Ecological Community (CEEC) under both the BC Act and the EPBC Act (Figure 5). Despite past and ongoing disturbance to this patch through regular mowing, it retains the following features that identify it as Cumberland Plain Woodland:

- location – the subject land is located within the Cumberland Plain.
- soils – The subject land contained clay soils derived from Wianamatta Group geology.
- dominant canopy species – *Eucalyptus crebra* (narrow-leaved ironbark) is listed as one of the characteristic upper-storey species in the Final Determination.
- species assemblage – many of the species listed in the Final Determination for Cumberland Plain Woodland were present with the patch, including: *Aristida vagans* (threeawn Speargrass), *Carex inversa* (knob sedge), *Commelina cyanea* (native trad), *Dichondra repens* (kidney weed), *Einadia trigonos*, *Eucalyptus crebra* (narrow-leaved ironbark), *Glycine clandestina* (twining glycine),

Glycine tabacina (variable glycine), *Juncus usitatus*, *Microlaena stipoides* var. *stipoides* (weeping grass), *Oxalis perennans*, *Paspalidium distans*, *Phyllanthus virgatus* (wiry spurge), *Solanum prinophyllum* (forest nightshade), and *Veronica plebeia* (trailing speedwell).

- Diversity and structure – The patch would be best described as a grassy woodland, as there was no shrub layer present (admittedly due to land-use practices), and a moderate diversity and cover of native grasses and forbs (see section 1.3, above, and Appendix B for list of species).

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community is listed as critically endangered under the EPBC Act. PCT 3320 identified within the subject land does not meet the condition thresholds outlined in the approved listing advice (Commonwealth of Australia, 2010) due to not forming part a contiguous patch of native vegetation greater than 5 ha in size (with assessment based on the most recently available aerial imagery). Therefore, vegetation within the subject site is not considered to conform to the EPBC Act listed community.

4.5. Vegetation integrity assessment

4.5.1. Vegetation zones

Three vegetation zones were identified within the subject land (Figure 6). One of these vegetation zones could be assigned to a PCT and these are shown in Table 10. The other vegetation zones mapped within the development site are not consistent with a PCT and have been mapped as exotic / cleared land and planted native vegetation (Figure 6). A total of two vegetation integrity survey plots were collected on the development site consistent with the BAM (Figure 6). One of the plots was undertaken in exotic grassland and is not included in Table 10. A description of the vegetation zone is provided in Table 11.

Table 10: Vegetation zones and vegetation integrity survey plots collected on the development site

Vegetation Zone	PCT ID	PCT Name	Condition	Area within the Subject Land (ha)	Patch Size	Vegetation Integrity Survey Plots required	Vegetation Integrity Survey Plots collected
1	3320	Cumberland Shale Plains Woodland	Degraded	0.14	29	1	1

4.5.2. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size of 29 ha was determined for the development site.

Table 11: Zone 1 PCT 3320 Degraded Condition

3320 – Cumberland Shale Plains Woodland			
Vegetation formation/class	Grassy Woodlands / Coastal Valley Grassy Woodlands		
Conservation status	NSW BC Act Endangered: <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> EPBC Act Critically Endangered: <i>Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest</i> (although this patch does not meet the EPBC condition threshold)		
Description	This community occurs along the shale plains of the Sydney Basin region on elevations of less than 150 m. Rainfall is restricted to a narrow band between 750 and 950 millimetres per annum. Canopy height is typically between 15-20 m. Mid-storey species generally occupy a height of 2-5 m.		
Characteristic canopy trees	<i>Eucalyptus crebra</i>		
Characteristic mid-storey	No characteristic native mid-storey species were observed during the field survey, due to the previous disturbance that has occurred within the subject land.		
Characteristic groundcovers	<i>Aristida vagans</i> , <i>Dichondra repens</i> , <i>Microlaena stipoides</i> var. <i>stipoides</i> , <i>Oxalis perennans</i> , <i>Paspalidium distans</i> ,		
Mean native richness	21		
Exotic species / HTW cover	<i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Axonopus fissifolius</i> , <i>Cardamine hirsuta</i> , <i>Cenchrus clandestinus</i> , <i>Chenopodium album</i> , <i>Cirsium vulgare</i> , <i>Cyclospermum leptophyllum</i> , <i>Cyperus brevifolius</i> , <i>Echium plantagineum</i> , <i>Euphorbia peplus</i> , <i>Galium aparine</i> , <i>Lysimachia arvensis</i> , <i>Modiola caroliniana</i> , <i>Opuntia</i> sp., <i>Oxalis purpurea</i> , <i>Scutellaria racemosa</i> , <i>Senecio madagascariensis</i> , <i>Setaria parviflora</i> , <i>Sida rhombifolia</i> , <i>Solanum mauritianum</i> , <i>Solanum physalifolium</i> var. <i>nitidibaccatum</i> , <i>Taraxacum officinale</i> , <i>Urtica urens</i> – 30.8%		
Condition	Degraded condition		
Variation and disturbance	There was a high level of disturbance within the BAM plot and wider subject land. This disturbance was largely due to the high number of exotic species within the subject land and regular mowing/slashing of the understorey. Smaller patches located toward the south of the subject land exists as single/few trees whereas the patch located toward the north had a greater canopy cover and abundance of native canopy species.		
No. sites sampled	1		
Threatened flora species	No threatened flora species were identified during the field survey		
Fauna habitats	Two hollow bearing trees and one stick nest were observed during the field survey. The native vegetation toward the north of the subject land could be potential marginal foraging habitat for highly mobiles species such <i>Pteropus poliocephalus</i> (grey-headed flying-fox).		
Composition	Structure	Function	Vegetation Integrity Score
59	61.6	55.2	58.5

3320 – Cumberland Shale Plains Woodland



4.5.3. Assessing vegetation integrity

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

Table 12: Vegetation integrity scores

Veg Zone	PCT ID	Condition	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Presence of Hollow bearing trees	Current vegetation integrity score
1	3320	Degraded	0.14	59	61.6	55.2	No	58.5

4.5.4. Exotic vegetation

A large portion of the development site was comprised of exotic vegetation. This included commonly planted exotic species which occurred around the existing building and included species such as *Schinus areira* (pepper tree), *Robinia pseudoacacia* (black locust), *Pinus radiata* (radiata pine), *Cinnamomum camphora* (camphor laurel) and *Jacaranda mimosifolia* (jacaranda). Exotic shrubs present included *Nerium oleander* (oleander), *Ligustrum lucidum* (large-leaved privet), *Murraya paniculata*, *Rhododendron* spp. (azalea) and *Camellia* spp. (camellia). Groundcover was dominated by a mix of common weed species that have established throughout the greater Sydney area including *Senecio madagascarensis* (fireweed), *Sonchus oleraceus* (common sowthistle), *Sida rhombifolia* (Paddy's lucerne), *Cirsium vulgare* (spear thistle) and *Cenchrus clandestinus* (kikuyu).

4.6. Use of local data

No local data was used in this assessment.

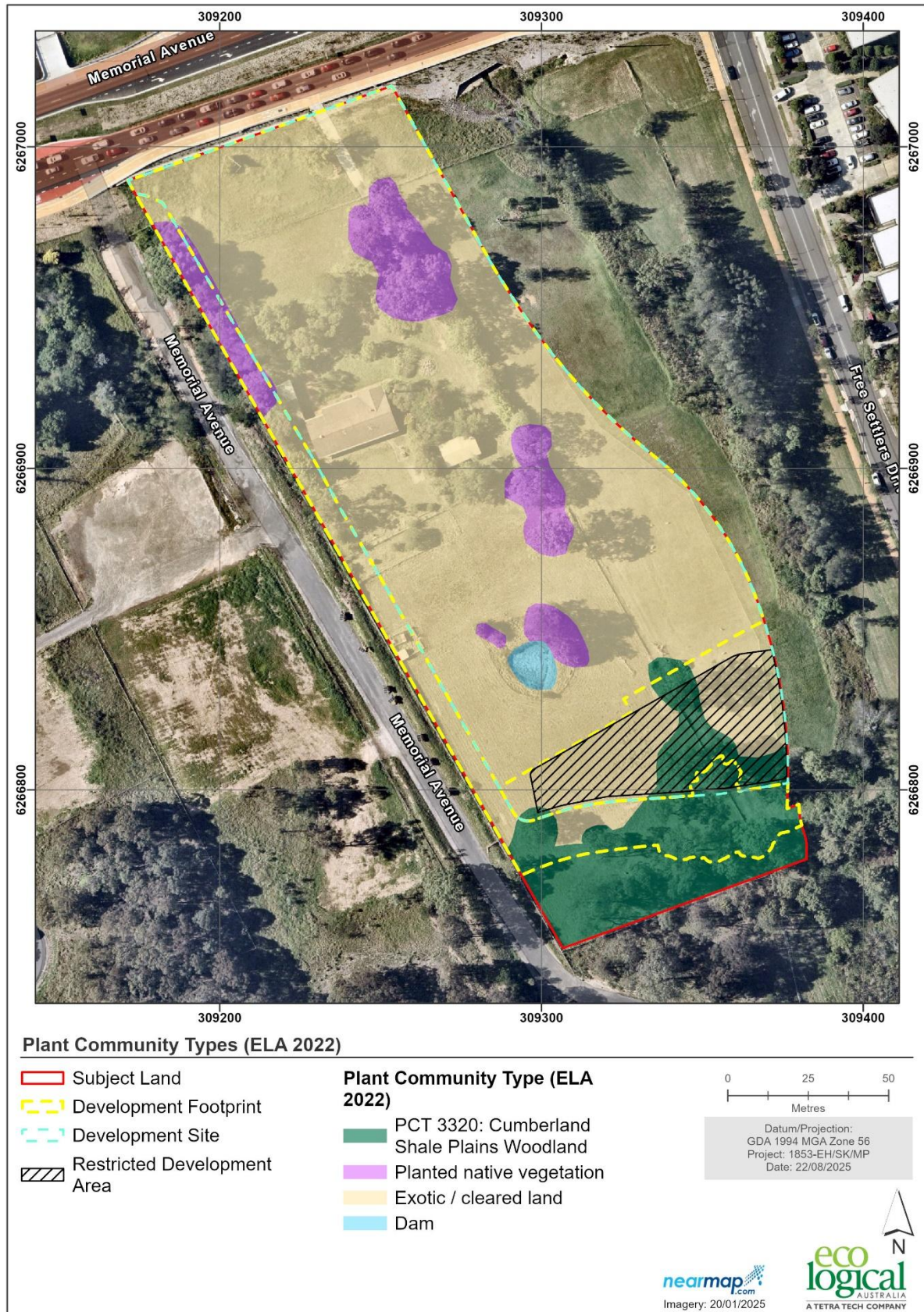


Figure 4: Plant Community Types present in the development footprint and subject land



Figure 5: Threatened Ecological Communities present in the development footprint and subject land



Figure 6: Vegetation zones and plots undertaken within the development footprint and subject land

5. Threatened species

5.1. Ecosystem credit species

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

Table 13: Predicted ecosystem credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
<i>Anthochaera phrygia</i>	regent honeyeater	-	-	High Sensitivity to Potential Gain	Critically Endangered	Critically Endangered
<i>Artamus cyanopterus cyanopterus</i>	dusky woodswallow	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Calyptorhynchus lathami lathami</i>	south-eastern glossy black-cockatoo (foraging)	Presence of Allocasuarina and casuarina species	-	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
<i>Chthonicola sagittata</i>	speckled warbler	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Climacteris picumnus victoriae</i>	brown treecreeper	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Dasyurus maculatus</i>	spotted-tailed quoll	-	-	High Sensitivity to Potential Gain	Vulnerable	Endangered
<i>Ephippiorhynchus asiaticus</i>	black-necked stork	Swamps; Shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300m of these swamps Waterbodies; Shallow lakes, lake margins and estuaries within 300m of these waterbodies	-	Moderate Sensitivity to Potential Gain	Endangered	Not listed

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
<i>Falco subniger</i>	black falcon	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Glossopsitta pusilla</i>	little lorikeet	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Haliaeetus leucogaster</i>	white-bellied sea eagle (foraging)	Waterbodies; Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Hirundapus caudacutus</i>	white-throated needletail	-	-	High Sensitivity to Potential Gain	Not listed	Vulnerable
<i>Lathamus discolor</i>	swift parrot (foraging)	-	-	Moderate Sensitivity to Potential Gain	Endangered	Critically Endangered
<i>Micronomus norfolkensis</i>	eastern coastal free-tailed Bat	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Miniopterus australis</i>	little bent-winged bat (foraging)	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Miniopterus orianae oceanensis</i>	large bent-winged bat (foraging)	-	-	High Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Pandion cristatus</i>	eastern osprey	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Petroica boodang</i>	scarlet robin	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed
<i>Petroica phoenicea</i>	flame robin	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
<i>Pteropus poliocephalus</i>	grey-headed flying fox (foraging)	-	-	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
<i>Stagonopleura guttata</i>	diamond firetail	-	-	Moderate Sensitivity to Potential Gain	Vulnerable	Not listed

Ecosystem credit species which have been excluded from the assessment and relevant justification is included in Table 14.

Table 14: Justification for exclusion of predicted ecosystem credit species

Species	Common Name	BC Act listing status	EPBC Act Listing status	Justification for exclusion of species
<i>Calyptorhynchus lathami</i>	south-eastern glossy black-cockatoo (foraging)	Vulnerable	Vulnerable	No presence of <i>Allocasuarina</i> or <i>Casuarina</i> species within the development footprint
<i>Ephippiorhynchus asiaticus</i>	black-necked stork	Endangered	Not listed	No swamps, shallow open freshwater or saline wetlands or shallow edges of deeper wetlands within 300m of these swamps within the development footprint

5.2. Species credit species

5.2.1. Identification of species credit species

Species credit species that require further assessment on the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 15.

Table 15: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
<i>Anthochaera phrygia</i>	regent honeyeater (breeding)	As per mapped areas	-	High Sensitivity to Potential Gain	Critically Endangered	Critically Endangered

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Listing status	Act
<i>Deyeuxia appressa</i>	<i>Deyeuxia appressa</i>	-	-	High	Endangered	Endangered	
<i>Eucalyptus benthamii</i>	Camden white gum	-	-	High	Critically Endangered	Vulnerable	
<i>Lathamus discolor</i>	swift parrot (Breeding)	As per mapped areas	-	Moderate Sensitivity to Potential Gain	Endangered	Critically Endangered	
<i>Micromyrtus minutiflora</i>	<i>Micromyrtus minutiflora</i>	-	-	High	Endangered	Vulnerable	
<i>Miniopterus australis</i>	little bent-winged bat (Breeding)	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature	-	Very High Sensitivity to Potential Gain	Vulnerable	Not listed	
<i>Miniopterus orianae oceanensis</i>	large bent-winged Bat (Breeding)	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature	-	Very High Sensitivity to Potential Gain	Vulnerable	Not listed	
<i>Pterostylis saxicola</i>	Sydney plains greenhood	-	-	Very High	Endangered	Endangered	

5.2.2. Assessment of habitat constraints and vagrant species

Habitat assessment within the subject land was undertaken in May 2023. Habitat assessment involved recording observations of fauna habitats available, including hollow bearing trees, stick nests and aquatic habitat. Two hollow bearing trees were identified within the subject land, including one within the development site. The hollow within the development site had a hollow entrance of 5 – 10 cm diameter and the hollow within the subject land had a hollow entrance of 5 cm diameter. One stick nest was also observed within the subject land. No evidence of current occupation of any habitat features was observed. Survey tracks and fauna habitats identified are show in Figure 7.

Based on the results of the habitat assessment some species credit species have been removed from further assessment as the species habitat constraints are not present within the subject land. Justification for exclusion is provided in Table 16.

No other candidate species (in addition to those generated by the BAMC) are considered likely to occur within the development site and no further assessment is required.

Table 16: Justification for exclusion/inclusion of species credit species

Species	Common Name	BC Act listing status	EPBC Act Listing status	Justification for exclusion of species
<i>Anthochaera phrygia</i>	regent honeyeater (Breeding)	CE	CE	Excluded: The subject land is not mapped as an important area for the Regent Honey Eater.
<i>Deyeuxia appressa</i>	<i>Deyeuxia appressa</i>	E	E	Excluded: This species was considered highly unlikely to occur, as it has not been identified in over 60 years. PlantNet has recently been updated (February 2025) by Richard Jobson of the Botanic Gardens of Sydney. Previous information on the distribution of this species had incorrectly identified this species as having a record from Killara in Hornsby NSW. It has been confirmed that the record was from further south of Sydney at Killara Park near Panania (comms. Royal Botanic Gardens Sydney). This species is likely to occur on vegetated fringes of watercourses that are slightly brackish. The location of the subject land is outside if the distribution of the previously known record at Panania. Although this species is associated with PCT 3320 within the BioNet TBDC, the occurrence of this PCT within the development footprint is in a highly degraded state.
<i>Eucalyptus benthamii</i>	Camden white gum	CE	V	Included: This species may be surveyed year-round and was not detected during survey of the subject land in 2022. Additionally, typical habitat of this species was not observed within the subject land.
<i>Lathamus discolor</i>	swift parrot (breeding)	E	CE	Excluded: The subject land is not mapped as an important area for the Swift Parrot.
<i>Micromyrtus minutiflora</i>	<i>Micromyrtus minutiflora</i>	E	V	Included: This species may be surveyed year-round and was not detected during survey of the subject land in 2022. Additionally, typical habitat of this species was not observed within the subject land.
<i>Miniopterus australis</i>	little bent-winged bat (breeding)	V	Not listed	Excluded: The buildings within the subject land did not present good microbat habitat, nor were there any caves or culverts to utilise across the development is site. As a result, it is very unlikely that this species would utilise the

Species	Common Name	BC Act listing status	EPBC Act Listing status	Justification for exclusion of species
				site for breeding habitat. As a precaution, we recommend a pre-demolition survey to ensure animal welfare.
<i>Miniopterus orianae oceanensis</i>	large bent-winged bat (breeding)	V	Not listed	Excluded: The buildings within the subject land did not present good microbat habitat, nor were there any caves or culverts to utilise across the development site. As a result, it is very unlikely that this species would utilise the site for breeding habitat. As a precaution, we recommend a pre-demolition survey to ensure animal welfare.
<i>Pterostylis saxicola</i>	Sydney greenhood	plains E	E	Excluded: The vegetation within the subject land is significantly degraded and is unlikely to provide suitable habitat to this species.



Figure 7: Survey effort within the development footprint and subject land

5.2.3. Candidate species requiring further assessment

As this BDAR is being assessed via the streamlined (small area) assessment (BAM 2020, Appendix C), only those candidate species at risk of a serious and irreversible impact (SAIL) require targeted survey. All the candidate species generated by the BAMC (Table 15) are entities at risk of a SAIL. Targeted surveys were conducted for *Eucalyptus benthamii* and *Micromyrtus minutiflora*. However, surveys were not conducted for the two other remaining flora species listed in Table 16 (*Deyeuxia appressa* and *Pterostylis saxicola*) due to no suitable habitat occurring within the subject land. No further assessment or targeted survey is required for these species. Likewise, as there is no breeding habitat present within the development site for candidate fauna species (*Anthochaera phrygia*, *Lathamus discolor*, *Miniopterus australis* and *M. orianae oceanensis*), no further assessment or targeted survey was required for these species.

5.2.4. Targeted surveys

Targeted surveys for suitable habitat were conducted for *Eucalyptus benthamii* and *Micromyrtus minutiflora* in May 2022.

The NSW TBDC provides the following information about *Eucalyptus benthamii*:

Occurs on the alluvial flats of the Nepean River and its tributaries. Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. Recruitment of juveniles appears to be most successful on bare silt deposits in rivers and streams.

This type of habitat was not recorded on the site.

The NSW TBDC provides the following information about *Micromyrtus minutiflora*:

Restricted to the general area between Richmond and Penrith, western Sydney. Grows in Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.

This type of habitat was not recorded on the site.

Additionally, neither *Eucalyptus benthamii* nor *Micromyrtus minutiflora* were recorded during the site survey.

5.2.5. Expert reports

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

5.3. Identification of prescribed additional biodiversity impact entities

The development site does not contain any additional prescribed impact entities.

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

The development site does not contain karst, caves, crevices, cliffs, rocks and other geological significance.

5.3.2. Human-made structures and non-native vegetation

The development site does not contain any human-made structures or non-native vegetation that is considered as potential habitat for threatened entities. The existing dwelling on the site is still occupied

and the garden shed is well used and almost completely sealed with no damage to the eaves and no access underneath as it is built on a slab. The non-native vegetation is present as maintained garden beds, with little prospect of threatened species using it for foraging or breeding.

5.3.3. Habitat connectivity

The development site is located within a highly urbanised landscape, with residential development currently under construction on the western boundary of the site. There is a local corridor shown in Figure 1, along Elizabeth Macarthur Creek which runs adjacent to the development site to the east. The corridor shows connectivity to vegetation along other riparian corridors which are tributaries of Cattai Creek which eventually connects to large tracts of bushland north of Glenorie. However, the corridor is limited to small, narrow, isolated patches of vegetation that are intersected by numerous busy roads within the highly urbanised landscape of Western Sydney. Given the lack of connectivity to large patches of habitat, only highly mobile threatened species are likely to occur within the development site (e.g. birds and bats). Threatened species that may forage across site on occasion include:

- *Micronomus norfolkensis* (eastern coastal free-tailed bat)
- *Miniopterus australis* (little bent-winged bat)
- *Miniopterus orianae oceanensis* (large bent-winged bat)
- *Pteropus poliocephalus* (grey-headed flying-fox).
- *Saccolaimus flaviventris* (yellow-bellied sheath-tail bat)
- *Falsistrellus tasmaniensis* (eastern false pipistrelle)
- *Myotis macropus* (southern myotis)
- *Scoteanax rueppellii* (greater broad-nosed bat).

Under the Streamlined Assessment Module for Small Areas, candidate species credit species that are not at risk of an SAI and are not incidentally recorded on the subject land do not require further assessment. Of the above threatened species that may forage across the site on occasion include the following species at risk of an SAI:

- *Miniopterus australis* (little bent-winged bat)
- *Miniopterus orianae oceanensis* (large bent-winged bat)

However, habitat for these threatened bats within the development site is marginal and is not well connected to areas of large intact foraging habitat for these species.

Threatened bird species listed as predicted ecosystem species in Table 13 are unlikely to regularly occur within the development site, given the poor habitat condition (lack of structural and floral diversity) and lack of connectivity to large areas of native bushland.

5.3.4. Water bodies, water quality and hydrological processes

Elizabeth Macarthur Creek is located to the east of the subject land. However, the proposed development will not have any direct impacts on this watercourse. Potential indirect impacts to the creek and its aquatic biodiversity are addressed in the riparian and aquatic assessment conducted by ELA for the proposed development (ELA 2022). However, mitigation measures for the development have been outlined in Table 26 and is considered unlikely that proposal will result in indirect impacts which would affect the creek should these be followed.

There is one artificial dam/water feature within the development site which is fed by overland flow. This dam may provide habitat for native fauna such as *Chelodina longicollis* (eastern long-necked turtle). The BAMC did not list *Myotis macropus* (southern myotis) as species credit species. However, southern myotis was considered during the site inspection and assessment due to the presence of a hollow bearing tree with a hollow of approximately 5 cm in diameter nearby. The dam is proposed to be dewatered which would directly affect potential foraging habitat for southern myotis. Under the Streamlined Assessment Module for Small Areas, candidate species credit species that are not at risk of an SAI and are not incidentally recorded on the subject land do not require further assessment.

5.3.5. Wind farm developments

This is not a wind farm development.

5.3.6. Vehicle strikes

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

6. Avoiding and Minimising Impacts on Biodiversity Values

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

6.1.1. Direct and indirect impacts

The BC Act and BAM 2020 requires proponents to avoid and minimise impacts on biodiversity values. The area of highest biodiversity value within the development is the patch of vegetation zone PCT 3320, occurring in a degraded condition, in the southern section of the site.

As discussed in Section 4.4, this vegetation zone corresponds with the TEC *Cumberland Plain Woodland in the Sydney Basin Bioregion*. This vegetation community is listed as Critically Endangered under the BC Act.

Approximately 0.22 ha of this remnant native vegetation would be retained within the subject land, with 0.05 to be retained as park of the proposed RDA (Figure 10). Initially it was proposed that 0.08 ha of this vegetation on the development site would be retained. The proposed footprint of the initial design that retained 0.08 ha of Cumberland Plain Woodland is shown in Figure 8. However, following completion of the road grading and civil design, in addition to the requirement to maintain orderly development practices with surrounding road network, the road was slightly realigned to improve traffic interaction and engineering practicality. These amendments increased the avoided vegetation from 0.08 ha to 0.22 ha. The final design of the road intersects the patch of remnant woodland, therefore, further avoidance of this vegetation zone was not possible.

As part of efforts to minimise impacts at the design stage, Landen have included in the proposal an engineering solution to protect trees located along the southern boundary of the development footprint. The trees to be retained are part of the patch of Cumberland Plain Woodland on the development site within the proposed RDA. Two full retaining walls will be implemented along the road on the southern side of the development site delineate RDA area between buildings and protect trees proposed to be retained.

In addition to avoiding impacts to 0.22 ha of Cumberland Plain Woodland TEC, the proposed development is avoiding and minimising impacts on biodiversity as follows:

- most of the development site has no to poor biodiversity values and does not require offsetting or assessment under the BAM as shown in Figure 14 and Figure 15.
- there are no impacts to specialised breeding habitat for threatened species.
- potential foraging habitat for *Pteropus poliocephalus* (grey-headed flying-fox), *Ninox strenua* (powerful owl), *Meridolum corneovirens* (Cumberland Plain land snail) and threatened microbat species listed in section 5.3.3 will be affected. Other ecosystem species have been included in the assessment (see Table 13) however, given the lack of habitat connectivity within the development site, foraging habitat for these species is marginal.
- indirect impacts to adjacent habitat are unlikely to result from the proposed development given the adjacent land is highly disturbed primarily consisting of gardens and cleared lawn. Land on the western boundary is currently under residential development and land to the east is highly disturbed with some isolated vegetation along Elizabeth Macarthur Creek. Indirect impacts can be managed through sediment and erosion control, and the implementation of a VMP.
- measures to minimise impacts to biodiversity will include supervision of vegetation removal in areas containing canopy or dense vegetation, including those with potential fauna habitat such as HBTs and stick nests (see Figure 7), by an ecologist to ensure any fauna present are taken into care and relocated into similar nearby habitat.
- a dam dewatering plan should be prepared to ensure any native fauna are captured and released in appropriate habitat.

Table 17: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Locating the proposal (including ancillary facilities) in areas lacking biodiversity values	The development will have impacts to remnant native, planted native and exotic vegetation. Remnant native vegetation in the form of PCT 3320 within the subject land occurs in a degraded condition. Only a small amount of this is proposed to be affected, with approximately 0.25 ha to be retained. The majority of the development footprint occurs on land mapped as exotic vegetation or cleared.	Impacts to native vegetation required at the extent shown in the footprint to meet traffic safety standards, at the request of Council. Retention of vegetation within the subject land will allow this PCT to persist in the landscape, with it likely extending into the south outside of the subject land. Majority of the proposed development has been located in areas of low biodiversity values, which includes exotic vegetation and cleared land.
Locating the proposal (including ancillary facilities) in areas where the native vegetation or threatened species habitat is in the poorest condition	Vegetation within the subject land occurs in a degraded condition due to regular maintenance through mowing and private use. Majority of the subject land has high coverage of exotic flora species.	Development footprint has been located in area predominantly featuring exotic vegetation which lack potential threatened species habitat. Areas of native PCT 3320 to be affected occur in a degraded condition, with no

Approach	How addressed	Justification
		threatened species observed utilising these areas for habitat during surveys.
Locating the proposal (including ancillary facilities) in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC, a highly cleared PCT or an entity at risk of a serious and irreversible impact (SAII)	No important habitat is mapped on the subject land. Hollow-bearing trees (HBTs) within the subject land may support roosting habitat for threatened microbat species. Canopy species could also support foraging habitat for grey-headed flying-fox.	Majority of impacts to occur in areas which are unlikely to support habitat for threatened species, including exotic vegetation occurring as predominantly exotic grasses, or cleared land. One HBT is proposed to be affected by the proposed development, with another to be retained within the subject land. Appropriate pre-clearance surveys and clearance supervision recommended to be undertaken during vegetation removal phases of the development
Locating the proposal in areas outside of the buffer area around breeding habitat features such as nest trees or caves	One HBT and one stick nest has been identified occurring within the development footprint.	One HBT to be affected by the construction of road, with another to be retained in the subject land. Recommended appropriate supervision by an ecologist or suitably qualified personnel for pre-clearance surveys and during vegetation clearing.

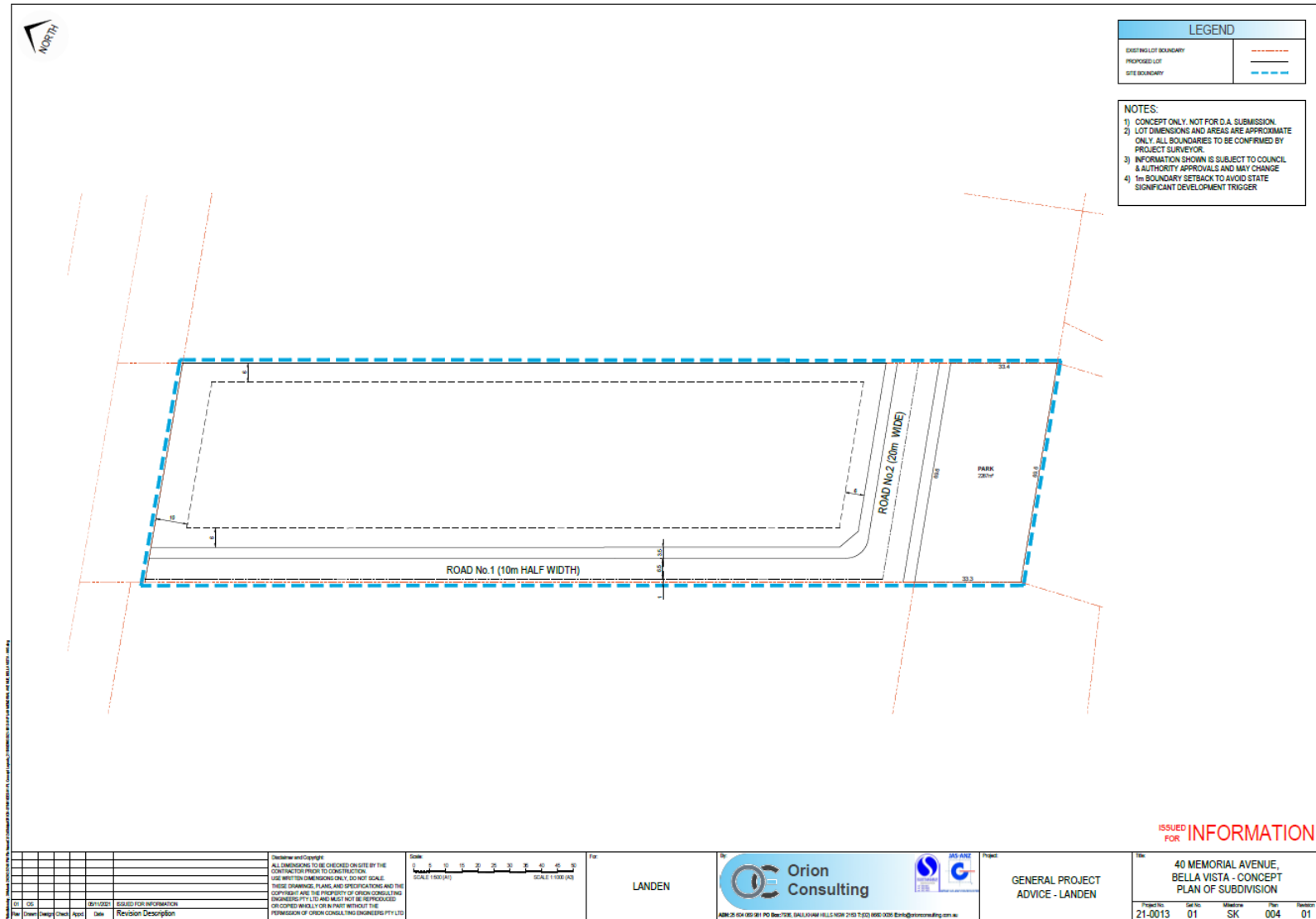


Figure 8: Previous proposed development footprint which would have retained 0.08 ha of Cumberland Plain Woodland on the development site

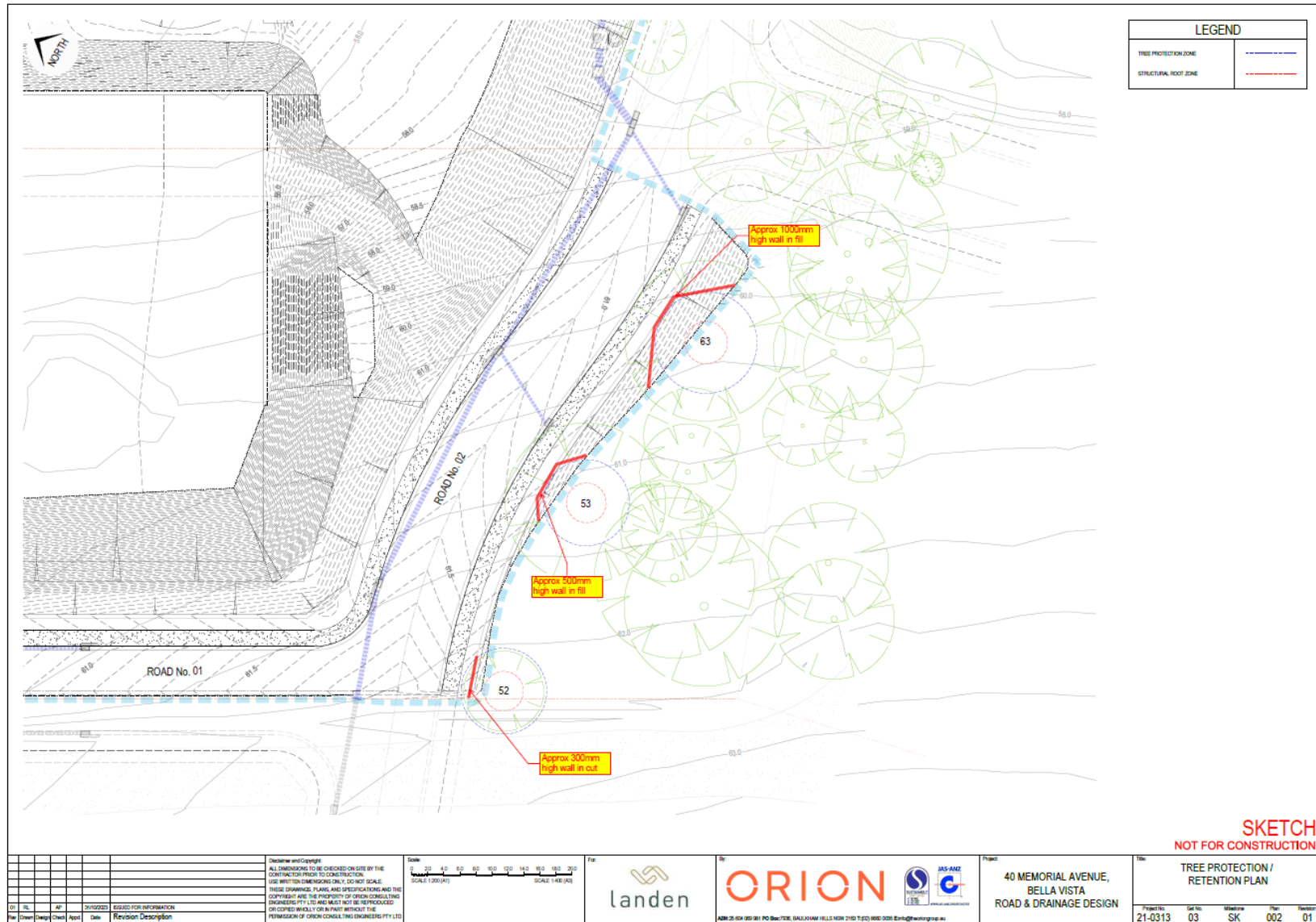


Figure 9: Previous proposed engineering plan to retain three trees characteristic of Cumberland Plain Woodland, with road batters present on the northern side of the road.



Figure 10: Final project footprint including construction and operation

6.1.2. Prescribed biodiversity impacts

Prescribed biodiversity impacts will be minimised as follows:

- a dam dewatering plan will be developed and implemented during dewatering of the dam, to ensure animal welfare if native fauna (e.g. turtles) are present, and exotic species (e.g. carp) are managed.
- exotic vegetation may provide foraging habitat or shelter sites (e.g. birds nest and possum dreys) for common peri-urban fauna and threatened species including southern myotis and grey-headed flying-fox. Pre-clearance surveys should be undertaken by an ecologist to determine the potential for exotic vegetation to provide habitat for native fauna species. Removal of exotic vegetation that is assessed as having potential to provide habitat for native species should be supervised by an ecologist to ensure animal welfare if fauna are present.

Table 18: Locating a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed and justification
Locate surface works to avoid direct impacts on the habitat features	Both the dam and planted native vegetation will be removed as part of the proposal. Native PCT is to be retained in the southern portion of the subject land which may facilitate removal of exotic vegetation which may form potential foraging habitat. Native species which may be utilising the dam should be relocated to the nearby Elizabeth Macarthur Creek.
Locating the envelope of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features, e.g. locating long wall panels away from geological features of significance or water dependent plant communities and their supporting aquifers	There will be no further impacts extending outside of the development footprint provided, including subsurface works.
Locating the project to avoid severing or interfering with corridors connecting different areas of habitat and migratory flight paths to important habitat or preferred local movement pathways	The subject land is unlikely to serve as a habitat corridor due to the limited amount of native vegetation present. Riparian vegetation associated within Elizabeth Macarthur Creek will remain within the vicinity of the subject land and will continue to provide habitat connectivity post-construction.
Locating the project to avoid direct impacts on water bodies	One dam is proposed to be dewatered and filled as part of the development. No direct or indirect impacts are likely to affect Elizabeth Macarthur Creek to the east of the subject land, following recommended mitigation measures outlined in Section 7.5 and 7.6 below.

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

6.2.1. Direct and indirect impacts

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

Only one native vegetation zone occurs within the development site, PCT 3320 - degraded. The vegetation integrity score for this vegetation zone is 57.6. Approximately 0.05 ha of this vegetation will be retained as part of a RDA. Initially it was proposed that all the remnant native vegetation on the development site (0.08 ha) would be retained. However, following review of the proposal by The Hills Shire Council, the road was redesigned at the request of Council to meet traffic safety standards. The final design of the road intersects the patch of remnant woodland, therefore, further avoidance of this vegetation zone was not possible.

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

Approach	How addressed	Justification
Reducing the proposal's clearing footprint by minimising the number and type of facilities	The majority of facilities will be located within the development footprint. One pathway is proposed to be constructed through the southern park containing native vegetation to be retained, with the purpose of providing walkways for the public to traverse and restrict traffic to a reduced area to prevent further impacts to retained native vegetation.	Pathway will reduce ongoing impacts which could be caused by foot traffic moving through native vegetation to be retained in the southern portion of the subject land.
Locating ancillary facilities in areas that have no biodiversity values	Most ancillary facilities are located in the development footprint which occur predominately in exotic vegetation.	Impacts to native PCT occurs in areas present in a degraded condition. Otherwise, impacts occurring to predominantly exotic vegetation which serves little to no biodiversity value.
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)	PCT 3320 occurs within the subject land in a degraded condition. Remaining areas include planted native or exotic vegetation, of which the latter is dominated by weedy grasses.	Surveys identified one HBT occurring within the development footprint, which could serve as habitat for threatened species. A second HBT was also identified occurring in the subject land and will be retained as part of the proposed works. Majority of impacts will affect exotic vegetation which is unlikely to provide habitat for threatened species. Native vegetation to be affected occurs in a degraded condition.
Locating ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAIL))	Proposed road will impact approximately 0.02 ha of PCT 3320, which conforms to a TEC which is also a listed SAIL entity. The proposal will retain areas of this PCT within the subject land as well.	To merge in with existing and proposed roads, impacts to PCT 3320 will occur (approximately 0.02 ha). This PCT within the subject land also conforms to the BC Act listed CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> , which is an SAIL entity. Remaining ancillary facilities are in areas containing either planted native or exotic vegetation.
Actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of	Pathways through the retained PCT 3320 in the southern portion of the subject land have been proposed to	Reduce ongoing impacts to ground cover within the retained native vegetation area.

Approach	How addressed	Justification
retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.	reduce future impacts to the community following construction completion by directing foot traffic.	

6.2.2. Prescribed biodiversity impacts

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

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

Approach	How addressed and justification
Design of project elements to minimise interactions with threatened entities	Prescribed biodiversity values on site are unlikely to support habitat for threatened species other than foraging habitat for grey-headed flying-fox or other highly mobile threatened species. Cumberland Plain land snail also has the potential to be present within the subject land. Landscaping will result in planting of native species which will supplement removal of potential foraging habitat in the form of exotic and planted native vegetation for the long-term. Native vegetation will be retained in the form of an RDA which will supplement removal of potential habitat for Cumberland Plain land snail.
Maintain environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation	The subject land is unlikely to contain environmental processes critical to the persistence of habitat features not associated with native vegetation.
Maintain hydrological processes that sustain threatened entities	The proposal is unlikely to affect hydrological processes which sustain threatened entities.
Controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities	Recommendations and mitigation measures have been provided in Section 7.6 to prevent indirect impacts occurring to Elizabeth MacArthur Creek caused by run-off from the development site. If these are followed, there is unlikely to be indirect impacts which may affect threatened entities downstream from the subject land.

7. Assessment of Impacts

7.1. Direct impacts

The proposed development will have direct impacts on:

- native vegetation and threatened ecological communities as outlined in Table 21
- prescribed biodiversity impacts as outlined in Section 7.4.

Direct impacts including the final project footprint (construction and operation) are shown on **Error! Reference source not found.** No impacts to candidate threatened species are expected to result from the proposal. Ecosystem credit species listed in Table 14 as being included, may be affected through a loss of foraging habitat as all the vegetation within the development site will be removed. Foraging habitat may include 0.25 ha of native vegetation (remnant PCT 3320 and planted native vegetation). However, *Pteropus poliocephalus* (grey-headed flying-fox) is also known to forage on exotic species and thus impacts to foraging habitat may be greater than 0.25 ha. This has been captured in an Assessment of Significance for the species, as presented in Section 9.1.1.

Table 21: Direct impacts to native vegetation

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)
3320	Cumberland Woodland	Shale Plains Critically endangered	PCT 3320 within the development footprint does not meet the EPBC Act condition thresholds	0.14

7.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 22.

Table 22: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	3320	Degraded	0.14	58.5	0	-58.5

7.3. Indirect impacts

The indirect impacts of the development are outlined in Table 23. Indirect impact zones are shown on Figure 11.

Table 23: Indirect impacts

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
Inadvertent impacts on adjacent habitat or vegetation	Damage during construction to existing native vegetation marked for retention including native trees within the proposed	PCT 3320, and habitat for common species.	Short term and during bulk earthworks	Loss of habitat and vegetation communities

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
	retention area. Vegetation and habitats outside the footprint.			
Reduced viability of adjacent habitat due to edge effects	Changing light and soil moisture from exposure	PCT 3320, and habitat for common species	Long term during construction and operation	Changes to soil conditions and potential changes to composition
Reduced viability of adjacent habitat due to noise, dust or light spill	Noise and dust from machinery movement No night works proposed - light spill unlikely	PCT 3320, and habitat for common species	Daily during bulk earthworks. Intermittently after vegetation removal, during truck movement, dry periods or heavy winds	Temporary loss of habitat quality
Transport of weeds and pathogens from the site to adjacent vegetation	Spread of weeds from adjacent areas. Minor impacts as vegetation in adjacent areas already contain high cover of exotic ground storey species.	PCT 3320	During bulk earthworks daily due to vehicle movement and dust and water movement	Minor increases in weed cover
Increased risk of starvation or exposure and loss of shade or shelter	Potential loss of habitat due to the removal of vegetation. Minor impact as the existing canopy is already highly fragmented and isolated.	Common species	Long term during construction and operation	Loss of individuals
Loss of breeding habitat	One hollow bearing tree with a small hollow (approx. 55 – 10 cm diameter entrance cm) is proposed for removal. Increased levels of disturbance post-construction due to increase public usage.	Common species and southern myotis.	Long term during construction and operation	Potential loss of breeding habitat.
Trampling of threatened species	Negligible chance of trampling since no threatened flora was observed on the subject site	Not likely to be any	During construction	Temporary crushing of plants
Inhibition of nitrogen fixation and increased soil salinity	Not likely to occur	NA	NA	NA
Fertiliser drift	Not likely to occur, not part of development	NA	NA	NA

Indirect impact	Description (nature, extent and frequency)	Biodiversity affected	Duration/ Timing	Consequence
Rubbish dumping	Rubbish dumping from construction workers, public during bulk earthworks	PCT 3320	Intermittently when contractors are on site	Shading of plants
Wood collection	Not likely to occur or be increased as a result of the development as the area is already highly urbanised.	NA	NA	NA
Removal and disturbance of rocks including bush rock	Not likely to occur as no surface rock is present	NA	NA	NA
Increase in predators	Increase presence of exotic fauna species such as feral cats and foxes is not likely to occur as a result of the development as the area is already highly urbanised.	NA	NA	NA
Increase in pest animal populations	Increased presence of exotic fauna species such as <i>Acridotheres tristis</i> (common myna), is not likely to occur as a result of the development since they already are present in the surrounding areas due to existing urbanisation	NA	NA	NA
Changed fire regimes	Not likely to occur	NA	NA	NA
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	No beach foraging habitats are present, hollow loss is dealt with in other indirect impact categories	NA	NA	NA
Sedimentation and contaminated and/or nutrient rich run-off	Runoff during construction resulting in changes to water chemistry and habitat	Adjacent soils and waterways and groundcover vegetation.	During construction	Contaminated waterways Nutrient enrichment in retained vegetation



Figure 11: Indirect impact zones

7.4. Prescribed biodiversity impacts

The potential prescribed impacts from the proposal are outlined in Table 24.

Table 24: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification	Additional information
Karst, caves, crevices, cliffs, rocks and other geological features of significance	N/A – no geological features are present	N/A	N/A	N/A
Human made structures or non-native vegetation	As discussed in Section 5.3.2, one dwelling and one shed will be demolished. Planted vegetation may provide foraging habitat for <i>Pteropus poliocephalus</i> (grey-headed flying-fox).	Potential impacts to microbats.	There was no evidence of microbats or entry/exit points into the buildings observed during an external inspection. The dwelling was still occupied, and the garden shed was in good condition, built on a slab with no entry points for fauna. Grey-headed Flying-fox are mobile and forages widely. The development site is not in proximity to a breeding camp.	Stop-work measures should be in place in the event fauna are observed within the other buildings and an ecologist contacted for advice / further investigation. An ecologist should supervise removal of vegetation to ensure animal welfare should fauna be present.
Habitat connectivity	There is a lack of connectivity to large patches of habitat, so only highly mobile threatened species are likely to occur within the development site (e.g. bats and birds).	Minor loss of foraging habitat and one hollow bearing tree for threatened bat species listed in Section 5.3.3.	Habitat for these threatened bats within the development site is marginal and is not well connected with areas of large intact foraging habitat for these species. Threatened bird species listed as predicted ecosystem species in Table 11 are unlikely to regularly occur within the development site, given the poor habitat condition (lack of structural and floral diversity) and lack of connectivity with large areas of native bushland.	N/A

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification	Additional information
Water bodies, water quality and hydrological processes	There is one artificial dam within the development site that will be drained and filled to allow for site development. Elizabeth Macarthur Creek is located to the east of the development site.	Removal of dam may affect some threatened species as it is considered potential foraging habitat.	There are two hollow bearing trees in proximity to the dam and the creek. However, the two hollows are small (approximately 5 - 10 cm in diameter) and may provide potential habitat for southern myotis. Also, the vegetation is isolated with poor connectivity to larger tracts of bushland.	A dam dewatering plan should be developed to ensure animal welfare in the event that native fauna (e.g. turtles) are present, and exotic species (e.g. carp) are euthanised.
Wind turbine strikes on protected animals	N/A	N/A	N/A	N/A
Vehicle strikes	The locality is already highly urbanised, and vehicle strike is an existing threat to fauna. The proposed development will involve construction of internal roads which may result in additional threats to fauna from vehicle strike.	Potential increase in fauna injury and mortality	The landscape is highly developed and vehicle strike as a result of the proposed development is unlikely to result in the loss of native fauna species. Particularly as habitat for ground dwelling and arboreal fauna is relatively sparse.	Vehicle strike impacts are unlikely to increase substantially above the existing levels.

7.5. Mitigating and managing direct and indirect impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 25.

Table 25: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
timing works to avoid critical life cycle events such as breeding or nursing	Moderate.	Low	Preclearance surveys should be undertaken prior to vegetation removal to identify any fauna or habitat by an ecologist or suitably experienced personnel.	Ensuring animal welfare and protection	Prior to and during vegetation removal	Project ecologist
instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Moderate one stick nest was observed in vegetation within development footprint. However, preclearance surveys will confirm fauna presence.	Low	Clearing protocols to manage wildlife by ecologist or suitably experienced personnel.	Risk to wildlife reduced	During construction	Project Ecologist
installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the affected site, e.g. nest boxes	N/A – no important habitat features are being removed as part of the proposal. As such, artificial roost structures are not required.	Negligible	No critical habitat is proposed for removal. No nest boxes or other artificial structures are proposed.	-	-	-
clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chain-saw, rather than heavy	High	Low	Instigate clearing protocols to limit inadvertent clearing.	Clearing limited to only the areas approved for clearing. Foraging habitat retained in situ	Prior to construction and during operation	Contractor

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

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Moderate	Low	Avoid vegetation removal during southern myotis breeding season.	Risk to southern myotis and other Microchiropteran bats reduced.	During construction	Contractor
temporary fencing to protect significant environmental features such as riparian zones	High	Low	Erect and maintain construction fence	Accidental incursions minimised	Before and during construction	Contractor
hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Low	Carry out site inductions to explain environmental significance of the subject land	Accidental incursions minimised	Before and during construction	Contractor
staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Moderate	Low	Carry out site inductions to explain environmental significance of the subject land	Accidental incursions minimised	Before and during construction	Contractor
development control measures to regulate activity in vegetation and habitat adjacent to residential development including controls on pet ownership, rubbish disposal, wood collection,	Moderate	Low	Relevant DCP conditions apply to the site to limit vegetation clearance	Reduce unnecessary clearing of vegetation post construction	Operation	Council Contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
fire management and disturbance to nests and other niche habitats						
making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	Moderate. A small amount of native vegetation is proposed for retention within the development site. The works are on waterfront land and would require a Controlled Activity Approval under the WM Act.	Low	Restoration of the adjacent riparian corridor would be addressed in the Controlled Activity Approval under the WM Act.	NA	Ongoing	Contractor

7.6. Mitigating prescribed impacts

Measures proposed to mitigate and manage prescribed biodiversity impacts at the development site before, during and after construction are outlined in Table 24.

7.7. Adaptive management strategy

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

Table 26: Mitigation measures for prescribed biodiversity impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Scheduling timing of construction activities to avoid critical life cycle events	Moderate	Low	Preclearance surveys should be undertaken prior to removal of vegetation to identify any trees containing nest or possum dreys. A preclearance survey of the shed at the development site is recommended to ensure no microbat species are present prior to demolition	Ensuring animal welfare and protection	Prior to vegetation removal	Project ecologist
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecological or licensed wildlife handler during clearing, construction and maintenance activities for human made structures and non-native vegetation	Moderate	Low	An ecologist be present to supervise removal of non-native vegetation and care and relocation of fauna (if present) Stop-work measures if fauna species are observed within buildings. A VMP will be implemented for the riparian zone on the western side of the creek (ELA 2023).	Ensuring animal welfare and protection	During vegetation removal Prior to and during demolition of buildings	Project ecologist and site manager. Project bush regenerator for the creekline VMP
Retaining habitat features within the subject land or relocating them to adjacent retained remnant vegetation	Low. The stick nest observed on-site during inspection should be carefully relocated to adjacent retained vegetation. Follow clearance protocols if any fauna are found in the nest.	Negligible	An ecologist be present to supervise removal of non-native vegetation and care and relocation of fauna and habitat (if present) Stop-work measures if fauna species are observed within buildings	Ensuring animal welfare and protection	During and prior to vegetation removal and building demolition	Project ecologist
Installing artificial connectivity measures to re-establish connections between habitat and favoured transport corridors	N/A	N/A	N/A	N/A	N/A	N/A

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Erecting temporary fencing to protect significant environmental features such as karst, caves, rock outcrops and water bodies	N/A	N/A	N/A	N/A	N/A	N/A
Replacing habitat provided by human made structures and non-native vegetation with alternative habitat	Moderate	Low	If microbats are present in buildings, consider preparation of compensatory habitat plan and provision of nest boxes. Follow clearance protocols for any nests or dreys encountered in the planted vegetation to be removed.	Replacement of habitat features for microbats	During construction	Project ecologist
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Moderate	Low	Standard sediment and erosion control (SEC) measures and dust control measures should be implemented	Contain sediments within the site to avoid entering stormwater	Establish SEC measures prior to works commencing	Contractor
Staff training and site briefing to communicate environmental features to be protected and measures implemented to protect them	High	Low	Train staff regarding the protection of retained vegetation within the development site and within the indirect impact areas	Staff aware of no-go zones and vegetation protection zones	Prior to works commencing onsite	Contractor
Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on or adjacent to the subject land	Moderate. A small amount of native vegetation is proposed for retention within the development site. The works are on waterfront land and would require a Controlled Activity Approval under the WM Act.	Low	Restoration of the adjacent riparian corridor would be addressed in the Controlled Activity Approval under the WM Act. A VMP would be submitted along this BDAR to rehabilitate the riparian corridor on the site.	Enhancement of vegetation integrity within adjacent riparian corridor	Prior to and during construction and operation	Contractor and appointed bush regeneration contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Development control measures that regulate the types of activities that can occur in native vegetation and habitat adjacent to residential development including prohibiting the collection of bush rocks	N/A	N/A	N/A	N/A	N/A	N/A

8. Impact summary

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

8.1. Serious and Irreversible Impacts (SII)

The development has candidate Serious and Irreversible Impacts (SII) values as outlined in Table 27. Detailed consideration of whether impacts on TECs that are serious and irreversible is included in Table 28.

Table 27: Serious and Irreversible Impacts Summary

Ecological Community	Principle	Direct impact individuals / area (ha)	Threshold
<i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	Principle 1 (species or ecological community currently in a rapid rate of decline), and Principle 2 (species or ecological communities with a very small population size)	0.14	None published

8.1.1. Cumberland Plain Woodland

Table 28: Evaluation of an impact on a Cumberland Plain Woodland consistent with 9.1.1 of the BAM

Impact Assessment Provisions	Assessment
1. the action and measures taken to avoid the direct and indirect impact on the potential entity for an SII	Measures taken to avoid the direct and indirect impacts to Cumberland Plain Woodland as addressed in Section 6 and include retention of 0.05 ha of Cumberland Plain Woodland within the southern section of the development site in the form of a proposed park, with an additional 0.17 ha to be avoided. Indirect impacts on retained and adjacent patches of Cumberland Plain Woodland TEC will be managed through fencing, signage and tree protection measures. The proposed clearing of 0.14 ha of the TEC is as a result of Council's request to provide road access through the patch to satisfy traffic safety. There are no opportunities to further avoid the community without risking safety.
2a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	Prior to European settlement, Cumberland Plain Woodland was extensive across the Cumberland Plain in western Sydney on soils derived from Wianamatta Shale (BioNet 2021), covering approximately 125,000 ha (NPWS 2004). The current geographic extent of Cumberland Plain Woodland is estimated to be 9% of this original extent (BioNet, 2021). The estimated reduction in geographic extent since 1970 was not found in relevant literature. However, the reduction in the community is likely to have been significant since 1970 given the vast and rapid development approved on the Cumberland Plain.
2b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic	Cumberland Plain Woodland was originally cleared for agriculture during European settlement given its fertile soils, gentle slopes and proximity to early settlement within Sydney (DECCW 2010). As a result, by the middle of the 19 th century, most of the Cumberland Plain was being grazed or under cultivation. In more recent years, Cumberland Plain Woodland has been subject to clearing for industrial and residential development and for

Impact Assessment Provisions	Assessment
processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: i. change in community structure ii. change in species composition iii. disruption of ecological processes iv. invasion and establishment of exotic species v. degradation of habitat, and vi. fragmentation of habitat	infrastructure including roads, to service Sydney's growing population (DECCW 2010). In relation to the ecological function of the community: 1. the structure of the community has changed, primarily to a grassland where canopy and shrub species have been removed. In some areas, such grassland is still dominated by native grasses and is considered to be Derived Native Grassland (DNG), particularly in areas where pasture improvement and application of fertiliser has not occurred. In other areas, primarily in rural land-use, under-scrubbing has occurred, where a canopy is retained, but the shrub and groundcover removed to allow for grazing and hobby farms. As such, the structure of the TEC has been simplified. 2. the composition of the community has changed with a general reduction in diversity of native species. As woodland has become fragmented and patch size has reduced, weed invasion has reduced diversity, particularly with long established weeds such as <i>Olea europea</i> subsp. <i>cuspidata</i> (african olive). This species has thrived in remnant and regenerating patches of Cumberland Plain Woodland and displaces native species, reducing native flora diversity. Likewise, the diversity of fauna that originally inhabited Cumberland Plain Woodland has been reduced and simplified, with local extinctions of mammals and birds, particularly since the 1950s (DECCW 2010). In turn, some opportunistic native species have increased in numbers over time, including the noisy miner. 3. ecological processes are the interactions between biota and abiotic components such as water cycle, mineral cycle, decomposition and nutrient cycles, reproduction / pollination and food webs. With a reduction in the extent of Cumberland Plain Woodland into smaller isolated and fragmented patches and a reduction in biodiversity of flora and fauna, such ecological processes have been disrupted. Understanding these processes can be complex, but as an example, the loss of certain pollination vectors is likely to lead of local extinction of some flora species. Changes to fire regimes, particularly due to the urban setting of western Sydney is another example of disruptions to ecological processes. 4. as discussed above, invasion and establishment of exotic species has become a significant problem within Cumberland Plain Woodland. This community is particularly vulnerable to weed invasion due it's grassy understorey, comparatively fertile soils and past agricultural land uses (DECCW 2010). 5. the clearing and fragmentation of Cumberland Plain Woodland into smaller and more isolated patches makes the remaining of areas of Cumberland Plain Woodland more susceptible to habitat degradation. Degradation results from all the factors listed above including edge effects, weed invasion, disruption of ecological processes and loss of biodiversity. 6. fragmentation of Cumberland Plain Woodland has reduced the resilience of the community. Larger remnants are usually more diverse, less susceptible to edge effects and catastrophic events like bushfire and the expected impacts of climate change (DECCW 2010). However the importance of smaller retained patches should not be discounted.

Impact Assessment Provisions	Assessment
2c. evidence of restricted geographic distribution (Principle 3, clause 6.7 (2) (c) BC Regulation), based on the TECs geographic range in NSW according to the: i. extent of occurrence ii. area of occupancy, and iii. number of threat-defined locations.	This principle does not apply to Cumberland Plain Woodland TEC. However, the distribution of Cumberland Plain Woodland TEC is restricted to the Cumberland Plain within the Sydney Basin Bioregion and originally occupied 125,211 ha (pre-1750) (DECCW 2010).
2d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7 (2) (d) BC Regulation).	This principle does not apply to Cumberland Plain Woodland TEC. The recovery plan (DECCW 2010) discusses how Cumberland Plain Woodland responds to recovery actions, including weed control and revegetation. There are numerous examples of how remnants of Cumberland Plain Woodland have responded well to carefully planned and implemented bush regeneration. In some cases, threatened species have been released from competition when invasives such as African Olive are removed.
3. Where the TBDC indicated that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in subsection 9.1.1(2), the assessor must record this in the BDAR or BCAR.	N/A
4a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be affected by the proposal: i. in hectares, and ii. as a percentage of the current geographic extent of the TEC in NSW.	i. The total area of Cumberland Plain Woodland TEC affected by the proposed development is 0.14 ha. ii. Assuming that 9% of the original 125,449 ha of Cumberland Plain Woodland remains today (11,290 ha), the Cumberland Plain Woodland affected by the proposed development represents <0.1% of the current geographic extent of the TEC in NSW.
4b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by: i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured 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 - estimated maximum dispersal distance for native flora species characteristic of the TEC, and - other information relevant to describing the impact on connectivity and	The extent that the proposed development is likely to contribute to further environmental degradation and disruption of biotic processes of Cumberland Plain Woodland is discussed below, in relation to: i. remaining areas of TEC within 500 m of the development footprint is 12.77 ha of vegetation previously mapped as Cumberland Plain Woodland, based on previous mapping by DPIE 2015 (Figure 12). ii. The existing condition of the Cumberland Plain Woodland TEC within the development site is already highly fragmented. The vegetation is in a poor condition and consists of canopy species, no shrub layer and a ground cover dominated by exotic species. The removal of Cumberland Plain Woodland within the development site is due to a proposed road that dissects through the centre of the patch (Figure 4). This creates fragmentation a standalone tree on the northern end of the patch. The outline of the patch within the patch of woodland would largely remain the same and therefore the average distances between surrounding patches would remain the similar. Dispersal of native flora species characteristic of the TEC may be several kilometres when considering pollen vectors such as <i>Pteropus poliocephalus</i> and seed dispersal by wind and fauna. However, given the location of the subject is within a largely suburban landscape, dispersal and exchange of flora species characteristic of the Cumberland Plain Woodland is likely to be very limited.

Impact Assessment Provisions	Assessment
fragmentation, such as the area to v. perimeter ratio for remaining areas of the TEC as a result of the development iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.	The vegetation integrity score for the vegetation zone PCT 3320, which is the only vegetation zone within the development site containing the Cumberland Plain Woodland TEC, is 57.6. This score is derived from a composition score of 57, a structure score of 59, and a function score of 56.8. A breakdown of these scores is contained in Appendix C. These scores are relatively low when compared to the benchmarks for the PCT 3320 (BioNet Vegetation Classification, 2021). For example, the shrub richness and cover were both zero, but benchmark is 8 and 16 respectively. Tree richness was 1, but benchmark is 5; grass richness was 8 but benchmark is 12. The grass cover was approximately half benchmark which is 58 and the tree cover was 30 but the benchmark is 53. In terms of function data, there were 4 large trees within the plot, but benchmark is 3. Fallen log total length was only 1 m within the plot but benchmark is 40 m. In summary, the Cumberland Plain Woodland within the site is a simplified patch of large trees lacking structural and floral diversity with some weed invasion (3.3 score for High Threat Weeds).



Figure 12: Candidate Serious and Irreversible Impact entity (Cumberland Plain Woodland) present in the development footprint and subject land

8.2. Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 29 and shown on Figure 13.

Table 29: Impacts to native vegetation that require offsets

Vegetation Zone	PCT ID	PCT Name	Vegetation Class			Vegetation Formation	Direct impact (ha)
1	3320	Cumberland Woodland	Shale Plains	Coastal Valley	Grassy Woodlands	Grassy Woodlands	0.14

8.3. Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are outlined in Table 30 and shown on Figure 14.

Table 30: Impacts to native vegetation that do not require offsets

Vegetation Zone	PCT ID	PCT Name	Direct impact (ha)	Rationale
Planted Native Vegetation	N/A	N/A	0.22	The decision-making key for planted native vegetation outlined in Appendix D of BAM 2020 was reviewed and determined that the removal of planted native vegetation does not require offsets (see Section 2.2 of this BDAR)

8.4. Areas not requiring assessment

Areas not requiring assessment as shown in Figure 15. These areas do not contain native vegetation and do not need to be assessed for ecosystem credits under section 9.3 of the BAM. These areas have been assessed for threatened species habitat and prescribed impacts.

8.5. Credit summary

The number of ecosystem credits required for the development are outlined in Table 31. A biodiversity credit report is included in Appendix E.

Table 31: Ecosystem credits required

Vegetation Zone	PCT ID	PCT Name	Credit Class			Direct impact (ha)	Credits required	
1	3320	Cumberland Woodland	Shale	Plains	Cumberland Woodland in the Sydney Basin Bioregion	Plain	0.14	5



Figure 13: Impacts requiring offset



Figure 14: Impacts not requiring offset



Figure 15: Areas not requiring assessment

9. Consistency with legislation and policy

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

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

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

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

One MNES has been assessed as a part of this assessment:

- *Pteropus poliocephalus* (grey-headed flying-fox).

9.1.1. *Pteropus poliocephalus* (grey-headed flying-fox)

The grey-headed flying-fox is listed as a vulnerable species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging and have been recorded travelling long distances on feeding forays. Fruits and flowering plants of a wide variety of species are the main food source (DAWE 2021). The species roosts in large 'camps' of up to 200,000 individuals (DAWE 2021). Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas.

There are no camps within 10 km of the site. The closest camp is the Gordon Camp which is approximately 20 km east of the development site.

The vegetation within the development site provides marginal seasonal foraging habitat. There is potential that this species could use the site on occasion for foraging purposes. An EPBC act impact assessment has been undertaken for this species. The result of this assessment can be found in Table 32.

Table 32: EPBC Act impact assessment for *Pteropus poliocephalus* (grey-headed flying-fox)

Criterion	Assessment
Criterion a: lead to a long-term decrease in the size of an important population of a species	The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery.

Criterion	Assessment
	This may include populations identified as such in recovery plans, and/or that are: • key source populations either for breeding or dispersal • populations that are necessary for maintaining genetic diversity, and/or • populations that are near the limit of the species range The development site does not provide habitat for a breeding camp however it could provide marginal foraging habitat for travelling flying-foxes. Considering the small size of the impact and the amount of more suitable foraging habitat in the locality, it is considered unlikely that action will result on a long-term decrease in the size of an important population.
Criterion b: reduce the area of occupancy of an important population	Considering the small size of the impact and the amount of suitable areas of occupancy in the locality, it is considered unlikely that the proposed development will result in a long-term reduction of an area of occupancy of an important population.
Criterion c: fragment an existing important population into two or more populations	The potential seasonal foraging habitat to be removed is considered marginal relative to nearby potential foraging habitat within the locality. While the potential foraging habitat may contribute as a 'steppingstone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works, given that scattered vegetation and landscaped gardens will remain in the locality. This species has been recorded in urban environments and is likely to continue to forage adjacent to the development site and across the broader locality. Therefore, the proposed works are unlikely to fragment an existing important population into two or more populations.
Criterion d: adversely affect habitat critical to the survival of a species	Foraging habitat critical to the survival of this species includes natural habitat that is productive during winter and spring when food bottlenecks have been identified. Critical foraging habitat has also been known to support populations of > 30,000 individuals within a 50km radius, productive during the final stages of gestation, during the weeks of birth, lactation and conception (September to May), productive during the final stages of fruit development and ripening in commercial crops affected by grey-headed flying-fox and known to support a continuously occupied camp (DAWE 2021). The vegetation to be removed is a small amount of potential foraging resources (0.02 ha) in the wider region. Given that this species travels up to 50 km to forage, it is considered unlikely that the works would adversely affect habitat critical to the survival of this species.
Criterion e: disrupt the breeding cycle of an important population	The nearest active grey-headed flying-fox camp occurs approximately 20 km to the east of the development site at the Gordon camp (DAWE 2020a). Considering this distance, the marginal nature of the foraging resources in the development site, and the amount of other suitable foraging resources in the locality it is considered unlikely that the action will disrupt the breeding cycle of an important population.
Criterion f: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Given the small amount of potential foraging habitat to be removed relative to the amount remaining in the locality, it is considered that potential foraging habitat will persist adjacent to the development site and across the locality. This species is highly mobile, and it is unlikely that the habitat to be removed would cause the species to decline. Furthermore, according to the National Flying-fox Monitoring Program, no grey-headed flying-fox camps currently occur or have ever been recorded within the

Criterion	Assessment
	development site (DAWE 2020a). The nearest active grey-headed flying-fox camp occurs approximately 20 km to the east of the development site at the Gordon camp (DAWE 2020a). Therefore, no known grey-headed flying-fox roosting camps for this species will be affected by the proposed works.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed works will not result in the establishment of an invasive species that is harmful to grey-headed flying-fox.
Criterion h: Introduce disease that may cause the species to decline	The proposed works will not result in the introduction of a disease that is harmful to the grey-headed flying-fox.
Criterion i: Interfere substantially with the recovery of the species	Considering the above factors, the proposed works will not interfere substantially with the recovery of the species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the grey-headed flying-fox. No camps are located closer than 20 km away from the development site. The removal of 0.02 ha of native vegetation is unlikely to affect the availability of foraging habitat for this species. The vegetation to be affected is similar in composition to the surrounding environment, as a result foraging grey-headed flying-fox will have ample choice of habitat should they forage in this area. As such, a referral is not recommended.

9.1.2. *Lathamus discolor* (swift parrot)

The swift parrot is listed as critically endangered under the EPBC Act.

Swift parrot is a migratory species, spending time on mainland Australia during the non-breeding season (DCCEEW 2024). It favours eucalypt woodland and forest habitats, in which it will forage on flowers of canopy species in these habitats (DCCEEW 2024). Lerps from insect nymphs are an important foraging resource for the species as well (DCCEEW 2024). The species breeds exclusively in Tasmania (DCCEEW 2024).

The proposed action will remove up to 0.32 ha of potential foraging habitat for swift parrot, in the form of PCT 3320 (0.14 ha) and planted native vegetation (0.22 ha). The species only breeds in Tasmania, and therefore no breeding habitat will be affected by the proposed development. An EPBC act impact assessment has been undertaken for this species. The result of this assessment can be found in Table 33.

Table 33: EPBC Act impact assessment for *Lathamus discolor* (swift parrot)

Criterion	Assessment
Criterion a: will the action lead to a long-term decrease in the size of a population	A 'population of a species' refers to a population, or collection of local populations, that occurs within a particular bioregion. The proposed works would remove 0.32 ha of potential foraging habitat for the swift parrot. No breeding habitat would be affected as part of the proposed works. Given that this species is highly mobile and can continue to access foraging habitat retained within the development site and surrounding area, the proposed works would not lead to a long-term decrease in populations of this species.

Criterion	Assessment
Criterion b: will the action reduce the area of occupancy of the species	The proposed action would reduce the availability of potential foraging habitat for swift parrot by 0.32 ha. The area of occupancy of this species would therefore be marginally affected. Suitable foraging habitat would remain available adjacent to the action area, and in the surrounding landscape.
Criterion c: will the action fragment an existing population into two or more populations	The proposed action would remove 0.32 ha of foraging habitat for swift parrot to use seasonally and sporadically. Vegetation is proposed to be retained within the subject land, with additional potential foraging habitat present within the surrounding landscape. As the species is highly mobile, it would still be able to readily access these foraging resources. Therefore, the proposed works would not fragment populations of these species.
Criterion d: will the action adversely affect habitat critical to the survival of a species	The national recovery plan for the swift parrot identifies critical habitat as those with a <i>“level of site fidelity or possess[ing] phenological characteristics likely to be of importance to the Swift Parrot or are otherwise identified by the recovery team”</i> (DCCEEW 2024). No key tree species listed in the recovery plan have been identified occurring within the action area (DCCEEW 2024). The proposed works would not impact critical habitat for the species.
Criterion e: will the action disrupt the breeding cycle of a population	The Swift Parrot breeds only in Tasmania. The breeding cycle of this species would not be affected by the proposed action.
Criterion f: will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action would remove 0.32 ha of potential foraging habitat available for these species within the subject land. The quality of foraging habitat is poor, with no midstorey. Retained vegetation within the action area will be somewhat isolated. However, as the species is highly mobile, it should be able to access retained foraging resources, likely only on a sporadic basis.
Criterion g: will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species’ habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to the swift parrot.
Criterion h: will the action introduce disease that may cause the species to decline	Psittacine Beak and Feather Disease may cause the swift parrot to decline (DCCEEW 2024). This disease is spread through food sharing, excrement, feather and skin particles. The proposed action is unlikely to introduce this disease.
Criterion i: will the action interfere with the recovery of the species	One threat activity identified within the <i>National Recovery Plan for the Swift Parrot 2024</i> is relevant to the proposed action: • habitat loss and alteration. The proposed action would remove 0.32 ha of potential foraging habitat for this species. This threat is considered minimal given the small area of habitat removal, and that similar habitat would still be available for this species adjacent to the subject land and in the surrounding area. As such, the proposed action will not fragment foraging habitat or movement corridors and would not significantly interfere with their recovery considering this habitat extent is very marginal.
Conclusion	No. The proposed activity is unlikely to have a significant impact on swift parrot as there is no breeding habitat that will be affected, will affect a marginal amount of potential foraging habitat in the form of PCT 3320 (0.14 ha) and planted native vegetation (0.22 ha). Foraging habitat for these

Criterion	Assessment
	highly mobile species would remain available adjacent to the action area and in the surrounding landscape.

10. Conclusion

Eco Logical Australia (ELA) was engaged by Landen Dev No.8 Pty Ltd to prepare a Streamlined (small area) Biodiversity Development Assessment Report (BDAR) for 40 Memorial Avenue, Bella Vista (the development site) within The Hills Shire local government area. The proposed development involves partial removal of vegetation and construction of residential flat buildings, internal roads and services.

The development site (Lot 1 DP1237055 and Lot 1 DP1298513) contains an existing dwelling, a garden shed and a chicken coop. The site is extensively disturbed from previous land occupation, creation of landscaped gardens and weed invasion. Elizabeth Macarthur Creek is located approximately 50 m to the east of the subject land. The site also contains a dam which receives water from overland flow. Native vegetation was mapped within the subject land, consisting of the following:

- 0.22 ha of planted native vegetation.
- 0.36 ha of PCT 3320 Cumberland Shale Plains Woodland.

PCT 3320 was present in one condition state – degraded. The understorey of the patch of PCT 3320 appeared to be regularly mown so contained no shrubs and a very short layer of grass and forbs. Despite this regular disturbance, there was a relatively high cover of native grasses and forbs. Approximately 0.14 ha of PCT 3320 is to be affected by the proposed development.

The remaining vegetation within the development site was either gardens containing exotic and planted native species, or cleared land dominated by exotic grasses and weeds.

Measures to avoid and minimise impacts have resulted in retention of 0.05 ha of PCT 3320 in the RDA. The RDA arose after discussion with council, in which council ecologists wanted to see more avoidance of native vegetation within the development site. Additionally, another 0.17 ha is to be avoided by the proposed works. Therefore, a total of 0.22 ha of PCT 3320 will be avoided by the proposed works. Following review of the proposal by The Hills Shire Council, the road in the southern part of the development site was redesigned at the request of Council to meet traffic safety standards. The final design of the road intersects the patch of remnant woodland, therefore, further avoidance of this vegetation zone was not possible.

A summary of credit requirements to offset impacts to PCT 3320 are shown in the table below.

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

PCT ID	PCT Name	Condition	Vegetation Zone	Direct impact area (ha)	Credits
Ecosystem credits					
3320	Cumberland Shale Plains Woodland	Degraded	1	0.14	5
Total				0.14	5

Removal of 0.22 ha of planted native vegetation was assessed against *Appendix D: Streamlined assessment module - planted native vegetation* of the BAM 2020 and does not require offsetting.

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

Foraging habitat for the EPBC Act list species *Pteropus poliocephalus* (grey-headed flying-fox) will be affected. An assessment of significance for this species concluded that the proposed development is unlikely to cause a significant impact to grey-headed flying-fox. A referral to the Commonwealth Department of Agriculture, Water and the Environment is not recommended.

A dam dewatering plan is recommended to ensure animal welfare in the event that native fauna (e.g. turtles) are present. The existing dwelling and garden shed on the development site not considered to be suitable microbat habitat because they are in good condition and are used frequently because the dwelling is still occupied. However, a preclearance survey of the dwelling, shed and chicken coop is recommended to ensure no microbat species are present prior to demolition. Sediment and erosion control measures are recommended to prevent stormwater pollution or movement of soils from the development site.

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Appendix A Definitions

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

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

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

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

Appendix B Vegetation Floristic Plot Data

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 (PCT 3320)			Plot 2 (Exotic)		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Araujia sericifera</i>	Moth Vine			*	1		g	0.1	5			
<i>Aristida vagans</i>	Threeawn Speargrass					Grass & grasslike (GG)	g	0.1	20			
<i>Asparagus asparagoides</i>	Bridal Creeper			*	1		g	0.2	1			
<i>Axonopus fissifolius</i>	Narrow-leafed Carpet Grass			*	1		g	1	10	g	60	2000
<i>Cardamine hirsuta</i>	Common Bittercress			*			g	0.1	5			
<i>Carex inversa</i>	Knob Sedge					Grass & grasslike (GG)	g	0.5	500	g	0.5	500
<i>Cenchrus clandestinus</i>	Kikuyu Grass			*	1		g	1	20	g	0.5	500
<i>Chenopodium album</i>	Fat Hen			*			g	0.1	5			
<i>Chenopodium glaucum</i>						Forb (FG)	g	0.1	1			
<i>Cirsium vulgare</i>	Spear Thistle			*			g	0.2	10	g	0.1	10
<i>Commelina cyanea</i>	Native Wandering Jew					Forb (FG)	g	10	1000			
<i>Cotula australis</i>	Common Cotula					Forb (FG)	g	0.1	5			
<i>Cyclospermum leptophyllum</i>	Slender Celery			*			g	0.1	5			
<i>Cyperus brevifolius</i>				*			g	0.1	1	g	1	1000
<i>Cyperus gracilis</i>	Slender Flat-sedge					Grass & grasslike (GG)	g	0.5	500			
<i>Dichondra repens</i>	Kidney Weed					Forb (FG)	g	1	1000			
<i>Echium plantagineum</i>	Patterson's Curse			*			g	0.2	20			

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 (PCT 3320)			Plot 2 (Exotic)		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Einadia trigonos</i> subsp. <i>trigonos</i>						Forb (FG)	g	0.1	1			
<i>Eragrostis brownii</i>	Brown's Lovegrass					Grass & grasslike (GG)	g	0.5	50			
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark					Tree (TG)	u	30	3			
<i>Euphorbia peplus</i>	Petty Spurge	,		*			g	0.1	20			
<i>Galium aparine</i>	Goosegrass	,		*			g	0.1	1			
<i>Glycine clandestina</i>	Twining glycine	,				Other (OG)	g	0.1	20			
<i>Glycine tabacina</i>	Variable Glycine	,				Other (OG)	g	0.1	20			
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	,				Forb (FG)	g	0.1	50			
<i>Hypericum gramineum</i>	Small St John's Wort	,				Forb (FG)				g	0.1	1
<i>Juncus usitatus</i>		,				Grass & grasslike (GG)	g	0.1	5	g	5	2000
<i>Lotus corniculatus</i>	Birds-foot Trefoil	,		*						g	0.1	1
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	,		*			g	0.1	50	g	0.1	5
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	,				Grass & grasslike (GG)	g	20	1000	g	1	1000
<i>Modiola caroliniana</i>	Red-flowered Mallow	,		*			g	0.1	20			
<i>Opuntia spp.</i>		,		*			g	0.1	10			
<i>Oxalis perennans</i>		,				Forb (FG)	g	0.3	500	g	0.1	50
<i>Oxalis purpurea</i>		,		*			g	0.1	5			
<i>Paspalidium distans</i>		,				Grass & grasslike (GG)	g	10	1000			
<i>Paspalum dilatatum</i>	Paspalum	,		*	1					g	20	1000
<i>Phyllanthus virgatus</i>	Wiry Spurge	,				Forb (FG)	g	0.1	1			

Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1 (PCT 3320)			Plot 2 (Exotic)		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
<i>Portulaca oleracea</i>	Pigweed	,				Forb (FG)	g	0.1	1			
<i>Rumex brownii</i>	Swamp Dock	,				Forb (FG)	g	0.1	5			
<i>Scutellaria racemosa</i>		,		*			g	0.5	100	g	1	500
<i>Senecio madagascariensis</i>	Fireweed	,		*	1		g	1	50	g	1	500
<i>Setaria parviflora</i>		,		*			g	20	1000	g	1	1000
<i>Sida rhombifolia</i>	Paddy's Lucerne	,		*			g	0.1	10	g	0.1	5
<i>Solanum mauritianum</i>	Wild Tobacco Bush	,		*			g	0.1	5			
<i>Solanum physalifolium</i> var. <i>nitidibaccatum</i>		,		*			g	0.1	10			
<i>Solanum prinophyllum</i>	Forest Nightshade	,				Forb (FG)	g	0.2	20			
<i>Solanum pseudocapsicum</i>	Madeira Winter Cherry	,		*			g	5	500			
<i>Solanum sisymbriifolium</i>		,		*			g	0.1	1			
<i>Sonchus oleraceus</i>	Common Sowthistle	,		*						g	0.1	10
<i>Sporobolus creber</i>	Slender Rat's Tail Grass	,				Grass & grasslike (GG)	g	0.5	100	g	5	2000
<i>Taraxacum officinale</i>	Dandelion	,		*			g	0.1	5			
<i>Urtica urens</i>	Small Nettle	,		*			g	0.1	1			
<i>Verbena rigida</i> var. <i>rigida</i>	Veined Verbena	,		*						g	0.1	1
<i>Veronica plebeia</i>	Trailing Speedwell	,				Forb (FG)	g	0.1	1			

Appendix C Vegetation Integrity Plot Data

Eco Logical Australia – BAM Plot Data Sheet	
Plot descriptors	Plot 1
Plot number / name	BellaVista1
Project number	1853
Date (DD/MM/YY)	23/05/2022
Recorder(s)	BC JG
Zone (In Collector, 56, 55)	56
Easting (Unless recorded in Collector)	309354.849
Northing (Unless recorded in Collector)	6266778.706
Plot orientation	240
Slope (degrees and direction)	east

Vegetation Zone Identification	
Plant Community Type (PCT) - Refer to PCT database	Cumberland Shale Plain Woodland
PCT Number	3320
Large Tree Benchmark	50
Vegetation Zone Identification	intact canopy
Condition (e.g. Low, Moderate, Good, Degraded, DNG etc.)	Degraded
Habitat Features (e.g. caves, rock faces, bridges/culverts)	-
General notes	-

Growth form groups	Total number of species	Total Cover
Tree (TG)	1	30.0
Forb (FG)	12	12.3

Growth form groups	Total number of species	Total Cover
Shrub (SG)	0	0.0
Grass & grasslike (GG)	8	32.2
Other (OG)	2	0.2
Fern (EG)	0	0.0
High Threat Weeds	5	3.3

Stem size classes (DBHOB)	
5-9 cm	0
10-19 cm	0
20-29 cm	1
30-49 cm	1
50-79 cm	1
80 cm +	1
Number of large trees	4

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

Appendix D Likelihood of Occurrence Assessment

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

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

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

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

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
THREATENED FLORA					
<i>Acacia bynoeana</i>	Bynoe's wattle	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	V	2	No. Not identified during field survey.
<i>Acacia gordonii</i>	-	Restricted to the north-west of Sydney, it has a disjunct distribution occurring in the lower Blue Mountains in the west, and in the Maroota/Glenorie area in the east. This species is known from only a few locations and is found within the Hawkesbury, Blue Mountains and Baulkham Hills local government areas. Grows in dry sclerophyll forest and heathlands amongst or within rock platforms on sandstone outcrops.	E	0	No. No suitable habitat (heathlands amongst or within rock platforms on sandstone outcrops). No local records.
<i>Acacia pubescens</i>	downy wattle	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone.	V	15	No. Not identified during field survey.
<i>Allocasuarina glareicola</i>	-	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> . Common associated understorey species include <i>Melaleuca nodosa</i> , <i>Hakea dactyloides</i> , <i>Hakea sericea</i> ,	E	0	No. No suitable habitat present. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		<i>Dillwynia tenuifolia</i> , <i>Micromyrtus minutiflora</i> , <i>Acacia elongata</i> , <i>Acacia brownei</i> , <i>Themeda australis</i> and <i>Xanthorrhoea minor</i> . Not killed outright by fire but resprouts from the rootstock. Spreads by vegetative means, such that clumps of up to 100s of stems may be a single individual.			
<i>Asterolasia elegans</i>	-	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also likely to occur in the western part of Gosford local government area. Known from only seven populations, only one of which is wholly within a conservation reserve. Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes turpentine (<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>), smooth-barked apple (<i>Angophora costata</i>), Sydney Peppermint (<i>Eucalyptus piperita</i>), forest oak (<i>Allocasuarina torulosa</i>) and Christmas Bush (<i>Ceratopetalum gummiferum</i>).	E	0	No. No suitable habitat. No local records.
<i>Caladenia tessellata</i>	thick-lipped spider-orchid	The thick-lipped spider-orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	V	0	Unlikely. Outside of current known distribution. No Local records. Only known historically from the Sydney area.
<i>Cryptostylis hunteriana</i>	leafless tongue-orchid	The leafless tongue-orchid grows singly or in small colonies in a range of habitats including wet heath and sedgeland, on grasstree plains and in woodland with scribbly gum, silvertop ash, red bloodwood and black sheoak. It often grows near the other tongue-orchids <i>C. subulata</i> and <i>C. erecta</i> . The species is found in coastal areas and nearby ranges south from the Gibraltar Range National Park in New South Wales to East Gippsland between Marlo and Genoa in Victoria.	V	0	Unlikely. No local records. Not suitable habitat.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Cynanchum elegans</i>	white-flowered wax plant	Dry rainforest; littoral rainforest; <i>Leptospermum laevigatum</i> - <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> (coastal tea-tree– coastal banksia) coastal scrub; <i>Eucalyptus tereticornis</i> (forest red gum) or <i>Corymbia maculata</i> (spotted gum) open forest and woodland; and <i>Melaleuca armillaris</i> (bracelet honeymyrtle) scrub. Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley.	E	0	No. No suitable habitat present. No local records.
<i>Darwinia biflora</i>	-	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include <i>Eucalyptus haemastoma</i> , <i>Corymbia gummifera</i> and/or <i>E. squamosa</i> . The vegetation structure is usually woodland, open forest or scrub-heath	V	106	No. No suitable habitat (shale ridges)
<i>Eucalyptus cryptica</i>	-	Between Colo Heights and Castle Hill, north-western Sydney. Scrub, heath and low woodland on sandy soils, generally on ridge tops on laterised clays overlying sandstone.	CE	0	Unlikely. Development site not located on ridge top. Not identified during field surveys.
<i>Genoplesium baueri</i>	Bauer's orchid	Dry sclerophyll forest and moss gardens over sandstone. Has been recorded from locations between the Shoalhaven area and Pittwater and may occur as far north as Port Stephens.	E	0	Unlikely. No local records. Not suitable habitat.
<i>Haloragodendron lucasii</i>	-	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest and grows in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels. Highly clonal, which implies the true population size may be considerably smaller than expected.	E	0	Unlikely. Not suitable habitat. No local records.
<i>Kunzea rupestris</i>	-	Mostly in the Maroota - Sackville - Glenorie area and one outlier in Ku-ring-gai Chase National Park. Shrubland or heathland, in shallow depressions on large flat sandstone rock outcrops.	V	0	No. No sandstone rock outcrops.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Lasiopetalum joyceae</i>	-	Grows in heath on sandstone. Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved.	V	0	Unlikely. Not suitable habitat (heath, shaley ridgetops). No local records.
<i>Leucopogon exolasius</i>	Woronora beard-heath	Upper Georges River area and in Heathcote National Park. Woodland on sandstone.	V	0	No. No suitable habitat. Not identified during field surveys.
<i>Melaleuca deanei</i>	Deane's paperbark	Known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. Irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and wetland or aquatic communities. Given its clonal nature, estimation of population size is difficult, as each "colony" may comprise of either several plants, or just one. However, at the Lake Bathurst site at least, there is some evidence of sexual propagation (i.e. by seeds). Along with its clonal (vegetative) reproduction, this species may reproduce by seeds. This species typically occurs within disturbed and often intermittently grazed sites that are dominated by grasses, sedge and/or other forbs.	V	0	No. No suitable habitat within subject land. No local records.
<i>Micromyrtus blakelyi</i>	-	Restricted to areas near the Hawkesbury River, north of Sydney. Distribution extends from north of Maroota in the north, to Cowan in the south. Heathlands in shallow sandy soil, on sandstone rock platforms.	V	0	No. Preferred heathland habitat no within subject land.
<i>Olearia cordata</i>	-	A NSW endemic with a scattered distribution generally restricted to the south-western Hunter Plateau, eastern Colo Plateau, and the far north-west of the Hornsby Plateau near Wisemans Ferry east of Maroota. Most known populations occur within conservation reserves (Wollemi National Park, Yengo National Park and Wisemans Ferry Historic Site). Populations are typically small and scattered. Grows in dry open sclerophyll forest and open shrubland, on sandstone ridges.	V	0	No. No suitable habitat within subject land (ridges). No local records.
<i>Persicaria elatior</i>	knotweed	Tall Knotweed is an erect herb to 90 cm. It has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near	V	0	Unlikely.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. It normally grows in damp places, especially beside streams and lakes.			No suitable habitat within subject land. No local records.
<i>Persoonia hirsuta</i>	hairy geebung	<i>Persoonia hirsuta</i> has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to the west. <i>Persoonia hirsuta</i> has a large area of occurrence, but occurs in small populations or isolated individuals, increasing the species' fragmentation in the landscape. The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone.	E	17	Unlikely. Not suitable habitat (heathy open forest/woodland on sandstone)
<i>Persoonia nutans</i>	nodding geebung	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (and 99% of individuals) occurring in the north of the species range in the Agnes Banks, Londonderry, Castlereagh, Berkshire Park and Windsor Downs areas. Core distribution occurs within the Penrith, and to a lesser extent Hawkesbury, local government areas, with isolated and relatively small populations also occurring in the Liverpool, Campbelltown, Bankstown and Blacktown local government areas. The southern and northern populations have distinct habitat differences. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest.	E	0	Unlikely. Outside known distribution. No suitable habitat within subject land. No local records.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near	V	13	No.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes. Flowers October to May. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.			No suitable habitat (Ridges, slopes, shale soils)
<i>Pimelea spicata</i>	spiked rice-flower	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites.	E	6	No. Not identified during field survey.
<i>Pomaderris brunnea</i>	rufous pomaderris (brown pomaderris)	Brown pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	V	0	Unlikely. Outside known distribution. No suitable habitat within subject land. No local records.
<i>Pterostylis gibbosa</i>	Illawarra greenhood	Open forest or woodland, on flat or gently sloping land with poor drainage. Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra).	E	0	Unlikely. Outside known distribution. No suitable habitat within subject land. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Pterostylis saxicola</i>	Sydney greenhood	plains Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been recorded for this species; however flowering occurs from October to December and may vary due to climatic conditions. The above ground parts of the plant wither and die following seed dispersal and the plant persists as a tuberoid until the next year. Typically occurs as scattered individuals or in small groups.	E	2	No. No suitable habitat (shelves above cliff lines).
<i>Pultenaea parviflora</i>	-	Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. Outlier populations are recorded from Kemps Creek and Wilberforce. May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. <i>Eucalyptus fibrosa</i> is usually the dominant canopy species. <i>Eucalyptus globoidea</i> , <i>E. longifolia</i> , <i>E. parramattensis</i> , <i>E. sclerophylla</i> and <i>E. sideroxylon</i> may also be present or co-dominant, with <i>Melaleuca decora</i> frequently forming a secondary canopy layer.	V	1	No. No suitable habitat and No Local records (only record is from the herbarium in 1960)
<i>Rhizanthella slateri</i>	eastern underground orchid	An underground orchid with a whitish, fleshy underground stem to 15 cm long and 15 mm diameter (DECC 2007). Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely	E	0	Unlikely. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed.			
<i>Rhodamnia rubescens</i>	scrub turpentine	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	CE	0	No. No suitable habitat and No Local records.
<i>Rhodomyrtus psidioides</i>	native guava	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	CE	0	No. No suitable rainforest habitat. No local records.
<i>Syzygium paniculatum</i>	magenta lilly pilli	Found in subtropical and littoral rainforest on gravels, sands, silts and clays. Occurs only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	V	10	No. No suitable rainforest habitat.
<i>Thesium australe</i>	Austral toadflax	In eastern NSW, this species is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. It grows in grassland on coastal headlands or grassland and grassy woodland away from the coast.	V	0	Unlikely. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
<i>Zieria involucrata</i>	-	Has a disjunct distribution north and west of Sydney, in the Baulkham Hills, Hawkesbury, Hornsby and Blue Mountains local government areas. Recent records for the species come from 22 populations in the catchments of the Macdonald, Colo and Hawkesbury Rivers between Melon Creek and Mogo Creek in the north to Little Cattai Creek (Hillside) and Wheeny Creek (Colo) in the south and from a single population in the upper Blue Mountains north of Katoomba. Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest, although some populations extend upslope into drier vegetation. Also known from at least two atypical ridgetop locations.	V	0	Unlikely. No local records.

Threatened ecological communities (TECs)

Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	The Castlereagh Scribbly Gum and Agnes Banks Woodlands ecological community is typically a low woodland, with canopy species reaching an average 15 m in height, but with some trees growing to around 20 m. The ecological community's understorey has a prominent and diverse mid-layer of sclerophyll shrubs. It typically has a patchy ground cover of sedges and grasses. However, in areas of poorly drained soil there may be less species diversity in the mid layer and the ground layer may contain a high diversity of sedges and grasses. The isolation of the alluvial deposits in the Hawkesbury-Nepean river valley and differences in the soil characteristics have led to the development of differences in species composition and abundance across the range of the ecological community.	E	-	No
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Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community		This community is found on the coastal floodplains of NSW. It has a dense to sparse tree layer. South of Bermagui, <i>Melaleuca ericifolia</i> is the only abundant tree in this community. The understorey is characterised by frequent occurrences of vines, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter.	E	-	No
Coastal Upland Swamps in the Sydney Basin Bioregion		Coastal Upland Swamps occur primarily on impermeable sandstone plateaux with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture. Generally associated with soils that are acidic and vary from yellow to grey mineral sandy loams with a shallow organic horizon to highly organic spongy black peats with pallid subsoils. The vegetation of the Coastal Upland Swamp may include tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgeland and fernlands.	E	-	No
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion		Occurs in western Sydney, and the extent of intact remnants is now reduced to 1011 hectares, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain. Ranges from open forest to low woodland, with a canopy dominated by broad-leaved ironbark (<i>Eucalyptus fibrosa</i>) and paperbark (<i>Melaleuca decora</i>). The canopy may also include other eucalypts such as woollybutt (<i>E. longifolia</i>). The dense shrubby understorey consists of prickly-leaved paperbark (<i>Melaleuca nodosa</i>) and peach heath (<i>Lissanthe strigosa</i>), with a range of 'pea' flower shrubs, such as <i>Dillwynia tenuifolia</i> , hairy bush-pea (<i>Pultenaea villosa</i>) and gorse bitter pea (<i>Daviesia ulicifolia</i>) (can be locally abundant). The sparse ground layer contains a range of grasses and herbs. Has a very restricted natural distribution and mainly occurs on clay soils derived from the deposits of ancient river systems (alluvium), or on shale	E	-	No

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		soils of the Wianamatta Shales. Can intergrade into Shale-Gravel Transition Forest (where the alluvium is shallow), Castlereagh Swamp Woodland (in moist depressions) and Castlereagh Scribbly Gum Woodland (on sandier soils).			
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest		The Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest typically occurs on flat to undulating or hilly terrain, at elevations up to approximately 350 metres above sea level. Some occurrences may extend onto locally steep sites at slightly higher elevations. Predominantly associated with clay soils, that are derived from Wianamatta Shale geology.	CE	-	Yes. Identified on the development site during field survey. But does not meet the condition thresholds under the Act.
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		This EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include <i>Eucalyptus tereticornis</i> (forest red gum), <i>E. amplifolia</i> (cabbage gum), <i>Angophora floribunda</i> (rough-barked apple) and <i>A. subvelutina</i> (broad-leaved apple). <i>Eucalyptus baueriana</i> (blue box), <i>E. botryoides</i> (bangalay) and <i>E. elata</i> (river peppermint) may be common south from Sydney, and <i>E. ovata</i> (swamp gum) occurs on the far south coast.	CE	-	No

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
Shale Sandstone Transition Forest of the Sydney Basin Bioregion		Occurs on areas transitional between the clay soils derived from Wianamatta Shale and the sandy soils derived from Hawkesbury Sandstone on the margins of the Cumberland Plain. Occurs or has occurred in the Bankstown, Baulkham Hills, Blue Mountains, Campbelltown, Hawkesbury, Liverpool, Parramatta, Penrith, and Wollondilly Local Government Areas (LGAs). The floristic composition of the community includes species otherwise characteristic of, or occurring in, either sandstone or shale habitats. The structure of the community is forest or woodland.	CE	-	No
Turpentine-Ironbark Forest of the Sydney Basin Bioregion		Open forest, with dominant canopy trees including turpentine (<i>Syncarpia glomulifera</i>), grey gum (<i>Eucalyptus punctata</i>), grey ironbark (<i>E. paniculata</i>) and thin-leaved stringybark (<i>E. eugenoides</i>). In areas of high rainfall (over 1050 mm per annum) Sydney blue gum (<i>E. saligna</i>) is more dominant. The shrub stratum is usually sparse and may contain mesic species such as sweet pittosporum (<i>Pittosporum undulatum</i>) and elderberry panax (<i>Polyscias sambucifolia</i>). Occurs close to the shale/sandstone boundary on the more fertile shale influenced soils, in higher rainfall areas on the higher altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus. A transitional community, between Cumberland Plain Woodland in drier areas and Blue Gum High Forest on adjacent higher rainfall ridges.	CE	-	No
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion		The Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion is typically tall open eucalypt forests found on basalt and basalt-like substrates in, or adjacent to, the Sydney Basin Bioregion. The ecological community usually occurs at elevations between 650 m and 1050 m above sea level. Varies from tall open forest to woodland depending on aspect, slope, soil conditions, soil depth, and previous disturbance. Typically, the ecological community has a sparse to dense layer of shrubs and vines, and a diverse understorey of native grasses, forbs, twiners and ferns. With increasing distance from the coast (and a corresponding	E	-	No

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		decrease in rainfall), the understorey tends to grade from relatively mesic (significant component of rainforest species), to relatively scleric (more drought and fire-tolerant shrubs and a more prominent grass layer). Rainforest elements are also present in the more inland remnants with sheltered aspects and topography, and along watercourses.			
Western Sydney Dry Rainforest and Moist Woodland on Shale		The Western Sydney Dry Rainforest and Moist Woodland on Shale ecological community is a type of dry rainforest that grades into moist woodland. Restricted to hilly country where it occurs on the sheltered lower slopes and in gullies. Generally found at higher elevation, in areas receiving higher rainfall than much of the Cumberland Plain Woodland. Occurs on clay soils derived from Wianamatta shale. Rainforest plants within this vegetation are fire sensitive and dependent on the sheltered aspect and density of vegetation for protection.	CE	-	No
AMPHIBIA					
<i>Heleioporus australiacus</i>	giant burrowing frog	The giant burrowing frog is distributed in south eastern NSW and Victoria. The southern of its two distinct populations occurs from north of Narooma through to Walhalla, Victoria. It is found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams.	V	0	Unlikely. No suitable habitat within the subject land (streams). No local records.
<i>Litoria aurea</i>	green and golden bell frog	Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely	V	2	Unlikely. Though suitable habitat (Dam) is present, closest local record (within 5km) is from 1968.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha spp.</i>) or spikerushes (<i>Eleocharis spp.</i>).			
<i>Mixophyes balbus</i>	stuttering frog	Stuttering frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	V	0	Unlikely. No suitable habitat within the subject land (rainforest, thick understory vegetation). No local records.
REPTILIA					
<i>Aprasia parapulchella</i>	pink-tailed worm-lizard	In NSW, only known from the Central and Southern Tablelands, and the South Western Slopes. Sloping, open woodland areas with predominantly native grassy groundlayers, rocky outcrops or scattered, partially-buried rocks.	V	0	Unlikely. Marginal suitable habitat within the subject land (open woodland containing rocky outcropping or partially buried rocks).
<i>Hoplocephalus bungaroides</i>	broad-headed snake	Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney.	V	0	No. No suitable habitat. No local records.
DIURNAL BIRDS					
<i>Actitis hypoleucos</i>	common sandpiper	Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	M	0	Unlikely - marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
					within 5 km and species not identified during field surveys
<i>Anthochaera phrygia</i>	regent honeyeater	The Regent Honeyeater inhabits temperate woodlands and open forests of the inland slopes of south-east Australia, particularly Box-Ironbark woodland, and riparian forests of <i>Casuarina cunninghamiana</i> (River Sheoak). These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. This species makes nomadic movements, following winter flowering Eucalypt species. Two of three known key breeding areas are in NSW: the Capertee Valley and the Bundarra-Barraba region. The other breeding area is in Chiltern, Victoria. They breed between July and January and usually nest in horizontal branches or forks in tall mature <i>Eucalyptus</i> spp. and <i>Casuarina/Allocasuarina</i> spp.	CE	2	Unlikely. No suitable mature high canopy cover.
<i>Aphelocephala leucopsis</i>	southern whiteface	Prefers the drier habitats of southern Australia. In NSW they are found east to about Tenterfield and south-west to the shale areas in the Sydney region. Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat, especially areas with fallen timber or dead trees and stumps.	V	0	Unlikely – while suitable woodland habitat occurs, it generally lacks the fallen timber and mid-storey species this species prefers. No local records.
<i>Apus pacificus</i>	fork-tailed swift	Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	M	0	Unlikely – the species is likely species likely to occasionally occupy the air space above the development site on occasion. However, they feed aerially and are unlikely to directly utilise habitat within the development site.
<i>Botaurus poiciloptilus</i>	Australasian bittern	Found over most of NSW, this species' habitat consists of permanent freshwater wetlands, with tall, dense vegetation, particularly <i>Typha</i> spp. (bulrushes).	E	0	No. No suitable habitat. No local records.
<i>Calidris acuminata</i>	sharp-tailed sandpiper	Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	M	0	Unlikely - marginal habitat occurs adjacent to the development footprint

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
					(creekline), although few BioNet records within 5 km and species not identified during field surveys
<i>Calidris ferruginea</i>	curlew sandpiper	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	M	0	Unlikely - marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records within 5 km and species not identified during field surveys
<i>Calidris melanotos</i>	pectoral Sandpiper	Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	M	0	Unlikely - marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records within 5 km and species not identified during field surveys
<i>Collocephalon fimbriatum</i>	gang-gang cockatoo	Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	E	0	Unlikely. Marginal foraging habitat available.
<i>Calyptorhynchus lathami lathami</i>	south-eastern glossy black-Cockatoo	In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	V	0	No. no suitable habitat available.
<i>Charadrius leschenaultii</i>	greater sand plover	The greater sand plover breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly, or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores;	V, M	0	No. No suitable habitat. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.			
<i>Climacteris picumnus victoricae</i>	brown treecreeper (south-eastern)	From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Eucalypt woodlands and dry open forest.	V	0	Unlikely. Marginal habitat available.
<i>Cuculus optatus</i>	oriental cuckoo	Northern and eastern Australia, records mainly coastal in NSW south to Bega area. Nonbreeding habitat: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodland.	M	0	No. No suitable habitat available.
<i>Erythroriorchis radiatus</i>	red goshawk	In NSW, extends to ~30°S. Recent records confined to the Northern Rivers region north of the Clarence River. Open woodland and forest, often along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and coastal riparian Eucalyptus forest.	V	0	No. Species considered extinct in NSW.
<i>Falco hypoleucos</i>	grey falcon	The grey falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. It is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	V	0	No. No suitable habitat. No local records.
<i>Gallinago hardwickii</i>	Latham's snipe	Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	V, M	0	Unlikely - marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records within 5 km and species not identified during field surveys
<i>Grantiella picta</i>	painted honeyeater	This species is nomadic and occurs predominantly on the inland slopes of the Great Dividing Range. It inhabits <i>Acacia pendula</i> (Boree/Weeping Myall), <i>A. harpophylla</i> (Brigalow) and Box-Gum Woodlands and Box-Ironbark Forests. It is a specialist feeder on the fruits of mistletoes growing on woodland Eucalypts and Acacias, preferring mistletoes of the	V	0	No. No suitable habitat. No local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		genus <i>Amyema</i> . Nesting occurs from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping <i>Eucalyptus</i> spp., <i>Allocasuarina</i> and <i>Casuarina</i> spp. (she-oaks), <i>Melaleuca</i> sp. (paperbark) or Mistletoe branches.			
<i>Hirundapus caudacutus</i>	white-throated needletail	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	V, M	0	Unlikely – the species is likely to occasionally occupy the air space above the development site on occasion. However, they feed aerially and are unlikely to directly utilise habitat within the development site.
<i>Lathamus discolor</i>	swift parrot	This species breeds in Tasmania during Spring and Summer and migrates to the Australian south-east mainland between March and October. On the mainland they occur where Eucalypts are flowering profusely, or where there are abundant lerp infestations. Favoured feed trees include winter flowering species such as <i>Eucalyptus robusta</i> (swamp mahogany), <i>Corymbia maculata</i> (spotted gum), <i>C. gummifera</i> (red bloodwood), <i>E. sideroxylon</i> (mugga ironbark), and <i>E. albens</i> (white box).	CE	13	Potential. Numerous local records, closest less than 1km. However, the site is not mapped within important habitat areas for the species. See Section 5.2.1
<i>Melanodryas cucullata cucullata</i>	south-eastern Hooded Robin	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i> . Open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	E	0	Unlikely – marginal suitable habitat. Rarely seen in Sydney. Species not identified during the field surveys.
<i>Motacilla flava</i>	yellow wagtail	Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	M	0	Unlikely - marginal habitat occurs within the development footprint (lawns), although few BioNet records within 5 km and species not identified during field surveys
<i>Neophema chrysostoma</i>	blue-winged parrot	Sparse populations are found in western New South Wales. Inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range, they favour grasslands and	V	0	Unlikely - marginal habitat occurs adjacent to the development footprint. However, rare visitor to Sydney with few

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Can also be seen in altered environments such as airfields, golf courses and paddocks.			records. Not identified during the field survey.
<i>Numenius madagascariensis</i>	eastern curlew, far eastern curlew	In NSW, the eastern curlew has a primarily coastal distribution. It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	CE, M	0	No. No suitable habitat. No local records.
<i>Pycnoptilus floccosus</i>	pilotbird	The pilotbird is found from the Wollemi National Park and Blue Mountains National Park in New South Wales through to the Dandenong Ranges, near Melbourne in Victoria. Its preferred habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris.	V	0	No. No suitable habitat. No local records.
<i>Rostratula australis</i>	Australian painted snipe	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	E	0	Unlikely – marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records within 5 km and species not identified during field surveys
<i>Stagonopleura guttata</i>	diamond firetail	Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland. Grassy eucalypt woodlands, open forest, mallee, natural temperate grassland, secondary derived grassland, riparian areas and lightly wooded farmland.	V	0	Unlikely – suitable grassy woodland habitat occurs, although no BioNet records occur within 5 km and species was not identified during field surveys
<i>Tringa nebularia</i>	common greenshank	Terrestrial wetlands (swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans, saltflats, sewage farms and saltworks dams, inundated rice crops and bores) and sheltered coastal habitats (mudflats, saltmarsh, mangroves, embayments,	E, M	0	Unlikely - marginal habitat occurs adjacent to the development footprint (creekline), although few BioNet records within 5 km and species not identified during field surveys

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).			
MAMMALS (EXCLUDING BATS)					
<i>Dasyurus maculatus</i>	spotted-tailed quoll (SE mainland population)	The spotted-tailed quoll has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. It uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. It is mostly nocturnal and spends most of the time on the ground, although is also an excellent climber and will hunt in tree hollows and prey on roosting birds.	E	1	Unlikely. Though some suitable habitat occurs in the locality, only one local record and limited connectivity.
<i>Isodon obesulus</i>	southern brown bandicoot (eastern)	Southern brown bandicoots are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruited) fungi. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nests may be located under Grass trees <i>Xanthorrhoea</i> spp., blackberry bushes and other shrubs, or in rabbit burrows.	E	0	No. No suitable habitat. No local records.
<i>Notamacropus parma</i>	parma wallaby	Confined to the coast and ranges of central and northern NSW from the Gosford district to the Qld border. Moist eucalypt forest, rainforest margins and occasionally drier eucalypt forest.	V	0	No – marginal suitable habitat. No local records.
<i>Petauroides volans</i>	greater glider	The greater glider occurs in Eucalypt forests along the ranges and coastal plains of eastern Australia, feeding almost exclusively on the young leaves and flower buds of select Eucalypt species. It shelters in tree hollows, with a particular preference for large hollows in large, old trees. Individuals occupy relatively small home ranges (1-3 ha).	V	0	Unlikely. Little potential habitat no local records.
<i>Petaurus australis</i>	yellow-bellied glider (south-eastern)	The yellow-bellied glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. It is restricted to tall mature forests, preferring productive tall open	V	2	Unlikely. Little potential habitat few local records.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		sclerophyll forests with a mosaic of tree species including some that flower in winter. Large hollows (>25 cm) within mature trees are required for shelter, nesting and breeding. The species feeds primarily on plant and insect exudates. Individuals are very mobile, occupying large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food.			
<i>Petrogale penicillata</i>	brush-tailed rock-wallaby	In NSW, the brush-tailed rock-wallaby occurs from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. It inhabits rocky escarpments, outcrops and cliffs, with a preference for complex structures with fissures, caves and ledges.	V	0	No. No suitable habitat (rocky escarpments, outcrops and cliffs. No local records.
<i>Phascolarctos cinereus</i>	koala	In NSW, the koala mainly occurs on the central and north coasts, with some populations in the west of the Great Dividing Range. It is associated with both wet and dry Eucalypt forest and woodland, feeding on the foliage of more than 70 Eucalypt species and 30 non-Eucalypt species, but in any one area will select preferred browse species.	E	2	Unlikely. Little potential foraging habitat. Limited habitat connectivity.
<i>Pseudomys novaehollandiae</i>	New Holland mouse	A small burrowing native rodent with a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland mouse ranges from 0.44 ha to 1.4 ha and the species peaks in abundance during early to mid-stages of vegetation succession typically induced by fire.	V	0	No. No suitable habitat. No local records.
MAMMALS (BATS)					
<i>Chalinolobus dwyeri</i>	large-eared pied bat	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country. Roosts in caves, rock overhangings and disused mine shafts, and is associated with rock outcrops and cliff faces. Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of	V	1	Unlikely. No suitable roost habitat (caves, rock outcrops, cliffs). One nearby record 5km away.

Scientific name	Common name	Habitat associations	EPBC Act status	BioNet records within 5 km	Likelihood of occurrence
		populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.			
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	This species is found along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. It inhabits subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	V	390	Likely. Many widespread local records. Major camp approximately 20km SE.
GASTROPODS					
<i>Pommerhelix duralensis</i>	Dural land snail	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the Cumberland IBRA subregion on shale-sandstone transitional landscapes. There is currently a degree of uncertainty about the distribution and identity of the snails in this and related species. <i>Pommerhelix duralensis</i> in the strict sense is found in an area of north-western Sydney between Rouse Hill - Cattai and Wiseman's Ferry, west from Berowra Creek. The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris. It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris. Migration and dispersal are limited, with overnight straight-line distances of under 1 metre identified in the literature and studies. The species is active from approximately one hour after dusk until dawn and no confirmed diurnal activity is reported.	E	7	Unlikely. No suitable shale transitional habitat. Closest record is 4km.

Appendix E Biodiversity credit report

See next page.

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00057205/BAAS17056/25/00060015	40 Memorial Drive Bella Vista	05/08/2025
Assessor Name	Report Created	BAM Data version *
	01/09/2025	Current classification (live - default) (82)
Assessor Number	BAM Case Status	Date Finalised
BAAS17056	Finalised	01/09/2025
Assessment Revision	BOS entry trigger	Assessment Type
0		Major Projects

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

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

BAM Credit Summary Report

Cumberland Shale Plains Woodland												
1	3320_Degraded	Cumberland Plain Woodland in the Sydney Basin Bioregion	58.5	58.5	0.14	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	5
											Subtotal	5
											Total	5

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAI	Species credits
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BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00057205/BAAS17056/25/00060015	40 Memorial Drive Bella Vista	05/08/2025
Assessor Name	Assessor Number	BAM Data version *
	BAAS17056	Current classification (live - default) (82)
Proponent Names	Report Created	BAM Case Status
	01/09/2025	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
0		Major Projects
Date Finalised	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
01/09/2025		

Potential Serious and Irreversible Impacts

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

BAM Biodiversity Credit Report (Like for like)

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo

Ephippiorhynchus asiaticus / Black-necked Stork

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3320-Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.1	0	5	5

BAM Biodiversity Credit Report (Like for like)

3320-Cumberland Shale Plains Woodland	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_Degraded	No	5	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00057205/BAAS17056/25/00060015	40 Memorial Drive Bella Vista	05/08/2025
Assessor Name	Report Created	BAM Data version *
	01/09/2025	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17056	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0		01/09/2025

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Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3320_Degraded	3320-Cumberland Shale Plains Woodland	Degraded	0.14	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00057205/BAAS17056/25/00060015	40 Memorial Drive Bella Vista	05/08/2025
Assessor Name	Report Created	BAM Data version *
	01/09/2025	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17056	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0		01/09/2025

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

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	3320-Cumberland Shale Plains Woodland
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3320-Cumberland Shale Plains Woodland
Diamond Firetail	Stagonopleura guttata	3320-Cumberland Shale Plains Woodland
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3320-Cumberland Shale Plains Woodland
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3320-Cumberland Shale Plains Woodland
Eastern Osprey	Pandion cristatus	3320-Cumberland Shale Plains Woodland
Flame Robin	Petroica phoenicea	3320-Cumberland Shale Plains Woodland
Grey-headed Flying-fox	Pteropus poliocephalus	3320-Cumberland Shale Plains Woodland
Large Bent-winged Bat	Miniopterus orianae oceanensis	3320-Cumberland Shale Plains Woodland
Little Bent-winged Bat	Miniopterus australis	3320-Cumberland Shale Plains Woodland
Little Lorikeet	Glossopsitta pusilla	3320-Cumberland Shale Plains Woodland

BAM Predicted Species Report

Regent Honeyeater	<i>Anthochaera phrygia</i>	3320-Cumberland Shale Plains Woodland
Scarlet Robin	<i>Petroica boodang</i>	3320-Cumberland Shale Plains Woodland
Speckled Warbler	<i>Chthonicola sagittata</i>	3320-Cumberland Shale Plains Woodland
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	3320-Cumberland Shale Plains Woodland
Swift Parrot	<i>Lathamus discolor</i>	3320-Cumberland Shale Plains Woodland
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	3320-Cumberland Shale Plains Woodland
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	3320-Cumberland Shale Plains Woodland

Threatened species Manually Added

None added

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

Common Name	Scientific Name	Plant Community Type(s)
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	3320-Cumberland Shale Plains Woodland
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	3320-Cumberland Shale Plains Woodland

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

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Habitat constraints
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00057205/BAAS17056/25/00060015	40 Memorial Drive Bella Vista	05/08/2025
Assessor Name	Report Created	BAM Data version *
	01/09/2025	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17056	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0		01/09/2025

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List of Species Requiring Survey

Name	Presence	Survey Months
<i>Eucalyptus benthamii</i> Camden White Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☒ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Micromyrtus minutiflora</i> Micromyrtus minutiflora	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☒ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

BAM Candidate Species Report

Common name	Scientific name	Justification in the BAM-C
Brown Pomaderris	<i>Pomaderris brunnea</i>	Refer to BAR
Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	Refer to BAR
<i>Deyeuxia appressa</i>	<i>Deyeuxia appressa</i>	Refer to BAR
<i>Dillwynia tenuifolia</i>	<i>Dillwynia tenuifolia</i>	Refer to BAR
Downy Wattle	<i>Acacia pubescens</i>	Refer to BAR
Eastern Osprey	<i>Pandion cristatus</i>	Refer to BAR
Green and Golden Bell Frog	<i>Litoria aurea</i>	Refer to BAR
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Refer to BAR
<i>Hibbertia puberula</i>	<i>Hibbertia puberula</i>	Refer to BAR
Juniper-leaved Grevillea	<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Refer to BAR
Koala	<i>Phascolarctos cinereus</i>	Refer to BAR
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Habitat constraints
Little Bent-winged Bat	<i>Miniopterus australis</i>	Habitat constraints
<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	Geographic limitations
Matted Bush-pea	<i>Pultenaea pedunculata</i>	Refer to BAR
Nodding Geebung	<i>Persoonia nutans</i>	Refer to BAR
<i>P. prunifolia</i> in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	<i>Pomaderris prunifolia</i> - endangered population	Geographic limitations
<i>Pimelea curviflora</i> var. <i>curviflora</i>	<i>Pimelea curviflora</i> var. <i>curviflora</i>	Refer to BAR
<i>Pultenaea parviflora</i>	<i>Pultenaea parviflora</i>	Refer to BAR
Regent Honeyeater	<i>Anthochaera phrygia</i>	Habitat constraints
Slaty Red Gum	<i>Eucalyptus glaucina</i>	Refer to BAR
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	Refer to BAR

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Southern Myotis	Myotis macropus	Refer to BAR
Spiked Rice-flower	Pimelea spicata	Refer to BAR
Squirrel Glider	Petaurus norfolcensis	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints
Sydney Plains Greenhood	Pterostylis saxicola	Refer to BAR
Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	Wahlenbergia multicaulis - endangered population	Geographic limitations
White-bellied Sea-Eagle	Haliaeetus leucogaster	Refer to BAR

