68-80 O'Connell Street, Kingswood
Biodiversity Development Assessment Report

Caddens Estate Development Pty Ltd

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Project Number	22SYD - 2193
Project Manager	Belinda Failes
Prepared by	Belinda Failes
Accredited Assessor	I certify that this report has been prepared on the basis of the requirements of, and information provided under, the Biodiversity Assessment Method and s.6.15 of the BC Act. In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct. I declare that I have considered the circumstances and there is no actual, perceived, or potential conflict of interest.  Belinda Failes (#BAAS18159)
Reviewed by	Meredith Henderson (BAAS17007)
Approved by	Meredith Henderson
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Executive Summary

Eco Logical Australia Pty Ltd was engaged by Caddens Estate Development Pty Ltd to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed new residential development at 68-80 O'Connell Street Kingswood (the 'development site') in Penrith local government area. The proposed development will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed new development will impact upon land mapped under the Biodiversity Values Map and therefore triggers entry into the Biodiversity Offset Scheme (BOS). The proposed development requires the preparation of a BDAR under the NSW *Biodiversity Conservation Act 2016* (BC Act) to be submitted as part of a Development Application (DA) to Penrith City Council (the "council"). The DA (DA 23/0281) was submitted in April 2023. Penrith City Council ("the council") reviewed the proposed development and consequently, amendments to the design footprint were required. This BDAR addresses the amended footprint and comments from council.

The proposed development will impact upon 0.06 ha of native vegetation, therefore, the Streamlined Assessment Module – Small Areas was applied in accordance with Appendix C of the Biodiversity Assessment Method 2020 (BAM). The development site also contains 0.13 ha of planted native vegetation which does not conform to a Plant Community Type (PCT) as such the Streamlined Assessment Module – Planted Native Vegetation was also applied to the development site.

This report has been prepared to meet the requirements of the BAM established under Section 6.7 of the BC Act. It describes the biodiversity values within the development site, describes the impacts and outlines the measures to be taken to avoid, minimise and mitigate impacts to the PCTs and threatened species habitat within the development site.

The report provides the number of biodiversity credits that would be required to be retired to offset the residual loss of biodiversity from the impacts of the development as described.

The proposed development involves direct and indirect impacts to the biodiversity values within the development footprint, through the clearing of native vegetation within the development site.

The vegetation within the development site has been historically cleared and is maintained through regularly mowing practices. A patch of *Cumberland Plain Woodland in the Sydney Basin Bioregion* was located in the northern portion of the development site and has been mapped on the Biodiversity Values Map. *Cumberland Plain Woodland in the Sydney Basin Bioregion* corresponds with *PCT 849 Cumberland Shale Plains Woodland* and is listed as part of a critically endangered ecological community under the BC Act. The patch of PCT 849 mapped within the development site is contiguous with vegetation on the adjoining land to the north. Due to the size and overall condition of the patch of PCT 849 it also satisfied the criteria for listing as part of the critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This patch will be entirely retained within the development site and managed through a Vegetation Management Plan (VMP).

No threatened flora species were recorded on or within the development site or are likely to persist in the soil profile. The vegetation within the development site was deemed highly disturbed and fragmented from other intact patches of vegetation. It does not represent potential habitat for threatened flora species.

Using the Streamlined Assessment Module – Small Areas, only candidate Serious and Irreversible Impacts entities require targeted surveys. No threatened fauna species were recorded within the development site. There is potential that highly mobile threatened species may utilise the vegetation for foraging resources on occasion. Consideration has been given to these highly mobile species during the preparation of this BDAR.

A small patch of Important Habitat for *Lathamus discolor* (Swift Parrot) was mapped within the vegetation in the north of the development site. The majority of this patch will be retained. This vegetation may provide important wintering foraging habitat for this migratory species. A species polygon was prepared and a total of one (1) species credits area required for 0.002 ha of impacts to Swift Parrot habitat.

Following consideration of all the above aspects, the residual unavoidable impacts of the project were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit calculator (BAMC). The number of credits required to offset the removal of PCT 849 is provided below. Impacts to planted native vegetation do not require offsets, consistent with the application of the Streamlined Assessment Module – Planted Native Vegetation.

Ecosystem credits required

Veg zone	PCT #	PCT name			Condition	Vegetation integrity score	Trading Group	Direct impact (ha)	Credit required
1	849	*Cumberland Woodland*	*Shale*	*Plains*	mown	57.1	Coastal Valley Grassy Woodlands >90%	0.06	2

The development site contains two candidates for Serious and Irreversible Impact (SAII), Cumberland Plain Woodland and Swift Parrot. An assessment of each SAII entity has been included to determine if 0.06 ha of impacts to Cumberland Plain Woodland or 0.002 ha of impact on Swift Parrot important areas.

Three Matters of National Environmental Significance (MNES), *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, Pteropus poliocephalus* (Grey-headed Flying-fox) and Swift Parrot were identified as having potential to be affected by the proposed works. Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and it is considered that this species is likely to use some of the development site for foraging (0.22 ha). The project was redesigned to avoid impacts to *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*, indirect impacts have been considered to this vegetation and will be mitigated through the implementation of a VMP. An assessment of the Commonwealth Significant Impact Criteria was undertaken for three MNES and concluded that the project would not have a significant impact on this threatened species or ecological community.

Requirements of the Penrith Local Environment Plan 2011 (LEP) and Development Control Plan 2011 (DCP) have also been addressed in this document.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment (now Commonwealth DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DNG	Derived Native Grassland
DPE	NSW Department of Planning and Environment (now NSW DCCEEW)
EHG	Environment and Heritage Group
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
MNES	Matters of National Environmental Significance
NSW	New South Wales
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage (now EHG)
PCT	Plant Community Type
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan
VIS	Vegetation Information System
WM Act	NSW *Water Management Act 2000*

1. Stage 1: Biodiversity assessment

1.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Belinda Failes, an accredited person (BAAS18159) under the *Biodiversity Conservation Act 2016* (BC Act). The report was peer reviewed by Meredith Henderson (BAAS17007) who is also an accredited person under the BC Act. All credit calculations have been undertaken using the BAM Calculator (BAMC) version 50 in case number 00036225/36226. The calculations were finalised in BAMC on 27 February 2024, and this BDAR was finalised on 28 February 2024.

This BDAR has applied the Streamlined Assessment Module – Small Areas in accordance with Appendix C of the Biodiversity Assessment Method 2020 (BAM). The development site also contains planted native vegetation which does not conform to a plant community type (PCT) as such the Streamlined Assessment Module – Planted Native Vegetation was also applied to the assessment.

Definitions of terminology used throughout this report are presented in Appendix A.

1.2 General description of the development site

The development site is located at 68-80 O'Connell Street, Kingswood (partial Lot 1 and 2 DP1268507). The proposed development site is approximately 5.47 ha and within the Penrith City Council Local Government Area (LGA).

The development site is currently zoned R4 High Density Residential and B2 Local Centre under the Penrith Local Environmental Plan 2010 (LEP). It is bordered by O'Connell Street in the south, and land zoned as R3 Medium Density Residential to the north, RE1 Public Recreation and RE1 and B7 Business Park to the east and B2 Business to the west.

The vegetation within the development site has been largely cleared. The development site is the location of the former historic Kingswood drive-in open cinemas. A portion of the development site includes the carpark at the new Caddens Corner shopping complex. A stand of mature canopy species is present within the northern boundary of the development site. The native vegetation patch within the development site is contiguous with vegetation located on the adjoining land to the north. The adjoining land to the north is currently under Council review for a separate DA for residential development (ELA 2021a), however the vegetation patch will be largely retained and managed for conservation through the implementation of a Vegetation Management Plan prepared by ELA (2024b).

Several scattered *Eucalyptus tereticornis* are also located within the development site. A small patch of exotic vegetation and planted non-locally indigenous native species were also recorded within the development site. The remainder of the development site is open exotic grass.

The 'development site' refers to 68-80 O'Connell Street, Kingswood (partial Lot 1 and 2 DP1268507) and includes the development and the vegetation patch in the north to be retained.

The 'development footprint', refers to the extent of the proposed development application (construction and operational footprints). The development site and development footprint are displayed in two maps, the Location Map (Figure 1) and Site Map (Figure 2).

1.3 Brief description of the proposal

ELA understands that Caddens Estate Development Pty Ltd submitted a Development Application (DA) DA 23/0281) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to Penrith City Council in April 2023. The DA proposed to create mixed use re-development, including shop top housing, residential flat building, multi-unit housing forms, retail premises, roads, civic, landscaping and associated works. The vegetation within the northern portion of the development site will be retained and conserved through the implementation of a Vegetation Management Plan. Penrith City Council ("the council") reviewed the proposed development and consequently, amendments to the design footprint were required. This BDAR addresses the amended footprint and comments from council.

The amended DA seeks council consent for:

- Bulk earthworks.
- Construction of 469 residential dwellings and internal access roads.
- Two level basement retail carpark below existing carpark.
- Clearing of native and exotic vegetation.
- Construction of stormwater features and landscaping. Retained lands including conservation areas and open space.

A development footprint map is provided in Figure 3.

1.4 Sources of information used

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

- Biodiversity Assessment Calculator (BAMC) (data v 55, 1.4.0.00)
- BioNet Vegetation Classification System (VIS) (accessed September 2022)
- BioNet Atlas 5 km database search (DPE 2022b) (accessed February 2024)
- Threatened Biodiversity Data Collection (TBDC) (accessed February 2024)
- NSW Government Biodiversity Values Map and threshold tool (online) (DPE 2022c) (accessed February 2024)
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act Protected Matters Search Tool 5 km database search (Department of Climate Change, Energy, the Environment and Water (DCCEEW 2022a) (Accessed February 2024)
- Department of Planning and Environment (DPE) 2022d Register of Declared Areas of Outstanding Biodiversity Value
- National Flying-fox monitor viewer (2020b) (Accessed December 2022)
- Additional geographic information system (GIS) datasets including soil, topography, geology and drainage
- The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage OEH 2016)
- NSW State Vegetation Type Map (DPE 2022) – Sharing and Enabling Environmental Data in NSW
- Department of Planning, Industry and Environment (DPIE) 2016. NSW (Mitchell) Landscapes – version 3.1
- State of NSW and Department of Planning, Industry and Environment 2021. Soil Landscapes from espade.environment.nsw.gov.au

- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft (Department or Environment and Conservation (DEC) 2004)
- Eco Logical Australia 2021. 46-66 & 29 O'Connell St Caddens -Biodiversity Development Assessment Report
- Ei Australia 2024. Geotechnical report
- ELA 2024a Vegetation Management Plan
- ELA 2024b Bushfire Protection Report
- ELA 2024c Fauna Management Plan.

Figure 1: Location Map

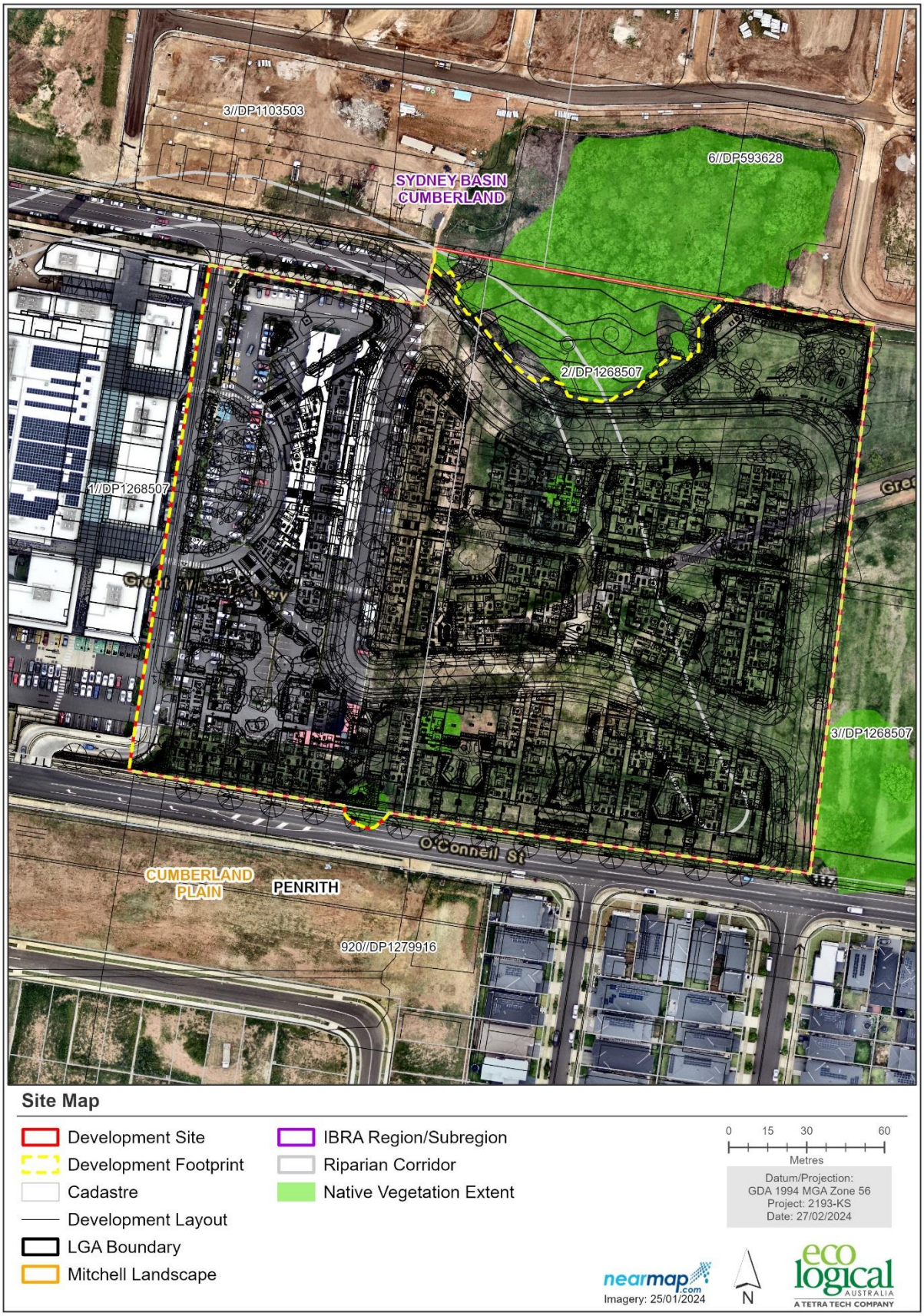

Figure 2: Site Map

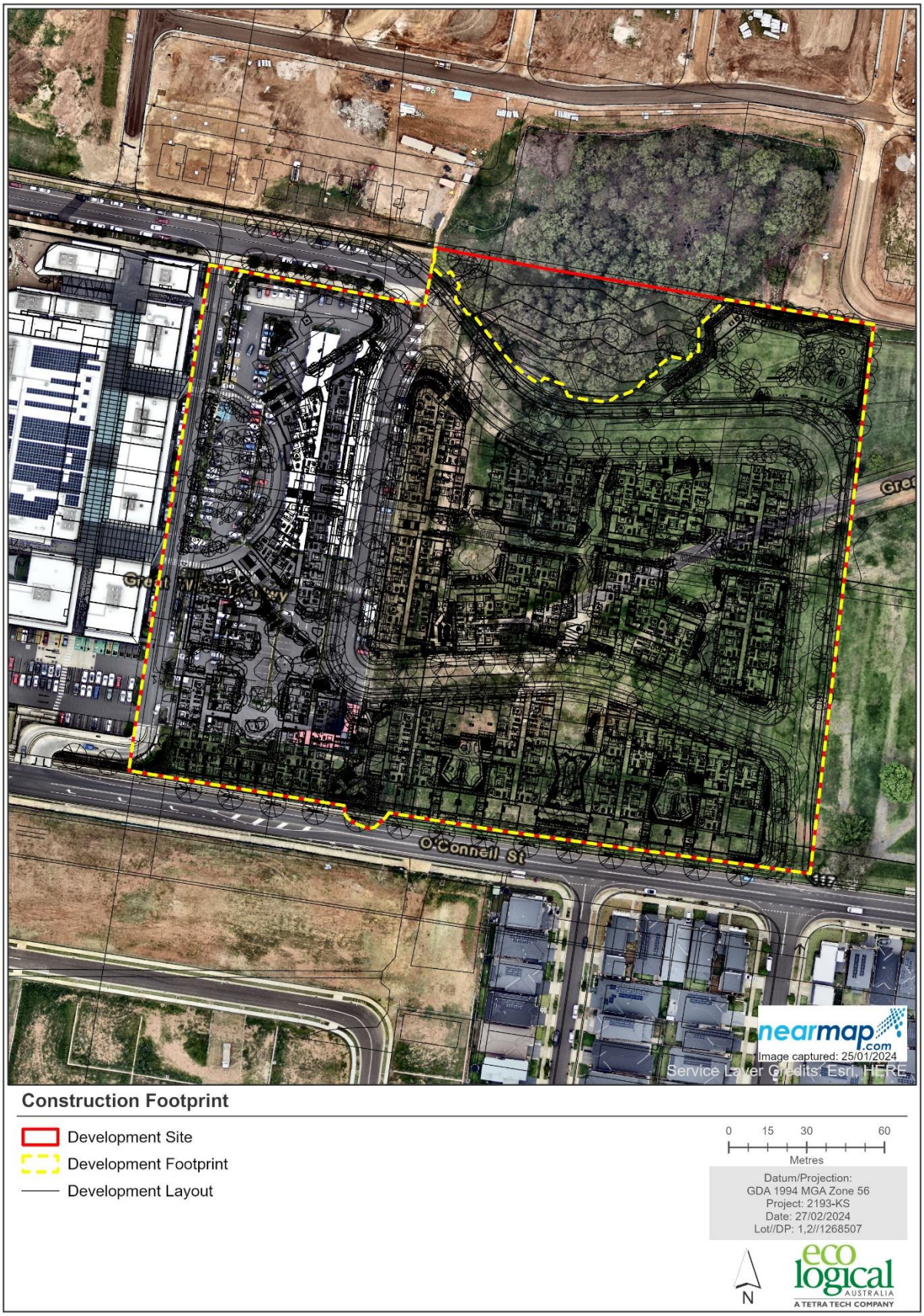

Figure 3: Construction footprint

1.5 Legislative context

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect Matters of National Environmental Significance (MNES) including wetlands of international importance, threatened species and communities and listed migratory species. An action that may or is likely to have a significant impact on MNES should be referred to the Commonwealth to determine whether it is a Controlled Action that requires approval from the Commonwealth. MNES have been identified on or near the development site. Three MNES were identified as having the potential to occur within the development site: • Cumberland Plain Woodland Shale Gravel Transition Forest • *Pteropus poliocephalus* (Grey-headed Flying-Fox) • *Lathamus discolor* (Swift Parrot). This report assesses impacts to MNES through an Assessment of Significance (Section 8.6.1) and concludes that the development is not likely to have a significant impact on MNES.
State	
Environmental Planning and Assessment Act 1979 (EP&A Act)	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 requires consent under Penrith Local Environmental Plan (LEP) 2019 and is to be assessed under Part 4 of the EP&A Act.
Biodiversity Conservation Act 2016 (BC Act)	The purpose of the BC Act is to maintain a healthy and productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The proposed development requires submission of a Biodiversity Development Assessment Report (BDAR) (i.e., this report) under the BC Act. The DA will need to be assessed in accordance with the BC Act 2016. A BDAR is required to be submitted with any development that has a significant impact on biodiversity values. There are four triggers for a significant impact: • exceeding the clearing threshold in section 7.2 of the BC Regulation 2017 (this is not triggered as the proposed clearing is 0.06 ha *which does not exceed the threshold value of 0.25 ha for the minimum lot size of 800 m^2 under the LEP). • impacting on vegetation shown on the Biodiversity Values Map in Section 7.3 of the BC Regulation 2017. **The proposed development is on this map; therefore, this trigger applies.** • a significant impact in accordance with Section 7.3 of the BC Act 2016 • impacts to Areas of Outstanding Biodiversity Value (AOBV). As there are not AOBV on site, this trigger does not apply. * Native Vegetation has the same meaning as Section 1.6 of the BC Act which includes any native vegetation native to NSW. The planted native vegetation recorded within the development site are cultivated species which are not considered native to NSW and planted native species which have been included in the calculation for the BOS.
Fisheries Management Act 1994 (FM Act)	The purpose of the BC Act is to maintain a healthy and productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.

Name	Relevance to the project
Water Management Act 2000 (WM Act)	The WM Act is the sustainable and integrated management of the state's water for the benefit for both present and future generations. If a 'controlled activity' is proposed on 'waterfront land', an approval is required under the Water Management Act (s91). 'Controlled activities' include: • The construction of buildings or carrying out of works (with the exception of land based private dwellings, a dual occupancy building or related ancillary facilities). • The removal of material or vegetation from land by excavation or any other means. • The deposition of material on land by landfill or otherwise. Or • Any activity that affects the quantity or flow of water in a water source. The development site contains a 1st order stream (under the Strahler classification) which has been mapped flowing south to north and then west. The headwaters to the mapped stream consists of a grassy swale which flows south to north and converges with the concrete open drain in the north. The 1st order stream (partly functioning as an open concrete drain) is mapped within the development site. The drainage line is currently partly concrete, running east to west along the northern portion of the development site (Figure 8). Clause 42 and 28 of Schedule 4 in the regulation and *Water Management Act 2000* addresses concrete lined streams. Concrete lined streams are exempt from controlled activity approvals. The portion of the grassy drainage line which is upslope does not fit the definition of a 'river' as it does not have a bank and bed and does not experience hydrological flows (i.e. does not deposit sediments/sands). Therefore, the mapped stream does not meet the definition of a river. The proposed works do not require a Controlled Activities Approval. However, confirmation from the Natural Resource Access Regulator may be required to validate the presence of the mapped watercourse. A 2nd order stream is located west, outside of the development site. It will not be directly impacted upon by the proposed development. The development footprint is more than 40 m from the 2nd order stream and therefore it is not located on Waterfront land.
Planning Instruments	
State Environmental Planning Policy (Resilience and Hazards) 2021	The proposed development is not located on land subject to this SEPP.
State Environmental Planning Policy 2021 (Biodiversity and Conservation)	The Minister for Planning and Public Spaces announced that on 1 March 2022 the commencement of the new Biodiversity and Conservation SEPP. The Biodiversity and Conservation SEPP consolidates 11 SEPPs into one new theme-based focus SEPP. The following chapters are relevant for this project: • Chapter 2 – Vegetation in Non-Rural Areas SEPP 17 aims 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. This SEPP applies to all trees and native vegetation within the Penrith City Council. • Chapter 4 – Koala Habitat Protection SEPP 2021 , which applies if the proposed development is located within a Local Government Area specified in the SEPP. The development site is not in an LGA specified in the SEPP (Penrith City Council), so Chapter 4 does not apply. • Chapter 6 – Water Catchments. The development site is not within a regulated catchment in accordance with Chapter 6 of this SEPP, therefore development controls under Section 6.7 relating to aquatic ecology do not apply.

Name	Relevance to the project
Penrith Local Environment Plan (LEP) 2010	The development site is zoned as the following under the Penrith LEP: • R4 High Density Residential • B2 Local Centre The development site is not subject to the Biodiversity or Riparian overlay under the LEP.
Penrith Development Control Plan (DCP) 2014	The Penrith DCP contains provisions relating to native vegetation. Section C2 Vegetation Management states that: • To adopt the principles of ecologically sustainable development (ESD) in protecting and enhancing Penrith's native vegetation; • To preserve existing trees and vegetation for the benefits they provide; • To preserve existing trees and vegetation, where possible, during the design, development and construction process and justify any tree or vegetation removal to Council; • To protect and enhance native vegetation and biodiversity in the Penrith Local Government Area, including habitat for threatened species, populations and ecological communities and corridors for flora and fauna; • To retain native vegetation in parcels of a size and configuration which will enable existing plant and animal communities to survive in the long term; • To protect and enhance the landscape character and scenic qualities of the Penrith Local Government Area; and • To manage the conflict between protecting and removing vegetation to address natural hazards such as bushfires. The proposed development is not consistent with some of the objectives of Section C2 in the DCP. The development has retained biodiversity values within the site and minimise impacts to threatened ecological communities (TEC). Additionally, revegetation works are proposed for the remnant TEC located within the development site. Although the proposed development is not consistent with some of the objectives it has considered retaining and enhancing biodiversity values on site.

2. Streamlined Assessment Module

Two streamlined assessment modules were applied for this assessment. Both are detailed in this section.

Section 7.14 (1) of the BC Act requires an application for development consent under Part 4 of the *Environmental Planning and Assessment Act 1979*, to be accompanied by a BDAR if the Biodiversity Offset Scheme (BOS) is triggered. Section 2.2 of BAM sets out the streamlined modules. Appendix C of BAM 2020 sets out the circumstances in which the small area assessment can be used. Appendix D of the BAM 2020 outlines a streamlined assessment module for assessing planted native vegetation. The streamlined assessment module can be applied where part of the subject land contains planted native vegetation.

2.1 Streamlined Assessment Module – Small Areas

Appendix C of the BAM 2020 outlines a streamlined assessment module for assessing small areas. This appendix contains two criteria which must be met for use of this streamlined assessment module. The criteria and their application to the proposed development are presented in Table 2.

The minimum lot size associated with Lot 2 DP1268507 is 800m^2. Lot 1 DP1268507 does not have a minimum size lot, therefore the actual lot is used. Where the development covers two lots with different minimum sizes, then the smallest lot size is used for the entire lot. Therefore, the property is 800 m^2 and the area to be cleared is less than 1 ha, therefore, the small area module has been applied for this assessment in accordance with Appendix C of the BAM 2020.

Table 2: Criteria for application of streamlined assessment module – small area in accordance with Appendix C of the BAM 2020

Criteria	Response and justification
The streamlined assessment module for small area developments must only be used according to the maximum area clearing limits* shown in Table 12 of the BAM 2020. * *Maximum area clearing limits are associated with the minimum lot size for a property under the relevant LEP or actual lot size where there is no minimum lot size in the LEP*.	**Yes** – 800m^2 for Lot 2 DP 1268507. Lot 1 DP 1268507 does not have a minimum size lot. The proposed development would clear 0.06 ha of PCT 849 and 0.13 ha of planted native vegetation which is less than the threshold for clearing.
The streamlined assessment module for small area developments 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.	**Yes** – the development site contains land mapped on the Biodiversity Values Map as it contains threatened ecological community; however, this area is not mapped as core koala habitat.
Can the streamlined assessment module – small area be applied?	**Yes**

2.2 Streamlined Assessment Module – Planted Native Vegetation

Section 2.2 of the BAM contains a streamlined assessment module for planted native vegetation. The streamlined assessment can be used where the native vegetation was planted for purposes such as

street trees and other roadside plantings, windbreaks, landscaping in parks and gardens, and revegetation for environmental rehabilitation.

The streamlined assessment module for planted native vegetation has been applied to part of the subject land where areas of planted native vegetation will be impacted. All other areas of non- planted vegetation impacted within the subject land will be assessed in this BDAR under the Small Area Assessment Module of the BAM 2020.

The field survey identified the presence of two *Callistemon viminalis* (Weeping Bottlebrush) interspersed with exotic horticultural species located adjacent to a concrete footpad and gravel road. These species are not associated with a local PCT 849.

The planted native vegetation within the subject land has been planted for the purpose of landscape plantings such as within the existing car park. Appendix D of the BAM provides a decision-making key for the assessment of the planted native vegetation. This decision-making key was applied to the sections of planted native vegetation mapped within the subject land. This assessment is displayed in Table 3.

Table 3: Decision-making key for planted native vegetation

Question	Response
A1: Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	• **No** – Planted native vegetation was located in the existing carpark and at the top of batters away from remnant vegetation. Planted native vegetation was small in size and located in rows, within garden beds and were not visible from earlier aerial imagery.
A2: Is the planted native vegetation: planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	• **No** – Planted native vegetation does not include representative species which are part of a local PCT. Planted native vegetation includes *Callistemon viminalis* which is a widely cultivated species and cultivated *Corymbia* species which are not indigenous to NSW. *Callistemon viminalis* natural distribution is north from Gloucester and does not include the development site.
A3: 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: • species recovery project • *Saving our Species* project • other types of government funded restoration project • condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat • legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act)	• **No** – the native species present are not listed as threatened under the BC Act or EPBC Act. They have not been planted for rehabilitation works and have not been planted or translocated for the purposes listed.

Question	Response
• ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or • approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW *Water Management Act 2000*)?	
A4: Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	• **No** – the planted native vegetation forms part of the landscaping of the existing shopping centre car park and several *Callistemon viminalis* which were planted near concrete hardstands in the development site.
A5: Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	• **Yes** – the planted native vegetation has been planted for aesthetics purposes associated with landscaping for the existing shopping centre carpark and previous Kingswood Cinema. • **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)**
A6: 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

Section D.2 of Appendix D of the BAM requires that the planted native vegetation is assessed for threatened species habitat. Opportunistic survey and habitat assessment for threatened flora and fauna habitat was undertaken as part of the field survey. Following a habitat assessment of this area it was determined that the planted native vegetation is unlikely to provide suitable habitat for threatened flora species.

No hollow-bearing trees, nests, scats, scratches, or any other evidence of fauna were identified within the area of planted native vegetation on site. It was determined that the planted native vegetation does not provide roosting or breeding habitat for threatened fauna species. The planted native vegetation could possibly serve as marginal foraging habitat for urban and peri-urban fauna such as common bird species however is unlikely to serve as important foraging habitat for threatened fauna species. There will be 0.03 ha of planted native vegetation impacted under the proposed development which does not require offset as a result of this streamlined assessment module.

3. Landscape features

The landscape features considered for this assessment are presented in Table 4 and Figure 2.

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 development site.

Table 4: Landscape features

Landscape feature	Description	Data source
IBRA Region(s)	The assessment area and development site are within the Sydney Basin IBRA Region.	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	The assessment area and development site are within the Cumberland IBRA subregion.	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	The development site contains a 1st order stream under the Strahler classification system (Figure 2). There is a 1st order stream (now partly functioning as an open concrete drain and partly grassy swale) mapped within the development site. The *Water Management Act 2000* (WM Act) defines a river as: • any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved, and • any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph (a) flows, and • anything declared by the regulations to be a river. The south to north portion of the drainage line (grassy swale) does not fit the definition of a 'river' (Water Management Act) as it does not have a bank and bed and does not experience hydrological flows (i.e. does not deposit sediments/sands) (Figure 2). The concrete section (along the northern boundary) does not meet the definition of a 'river' (see legislation table – Table 1). However, as the watercourse has been mapped within the development site and requires an assessment. For the purpose of this report, the 1st Strahler order stream was included and impacts to hydrological flows have been assessed. The 1st order stream flows into a 2nd order stream located west of the development site. The proposed development works are located approximately 100 m from the 2nd order stream. Indirect impacts due to changes in hydrological flow and water quality to the 2nd order stream have been included in this assessment.	NSW LPI Waterway mapping, Aerial imagery
Estuaries and wetlands	The development site and assessment area do not contain estuaries or wetlands.	NSW directory of important wetlands, Aerial imagery

Landscape feature	Description	Data source
Connectivity of different areas of habitat	The development site contains a patch of remnant vegetation along the northern boundary. This patch is fragmented from other vegetation by exotic grasslands, Caddens Corner shopping centre and roads. Planted native and exotic vegetation is present in patchy distribution within the development site. A large tract of vegetation has been mapped adjacent to the development site along Werrington Creek to the west. The vegetation is located on the University of Western Sydney (Kingswood campus) and is surrounded by a 2 m high fence. This vegetation has been fragmented from other tracts of vegetation by the formation of major arterial roads, namely, M4 Western Motorway in the south and Great Western Highway in the north which surrounds the development site. Some connectivity may remain for highly mobile species such as birds or bats. This includes flyways for migratory birds and bat species moving through the landscape. Fragmented connections are present for highly mobile species as seen in Figure 1. For the purpose of this assessment, the connectivity features were assessed.	Aerial imagery
Geological features of significance and soil hazard features	The development site and assessment area do not contain any geological features of significance (i.e., karst, caves, crevices, cliffs etc.) or soil hazard features.	Aerial imagery Field survey Topography and contour data sets
Biodiversity Values	The development site and assessment area do include areas mapped under the NSW Biodiversity Values Map (accessed 26 February 2024).	Biodiversity Values Map and Threshold Tool
Areas of Outstanding Biodiversity Value	The development site does not include areas of declared critical habitat (accessed 26 February 2024).	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)
NSW (Mitchell) Landscapes	Cumberland Plain	NSW (Mitchell) Landscapes – version 3.1 (DPIE 2016)
Percent (%) native vegetation extent	The development site is approximately 5.47 ha and contains approximately 0.36 ha of native vegetation. There are no differences between the mapped vegetation extent and the aerial imagery. The assessment area is approximately 861.57 ha and contains approximately 112.14 ha of native vegetation (13%).	Calculated using aerial imagery and ArcGIS software – Field survey found no differences between the mapped vegetation extent and the aerial imagery.

Landscape feature	Description	Data source
Patch size	Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. Although there are geographic barriers of major roads, namely M4 and Great Western Highway and large open landscapes surrounding the development site, there is connectivity of the vegetation within the development site with other patches of native vegetation and along riparian corridors. Therefore, the patch size area is >100 ha, therefore, the patch size area is within the size category of 101 ha (Figure 1).	Calculated using aerial imagery and ArcGIS software

3.1 Site context

3.1.1.1 Method applied

The site-based method has been applied to this development.

4. Native vegetation

The development site contains large open space with a cluster of native vegetation along the northern boundary. The vegetation in the north is contiguous with a patch of vegetation in the adjoining lands to the north.

The remaining vegetation has not been mapped by previous vegetation data sets (OEH 2016 and DPE 2022). This vegetation includes planted native vegetation (*Callistemon viminalis* (Weeping Bottlebrush) and *Corymbia* cultivars), planted exotics (*Nerium oleander* (Oleander) and (*Olea europaea* subsp. *Cuspidata* (African Olive)) and exotic grass (*Cenchrus clandestinus* (Kikuyu)). The development site also contains built areas including an existing carpark which will be redeveloped.

4.1 Survey effort

Vegetation survey was conducted on 3 June 2022 by Belinda Failes. A total of one (1) full-floristic and vegetation integrity plot was undertaken to identify plant community types (PCTs) and threatened ecological communities (TECs) on the development site (Figure 5 and Table 5). The vegetation integrity plot was undertaken within the development site in accordance with the BAM (Table 6). All field data collected is included in Appendix B.

Table 5: Full floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
849	Cumberland Shale Plains Woodland	1

Table 6: Vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Condition	Total area (ha)	Plots required	Plots surveyed
1	849	Cumberland Shale Plains Woodland	Mown	0.36	1	1
-	-	Planted Native Vegetation	Planted	0.14	0	0
-	-	Exotic grass	Degraded	2.87	0	0
-	-	Exotic vegetation	Degraded	0.616	0	0
-	-	Built	Degraded	1.49	0	0
			TOTAL	**5.47**	**1**	**1**

4.2 Plant Community Types present

One plant community type *PCT 849 Cumberland Shale Plains Woodland* in moderate condition was identified within the development site (Table 7, Figure 10). This PCT corresponds with listed threatened ecological communities (TEC) under the BC and/or EPBC Acts (Table 10, Figure 12). A discussion of the TEC listing is provided in Section 4.3.

Justification for PCT selection is provided below.

Table 7: Plant Community Type in the development site

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area	Percent cleared
849	Cumberland Shale Plains Woodland	Coastal Valley Grassy Woodland	Grassy Woodlands	0.36	93%

4.2.1 PCT selection justification

Justification of the selection of the PCT recorded within the development site is based on quantitative analysis of full-floristic plot data and a summary is provided in Table 8. The soil landscape, elevation and vegetation mapping of the development site was used to determine the 'best-fit' PCT for native vegetation. *PCT 849 Cumberland Shale Plains Woodland* was determined the most appropriate PCT for the development site.

Previous vegetation mapping (OEH 2016) (Figure 9) indicated that the vegetation located in the northern boundary of the development site contains a patch of PCT 849 which is associated with Cumberland Plain Woodland. This patch of Shale Plains Woodland is contiguous with native vegetation on the adjoining land to the north and approximately 1 ha in size.

Soil landscapes were also used to determine the best-fit PCT. The development site is mapped on the Luddenham (erosional) soil landscapes which is associated with Wianamatta Shale group with low local relief of 50 – 120 m and gentle rolling hills (Chapman and Murphy 1989). The land associated with Luddenham has been cleared for grazing, remnant vegetation includes *E. moluccana* (Grey Box), lesser occurrence of ironbark species and *E. tereticornis*. The soil landscape and relief are consistent with vegetation PCT 849 identified within the development site.

The field survey confirmed the remnant vegetation within the northern boundary of the development site is consistent with PCT 849. The canopy contained *Eucalyptus tereticornis* (Forest Red Gum) and dominant ground cover species of *Microlaena stipoides* var. *stipoides* (Weeping Meadow Grass) and occasional *Dichondra repens* (Kidney Weed). No native shrubs were present in this vegetation patch. Quantitative analysis of the floristic plot data (plot 1) within this patch confirmed that the vegetation resembles PCT 849 (Appendix C). About 65% of the diagnostic species were a match with the vegetation present in the development site.

Several scattered *E. tereticornis* were also mapped within the development site. These trees represent part of the Cumberland Plain Woodland and were including in the mapping as part of vegetation zone PCT 849_mown. These trees (two in the south and two directly south of the large patch) were located within 50 m of each other and had a diameter at breast height greater than 5 cm and a percent foliage cover of 25% of the benchmark. Therefore, the trees did not meet the criteria for listing as scattered trees under Appendix B of the Streamlined assessment module. These trees were therefore mapped as part of vegetation zone 1 PCT 849_mown.

Table 8: PCT selection justification

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance
849	Cumberland Shale Plains Woodland	IBRA region, subregion, soil landscape, elevation and results of floristic plot analysis including the presence of positive diagnostic canopy species	Presence of *Eucalyptus tereticornis*, and native *Microlaena stipoides* and *Dichondra repens* in ground layer. This PCT is a strong match.

4.2.2 Vegetation zones

A description of the vegetation zones is provided in Table 9. The location of vegetation zone is shown in Figure 11. Photos of the vegetation identified within the development site are shown below.

Table 9: Vegetation zones in development site

Veg zone	PCT	Condition	Total area (ha)	Description
1	849 Cumberland Shale Plains Woodland	Mown	0.36	A patch of remnant native vegetation was mapped as vegetation zone 1 along the northern boundary of the development site. Several *Eucalyptus tereticornis* were noted in this vegetation zone (Figure 4). No mid storey was present. Patches of native ground cover species were also recorded such as *Microlaena stipoides* and *Dichondra repens*.
-	Planted Native Vegetation	-	0.14	Planted natives includes two *Callistemon viminalis* located adjacent to hardstand near vegetation zone 1. Planted natives also includes rows of immature *Corymbia* cultivates planted along the carpark for the recently built shopping carpark complex (Figure 5).
-	Exotic	-	0.61	Exotics consists of a row of mature *Populus deltoides* (Eastern Cottonwood) (Birds Tree Consultancy 2024) with tree hollows. A small patch of Oleanders and woody weeds *Olea europaea* subsp. *Cuspidata* was also present (Figure 6).
-	Exotic Grass	-	2.87	Exotic grass is dominated by *Cenchrus clandestinus* (Kikuyu Grass) and represented within the south-eastern portion of the development site. Exotic grass are regularly mown and lacks native species within the canopy, shrub or ground layer (Figure 7).
-	Built areas		1.49	This includes the existing carpark and roads.
		TOTAL	**5.47**	

Figure 4: Vegetation zone 1 PCT 849 Cumberland Shale Plains Woodland_mown – start of vegetation integrity plot 1

Figure 5: Planted native vegetation (Corymbia cultivars) in the carpark area to be redeveloped

Figure 6: Dense patches of woody weeds mapped as exotic vegetation

Figure 7: Cleared lands with exotic grasses mapped as exotic grass

Figure 8: Concrete drain mapped as 1st order stream within the development footprint

4.3 Threatened Ecological Communities Justification

The BioNet Vegetation Classification lists PCT 849 as a component of Cumberland Plain Woodland which is listed as critically endangered under the BC Act and as critically endangered as part of *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest under the EPBC Act* (Table 10).

The patch of PCT 849 mapped within the development site meets the criteria for listing under the BC Act for the following reasons:

- The development site is located within the Sydney Basin bioregion, within the Cumberland Plain.
- The development is located on clay soils derived from Wianamatta Group geology.
- The vegetation contains representative species such as *Eucalyptus tereticornis* which are diagnostic for this TEC.

The large patch of PCT 849 also meets the criteria for listing under the EPBC Act as it is approximately 1 ha in size and contains perennial understorey of >50 % native species. The patch of PCT 849 is mapped within the development site is contiguous with the adjoining land to the north. As such the EPBC Act assessment considers the vegetation within the development site and adjoining land to the north to determine the patch size. Therefore, the vegetation patch satisfies listing under the EPBC Act as Category A (Table 11).

It is noted, that the fragmented *Eucalyptus tereticornis* located in the central and southern portion of the development site (0.06 ha) did not meet the criteria for listing under the EPBC Act as these trees were located more than 100 m from the patch of vegetation, was dominated by exotic grasses in the understorey and was disconnected from the patch of vegetation in the north of the development site. The isolated trees do, however, satisfy the criteria for listing under the BC Act.

Table 10: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
849	CEEC	Cumberland Plain Woodland	0.36	CEEC*	Shale Plains Woodland and	0.30

* THE NORTHERN PORTION OF VEGETATION ZONE 1 SATISFIES LISTING UNDER THE EPBC ACT.

Table 11: Condition thresholds for patches that meet the definition of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest critically endangered ecological community

Category and rationale	Thresholds
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is functional and consistent with the minimum mapping unit size applied in NSW.	Minimum patch size is ≥0.5ha; AND ≥50% of the perennial understorey vegetation cover is made up of native species.
OR	
B. Larger patches which are inherently valuable due to their rarity	The patch size is ≥5 ha; AND ≥ 30% of the perennial understorey vegetation cover is made up of native species

Category and rationale	Thresholds
OR	
C. Patches with connectivity to other large native vegetation remnants in the landscape	The patch size is ≥0.5 ha; AND The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) that is ≥ 5 ha in area.
OR	
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain.	The patch size is ≥ 0.5 ha in size; AND ≥ 30% of the perennial understorey vegetation cover is made up of native species; AND The patch has at least one tree with hollows per hectare or at least one large tree (≥80 dbh) per hectare from the upper tree layer species.

4.4 Vegetation integrity assessment

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

Table 12: Vegetation integrity

Veg Zone	PCT ID	Condition	Area impacted (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	849	Mown	0.06	43.5	67.2	63.8	57.1

4.4.1 Use of local data

The use of local data is not proposed for this assessment.

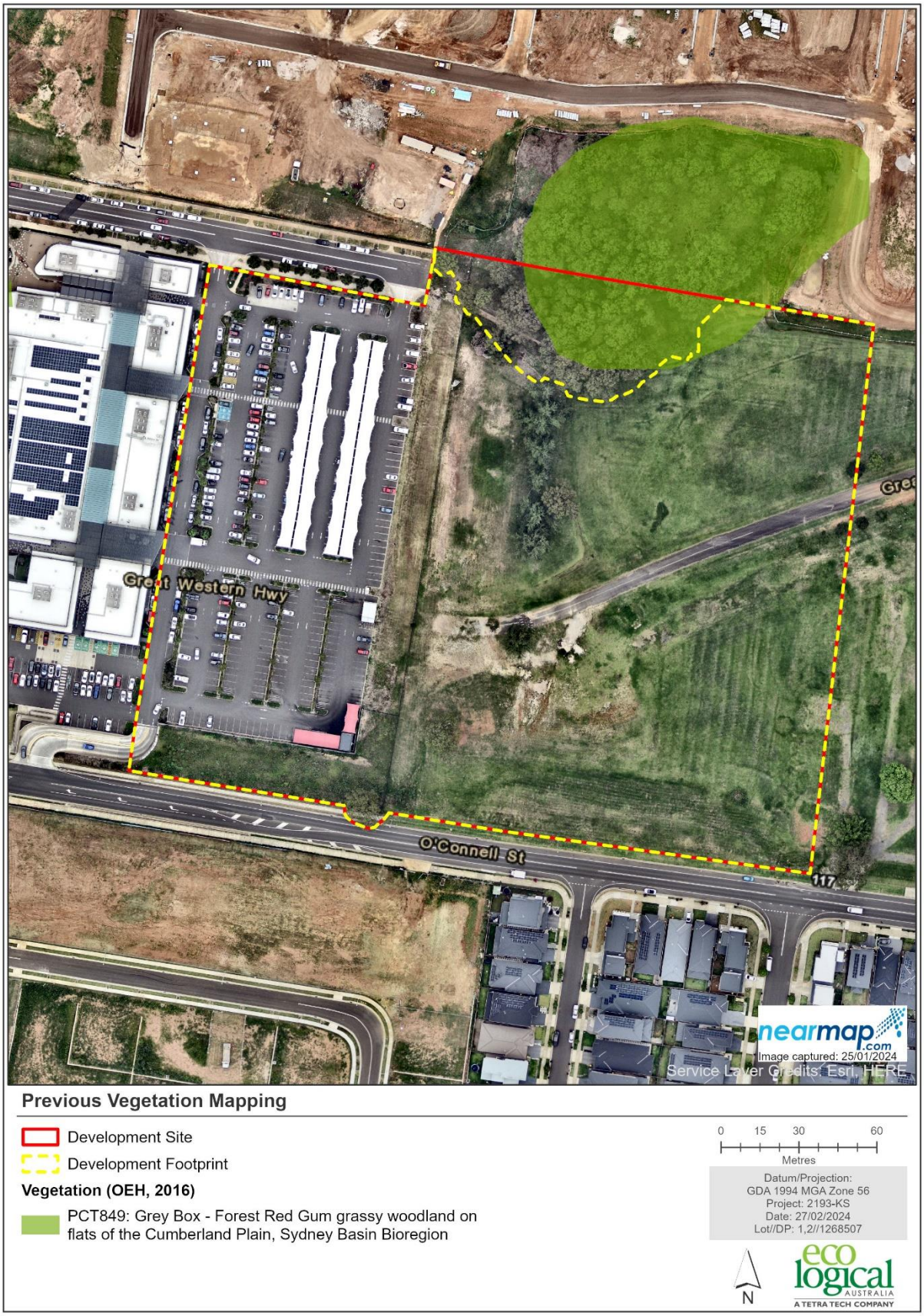

Figure 9: Previous vegetation mapping (OEH 2016)

Figure 10: Plant Community Types and habitat features

Figure 11: Plot locations and vegetation zones

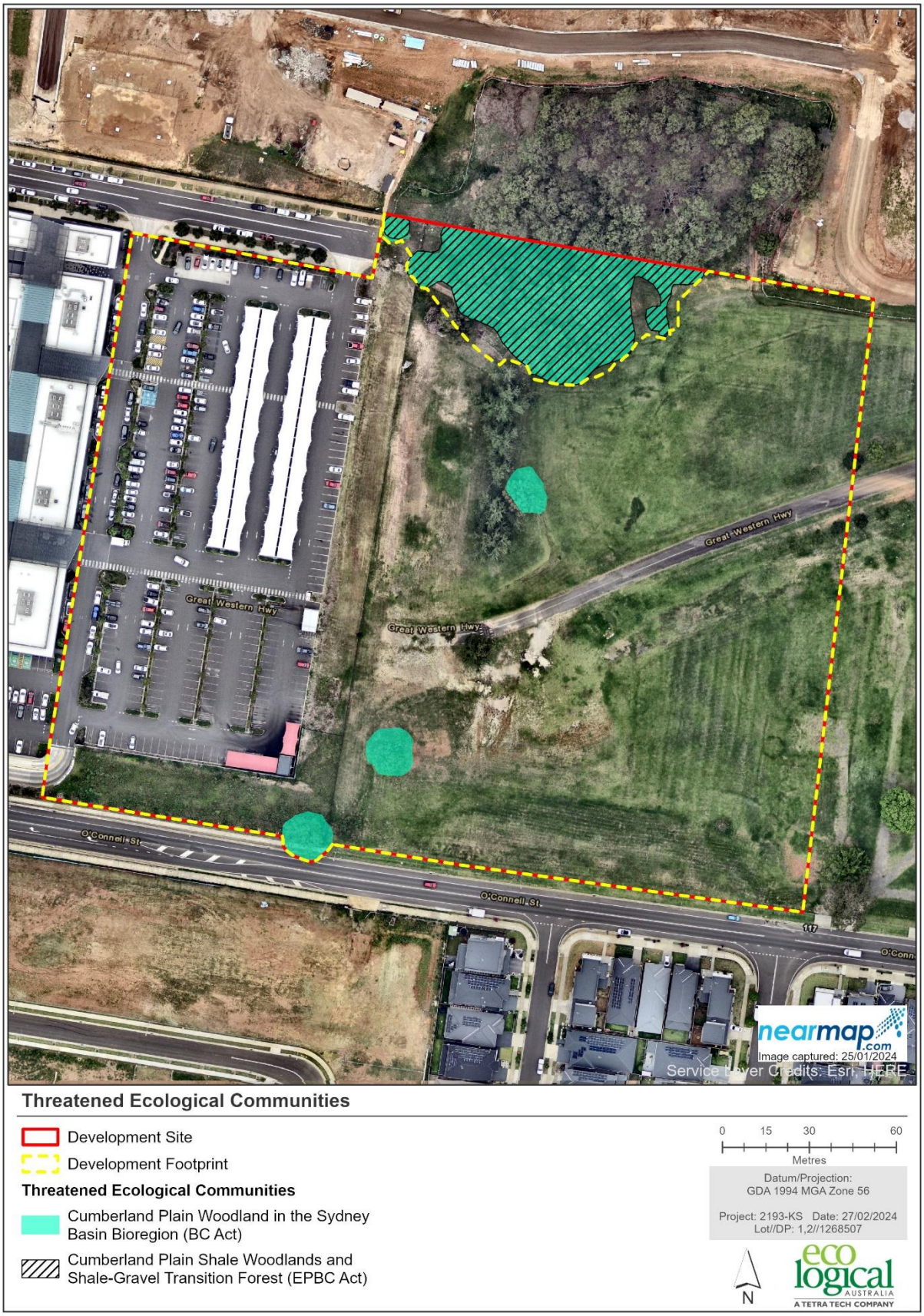

Figure 12: Threatened Ecological Communities

5. Threatened species

5.1 Ecosystem credit species

Ecosystem credit species predicted to occur within the subject land are generated by the BAMC following the input of vegetation integrity plot data and the PCTs identified within 4.2. 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 and relevant justification for their exclusion or inclusion from the assessment

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
Anthochaera phrygia	Regent Honeyeater (Foraging)	N/A	High	Critically Endangered	Critically Endangered	**Included** The development site contains low quality habitat for this species.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N/A	Moderate	Vulnerable	Not Listed	**Included** Habitat features for this species are present at in the development site.
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	N/A	Moderate	Vulnerable	Endangered	**Included** The development site contains low quality habitat for this species.
Chthonicola sagittata	Speckled Warbler	N/A	High	Vulnerable	Not Listed	**Included** This species may utilise the vegetation within the development site on occasion for foraging habitat.
Circus assimilis	Spotted Harrier	N/A	Moderate	Vulnerable	Not Listed	**Included** This species may utilise the vegetation within the development site on occasion for foraging habitat.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	N/A	High	Vulnerable	Not Listed	**Included** This species inhabits open forests and woodlands. Fallen timber is considered an important habitat

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
						requirement for this species, however, are absent from the development site. The site provides marginal habitat for this species. Furthermore, there are no BioNet records for this species within a 5 km radius of the development site.
Daphoenositta chrysoptera	Varied Sittella	N/A	Moderate	Vulnerable	Not Listed	**Included** This species may utilise the vegetation within the development site on occasion for foraging habitat.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	Vulnerable	Endangered	**Included** This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage. There is one record for this species within a 5 km radius of the development site. This species may traverse the development site to other habitats or utilise the development site on occasion.
Glossopsitta pusilla	Little Lorikeet	N/A	High	Vulnerable	Not Listed	**Included** There is one BioNet records for this species within a 5 km radius of the development site. This species may utilise the flowering species within the development site for seasonal foraging.
Grantiella picta	Painted Honeyeater	Other Mistletoes present at a density of greater than five mistletoe per ha	Moderate	Vulnerable	Vulnerable	Excluded This species inhabits woodlands and forests where it feeds on mistletoes. The development site does not comprise key plant species (mistletoe) required for foraging. There are no BioNet records for this species within a 5 km radius of the development site.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Waterbodies	High	Vulnerable	Not Listed	**Included**

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
	(Foraging)	Within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines				There is one BioNet records for this species within a 5 km radius of the development site. The development site it is located within 1 km of Werrington Creek.
Hieraaetus morphnoides	Little Eagle (Foraging)	N/A	Moderate	Vulnerable	Not Listed	**Included** There are two BioNet records for this species within a 5 km radius of the development site. The development site contains potential foraging habitat for this species.
Hirundapus caudactus	White-throated Needletail	N/A	High	Not Listed	Vulnerable	**Included** The development site contains low quality habitat for this species.
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	Endangered	Critically Endangered	**Included** On mainland Australia this species utilises *Eucalyptus tereticornis* which was recorded in PCT 849 vegetation zone 1. There are 108 BioNet records for this species within a 5 km radius of the development site.
Lophoictinia isura	Square-tailed Kite (Foraging)	N/A	Moderate	Vulnerable	Not Listed	**Included** There are two BioNet records for this species within a 5 km radius of the development site. The development site contains potential foraging habitat for this species.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	N/A	Moderate	Vulnerable	Not Listed	**Included** This species inhabits woodlands and cleared areas. The development site provides suitable habitat for this species. There are no BioNet records for this species within a 5 km radius of the development site.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	N/A	Moderate	Vulnerable	Not Listed	**Included** This species inhabits dry woodlands dominated by box species or ironbark eucalypts. Habitat features for this

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
						species are limited but present in the development site. There are no BioNet records for this species within a 5 km radius of the development site.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	N/A	High	Vulnerable	Not Listed	**Included** Seasonal foraging habitat was identified in this assessment. There are eight BioNet records for this species within a 5 km radius of the development site.
Miniopterus australis	Little Bent-winged-Bat (Foraging)	N/A	High	Vulnerable	Not Listed	**Included** Seasonal foraging habitat was identified in this assessment. There is one BioNet record for this species within a 5 km radius of the development site.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	N/A	High	Vulnerable	Not Listed	**Included** Seasonal foraging habitat was identified in this assessment. There are 66 BioNet records for this species within a 5 km radius of the development site.
Neophema pulchella	Turquoise Parrot	N/A	High	Vulnerable	Not Listed	**Included** This species is associated with woodlands and feeds on seeds and herbs in grasslands. Suitable foraging habitat is present in the development site. There are no BioNet records for this species within a 5 km radius of the development site.
Ninox connivens	Barking Owl (Foraging)	N/A	High	Vulnerable	Not Listed	**Included** The development site contains low quality habitat for this species.
Ninox strenua	Powerful Owl (Foraging)	N/A	High	Vulnerable	Not Listed	**Included** There are four BioNet records for this species within a 5 km radius of the development site. The development site contains potential foraging habitat for this species.

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
Petroica boodang	Scarlet Robin	N/A	Moderate	Vulnerable	Not Listed	**Included** This species has been included as a candidate species as during autumn and winter individuals may move to grasslands or grazed paddocks with scattered trees. There is one BioNet record for this species within a 5 km radius of the development site.
Petroica phoenicea	Flame Robin	N/A	Moderate	Vulnerable	Not Listed	**Included** This species utilises open understorey habitat for foraging. Breeding habitat occurs in ridgetops in tall moist forests. The development site contains potential foraging habitat for this species. There are no BioNet records for this species within a 5 km radius of the development site.
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	Vulnerable	Vulnerable	**Included** Limited foraging resources were present within the development area for this highly mobile species. This species may occasionally utilise the Eucalyptus species during flowering seasons to supplement foraging resources. There are 244 BioNet records for this species within a 5 km radius of the development site.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	N/A	High	Vulnerable	Not Listed	**Included** Seasonal foraging habitat was identified in this assessment. There is one BioNet record for this species within a 5 km radius of the development site.
Stagonopleura guttata	Diamond Firetail	N/A	Moderate	Vulnerable	Not Listed	**Included** This species feeds exclusively on the ground for grasses and herbs in woodland environments including derived grasslands. The development site contains suitable foraging habitat for this species.

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act listing status	Justification for exclusion or inclusion
						There are two BioNet records within 5 km radius of the development site.
Tyto novaehollandiae	Masked Owl (Foraging)	N/A	High	Vulnerable	Not Listed	**Included** There are no BioNet records for this species within a 5 km radius of the development site. The development site contains potential foraging habitat for this species.

6. Threatened species

6.1 Fauna surveys and habitat assessment

For Streamlined Assessment Module – Small Areas, a targeted survey is only required for species credit species which are Serious and Irreversible Impacts (SAII) entities.

The site visit on 3 June 2022 by Belinda Failes involved an assessment of potential habitat for threatened flora and fauna species.

Habitat assessments involved a search of important habitat features for threatened fauna species, such as hollow-bearing trees, rocky outcrops (if present) and deep leaf litter. Assessments also included a search of evidence of fauna foraging or roosting such as chewed cones, sap trees or roosting habitat in the form of white wash/pellets, plus inspection of structures to determine of suitable roosting/breeding habitat for threatened microbats. Binoculars were used to inspect tree hollows. No hollows inspected displayed any apparent visual evidence of microbat occupation.

A targeted survey for one threatened fauna species, *Meridolum corneovirens* (Cumberland Plain Land Snail) was conducted within the remnant vegetation in the north (Figure 10). This species is not a SAII entity, however, the survey was conducted to determine the presence of this species for the initial constraints analysis of the development. Surveys involved gently raking the leaf litter by hand away from the base of *Eucalyptus tereticornis*. No individuals were recorded and no habitat was identified as suitable due to the regular mowing practices and lack of habitat features including accumulated leaf litter and fallen logs (Figure 13). The locations of survey points are provided in Figure 10.

The survey also identified seven hollow bearing trees within the development site. Three hollowing-bearing trees within exotic vegetation (*Populus deltoides*) will be removed (Figure 14). Four hollow-bearing trees will be retained within the PCT 849 mown vegetation zone (Figure 10). Microbat use and/or markings were not observed around any of the tree hollow entrances, nor were any microbats observed when inspecting inside the accessible hollows.

A medium sized stick nest was recorded in PCT 849 in the northern boundary of the development site (Figure 15). Several *Corvus coronoides* (Australian Ravens) were observed in the tree near the nest during the field survey in June 2022. As the nest is not a large stick pile, the nest is located at the outer branches of the tree and the presence of more than one raven near the nest, it can determined with reasonable certainty that the stick nest does not belong to a large threatened species such as Little Eagle, Square-tailed Kite or Spotted Harrier. Additionally, the nest will not be removed from the site.

Macropus giganteus (Eastern Grey Kangaroos) were observed foraging within the development site and adjoining land to the north. The development site provides supplementary foraging habitat (native grasses). The adjacent land to the north provides suitable foraging and sheltering habitat for this species. The Eastern Grey Kangaroo is not listed as threatened species under the BC Act/EPBC Act and therefore this species is not included as an ecosystem or species credit species. However, the species is still protected under the BC Act and consideration of the impacts of the proposed development on the population is required. Consideration of the cumulative impacts due to the development within the land to the north has identified that the proposed works is likely to negatively impact upon this species.

Figure 13: Example of survey location for Cumberland Plain Land Snail. No snails were recorded.

Figure 14: Small hollow within exotic vegetation within the development footprint to be removed

Figure 15: Stick nest identified within vegetation to be retained in the development site

6.2 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 14. As the works are assessed in accordance with Streamline Assessment Module – Small Areas, only candidate species that are at risk of a Serious and Irreversible Impact (SAII) were included in the assessment

Table 14: Candidate species credit species

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
Anthochaera phrygia	Regent Honeyeater (Breeding)	Other As per mapped areas	High	Critically Endangered	Critically Endangered
Caladenia tessellata	Thick Lip Spider Orchid	N/A	Moderate	Endangered	Vulnerable
Chalinolobus dwyeri	Large-eared Pied Bat	Cliffs Within two km of rocky areas containing caves, overhangs, escarpment, outcrops, or crevices or within two km of old mines or tunnels	Very High	Vulnerable	Vulnerable
Lathamus discolor	Swift Parrot (Breeding)	Other As per mapped areas	Moderate	Endangered	Critically Endangered
Miniopterus australis	Little Bent-winged Bat (Breeding)	Caves 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	Vulnerable	Not Listed
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with	Very High	Vulnerable	Not Listed

Species	Common Name	Habitat constraints / Geographic limitations	Sensitivity to gain class	BC Act listing status	EPBC Act Listing status
		microhabitat code 'IC – in cave' Observation type code 'E nest-roost' With numbers of individuals > 500 Or from the scientific literature			

6.2.1 Assessment of habitat constraints and vagrant species

Species credit species excluded from further assessment and justification for their exclusion are presented in Table 15.

Table 15: Species credit species excluded from further assessment

Species	Common Name	Justification for exclusion of species
Anthochaera phrygia	Regent Honeyeater (Breeding)	The development footprint is not mapped on the BAM important areas map (accessed 19 February 2024)
Caladenia tessellata	Thick Lip Spider Orchid	The vegetation within the development footprint is degraded and subject to previous clearing of vegetation and on-going mowing practices which has degraded the overall condition of the development site. Additionally, there are no historic or recent BioNet records for *Caladenia tessellata* within a 5 km radius of the development site. According to the NSW final determination (NSW Scientific Committee 2021) for *Caladenia tessellata,* this species is now highly restricted to two distinct populations (Braidwood, approximately 250 km south of the site and Central Coast, approximately 100 km north-east of the site). This species was historically known to occur in Sydney region, but these recordings have not been seen since 1996 and habitat has been cleared for development (NSW Scientific Committee 2008). Additionally, the habitat for this species appears to favour sandy soils or grassy woodlands on clay loam may also provide habitat (DCCEEW 2023). The development footprint does not contain sandy soils. This species has been excluded based on the absence of records for this species and presumed local extinction in Sydney.
Chalinolobus dwyeri	Large-eared Pied Bat	The habitat on the development footprint or within 100 m of the development footprint did not contain cliffs, caves, overhangs, escarpments outcrops or crevices known or suspected to be used for breeding by the species.

Species	Common Name	Justification for exclusion of species
Miniopterus australis	Little Bent-winged Bat (Breeding)	The development footprint or land within 100 m of the development footprint did not contain caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding by the species.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	The development footprint or land within 100 m of the development footprint did not contain caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding by the species.

6.2.2 Candidate species requiring further assessment – assume presence

Species credit species where presence has been assumed due to habitat assessment as likely to be present is provided in Table 16.

Table 16: Species credit species where presence has been assumed

Target species	Common name	BAM survey period	Species credit required / species polygon justification methodology for species polygon
Lathamus discolor	Swift Parrot	N/A	A small portion of the development site is located on the Important Habitat maps (accessed 19 February 2024). Therefore, in accordance with the TDBC this species is assumed present within the development site and a species polygon is required. This species is a dual credit species and only areas critical to the life stage of the Swift Parrot are included as species credits.

6.2.3 Species credit species included in this assessment

One species credit species (Swift Parrot) was included in this assessment area provided below. The Important Habitat map includes areas identified in field surveys as planted native vegetation (0.004 ha), exotic vegetation (0.123 ha), exotic grass (0.168 ha) and built areas (0.01 ha). The mapping from BOAMs is provided in the Species Polygon for Swift Parrot in Figure 16. Entry into the BOAMs only included impacts to PCT 849 (0.002 ha).

Table 17: Species credit species included in this assessment

Species	Common name	Species presence	Geographic limitations	Species polygon descriptions	Number of individuals / habitat (ha)	Biodiversity risk weighting
Lathamus discolor	Swift Parrot	Yes (assumed presence)	Mapped areas of Important Habitat as per BOAMs	Areas within the Important Habitat are included in the species polygon. Where suitable habitat located outside of the Important Habitat was identified within the development site this has been assessed as	0.002	3.00

Species	Common name	Species presence	Geographic limitations	Species polygon descriptions	Number of individuals / habitat (ha)	Biodiversity risk weighting
				ecosystem credits. Species polygon is provided in Figure 16.		

6.2.4 Expert reports

Expert reports have not been prepared as part of this BDAR.

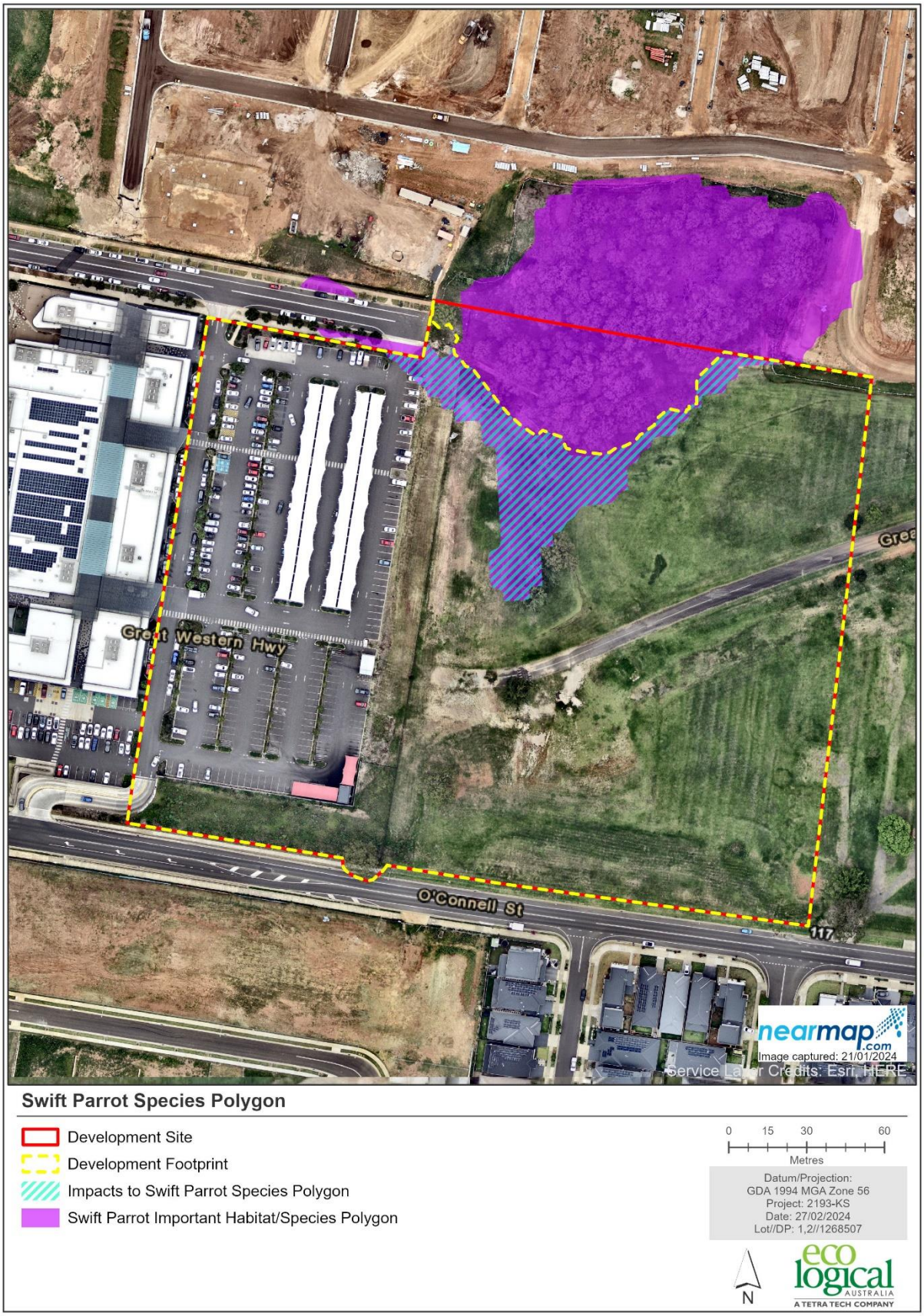

Figure 16: Species polygon (Swift Parrot)

7. Identification of prescribed additional biodiversity impact entities

7.1 Karst, caves, cliffs, rocks and other geological features of significance

The development site does not contain these features.

7.2 Human-made structures and non-native vegetation

The development site contains human-made structures. The development footprint contains 2.83 ha of open exotic grasses and 1.60 ha of hard stand which does not contain walls or a roof. These structures do not support habitat for threatened species.

7.3 Habitat connectivity

As identified in Table 4, the development site is largely cleared or built, and connectivity is limited. Some connectivity for highly mobile species may be present between remnant vegetation and areas of planted native vegetation within the development site.

The proposed development would retain some habitat connectivity by retaining the patch of remnant vegetation along the northern boundary. An assessment of prescribed impacts to habitat connectivity is presented in Table 18.

Table 18: Assessment of prescribed impacts to habitat connectivity

Criteria in accordance with BAM 2020 Section 6.1.3	Response
2. Where corridors or other areas of connectivity link habitat for threatened entities, the assessor must:	
a. prepare a list of threatened entities that are likely to use or are a part of the connectivity or corridor	Highly mobile, threatened birds and bats that are likely to utilise the vegetation within the development site (mostly for supplementary foraging) and were included in this assessment. Mega bats: • *Pteropus poliocephalus* (Grey-headed Flying Fox) Microchiropteran bats: • *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) • *Miniopterus australis* (Little Bent-winged Bat) • *Miniopterus orianae oceansis* (Large Bent-winged Bat) • *Scoteanax rueppellii* (Greater Broad-nosed Bat). Birds, including: • *Glossopsitta pusilla* (Little Lorikeet) • *Ninox strenua* (Powerful Owl). Migratory species (birds): • *Anthochaera phrygia* (Regent Honeyeater) • *Lathamus discolor* (Swift Parrot).
b. describe the importance of the connectivity to threatened entities, particularly for maintaining movement that is crucial to the species' life cycle	The development site is located within a fragmented landscape. It contains limited native vegetation, except a patch of remnant vegetation in the north of the development site. This patch is contiguous with native vegetation patch in the adjoining lands to the north. The patch is approximately 0.9 ha in size and is

Criteria in accordance with BAM 2020 Section 6.1.3	Response
	disconnected from other patches of native vegetation due to major arterial roads, development and extensive exotic grasslands. There is a narrow connective vegetation outside of the development site along the tributaries of Werrington Creek in the west which may facilitate movement of some highly mobile species which may move between tracts of native vegetation. The vegetation within the development site may act as part of the stepping-stone habitat which may assist in facilitating the movement of threatened species. This is limited to highly mobile species which can move through urban areas. Therefore, the vegetation within the development site is part of a serious of stepping-stone habitat, but on its own, it does not maintain movement that is crucial to a threatened species life cycle.

7.4 Water bodies, water quality and hydrological processes

The development site contains a mapped 1st order Strahler stream. The field survey identified that this watercourse is currently partially concrete along the north portion of the development site (Figure 8). The headwaters in the south, consist of a grassy swale of exotic and mown grasses. The watercourse follows the contours of the landscape; however, it does not contain semi-aquatic vegetation, or standing water or a defined 'bed and bank'. This watercourse does not provide habitat to threatened fauna species.

The development site does not contain mapped Groundwater Dependent Ecosystems based on a desktop review of the BOM groundwater dependent ecosystems map (BOM 2022).

An assessment of prescribed impacts to water bodies, water quality and hydrological processes is presented in Table 19.

Table 19: Assessment of prescribed impacts to water bodies, water quality and hydrological processes

Criteria in accordance with BAM 2020 Section 6.1.4	Response
1. Where water bodies or any hydrological processes that sustain threatened entities occur on the subject land, the assessor must:	
a. prepare a list of threatened entities that may use or depend on water bodies or hydrological processes for all or part of their life cycle, or	There were no threatened entities identified which would utilise the modified 1st order Strahler stream mapped within the development site.
b. prepare a list of threatened entities that will be, or are likely to be impacted by changes to existing water bodies or hydrological processes or the construction of a new water body	As previously stated, the northern portion of the watercourse consists of an open concrete lined channel. The headwaters consist of a regularly mown grassy swale which lacks a defined bed and bank. No permanent standing water or semi-aquatic vegetation was identified within the watercourse. The watercourse may receive surface water overflow during peak rainfall events and the water may naturally follow the contours which leads to the concrete channel. The proposed development of the site will alter the current topography through cut and fill and will create new gabion

Criteria in accordance with BAM 2020 Section 6.1.4	Response
	walls as part of changes to hydrological flows within the development site. These changes are not likely to impact upon threatened entities as no threatened entities were identified which depend upon the hydrological flow or waterbodies in the development site. Although PCT 849 located in the north of the development site is not a threatened entity which is dependent upon hydrological flows, it is noted that changes to the development site is likely to result in indirect changes to the flow regime and water quality. Stormwater basins and revegetation has been included in the landscape design to minimise changes to current hydrological flow into the northern patch of PCT 849.
c. describe the habitat provided for each threatened entity by the water body or hydrological process, including consideration of water quality, volume, flow paths and seasonal patterns	Hydrological assessments have not been undertaken as part of this assessment. As stated above, no threatened entities were identified which are likely to utilise the watercourse mapped within the development site.

7.5 Wind farm developments

The proposed development is not a wind farm development.

7.6 Vehicle strikes

The proposed development will result in an increase in vehicle movement within the development site. There could be an increased risk of vehicle strike on threatened species and other native fauna. Increase in risk of vehicle strike is most likely to impact upon nocturnal species. Mitigation measures to reduce impacts to native fauna species have been included in Table 30..

8. Avoiding and Minimising Impacts on biodiversity values

The BAM requires locating and designing a project to avoid and minimise direct and indirect impacts on biodiversity values and prescribed biodiversity impacts. The project was redesigned in February 2024 which resulted in the removal of one of the proposed buildings (Building A) and a reduction in the asset protection zone to be contained entirely within the development footprint (ELA 2024). Additionally, the initial development footprint included an elevated boardwalk through the threatened ecological community in the north. The revised landscape plans have removed the elevated boardwalk and as such further reduced the impact to PCT 849 from 0.09 ha to 0.06 ha. This has resulted in the retaining of the entire EPBC patch of PCT 849 in the north of the development site. This has also reduced the impacts to Swift Parrot important habitat in PCT 849 from 0.05 ha to 0.002 ha. The redesign of the proposed development footprint has demonstrated the avoid and minimise impacts to biodiversity values.

8.1 Locating a project to avoid and minimise impacts on vegetation and habitat

The project will result in the removal of a small amount of native vegetation and planted native vegetation from within the development site. However, the proposed development has avoided and minimised direct and prescribed impacts on biodiversity by retaining the majority of the large patch of remnant vegetation in the north and utilising previously cleared areas. This development has also been designed in a way to avoid and minimise impacts. These matters have been addressed in Table 20.

Table 20: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed and justification
Locating the project in areas lacking biodiversity values	The proposed development footprint is approximately 5.11 ha and of which, 5.05 ha is located within previously cleared lands (1.49 ha of built, 0.59 ha of exotic, 2.84 ha of exotic grass and 0.13 ha of planted natives) which lacks biodiversity values. The development is located on 99% land which contains limited or no biodiversity values. Areas of low biodiversity values demonstrate measures to avoid and minimise impacts. A small portion of the development site contains land mapped on the Biodiversity Values map (accessed 28 November 2022). This patch of vegetation was validated during field survey and includes a patch of PCT 849 in a disturbed condition and exotic canopy species (*Populus deltoides*). PCT 849 is listed as a TEC under the BC Act and EPBC Act and therefore represent biodiversity values. Of the 0.36 ha of PCT 849 mapped within the development site, only 0.06 ha will be impacted. The areas of PCT 849 of high conservation value including areas which satisfy listing under the EPBC Act will be entirely retained within the VMP area. Additionally, the proposed project has avoided impacts to four hollow-bearing trees located with PCT 849. Three hollow-bearing trees located in exotic trees will be removed. The project has located the development within areas of previously and current disturbed native vegetation and exotic vegetation. The loss of hollows has been compensated with the installation of nest boxes in the vegetation management area at a ratio of 1:1. The impacts to PCT 849 have been minimised through retaining the majority of the patch of PCT 849 with the development site and impacting upon scattered trees of PCT 849 which are isolated, in poorer condition and lacking hollows. A VMP will be prepared for the long-term conservation of the patch of PCT 849 retained within the development site.

Approach	How addressed and justification
	Although the project has utilised predominately exotic vegetation with low biodiversity values, it will impact upon a small amount of native vegetation listed as a TEC under the BC Act and therefore, contains high biodiversity values. It is noted that these impacts represent scattered trees which do not form part of the EPBC listed patch in the north. Effort to avoid or minimise impacts have been demonstrated through the retention of areas of high biodiversity values and use of land with low or negligible biodiversity values.
Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project is located in areas where native vegetation is in poor condition with a low vegetation integrity score. The project will remove poorer quality PCT 849 including three scattered *Eucalyptus tereticornis* which are in low condition and lack native species diversity and do not represent EPBC Act listed vegetation. Although the majority of the vegetation within the development footprint contains exotic grasses, the project design will impact upon 0.06 ha of PCT 849 which listed as a TEC under the BC Act. The redesign has ensured that the project does not impact upon PCT 849 which is listed under the EPBC Act.
Locating the project 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)	The project is predominantly located in exotic grass to avoid impacts to vegetation in high threat categories. The project will impact upon PCT 849 which has a biodiversity risk weighting of 2.5 according to the BAMC. PCT 849 is listed as a part of Cumberland Plains Woodland TEC and is a SAII entity. Impacts to PCT 849 have been avoided by retaining 0.29 ha of PCT 849 which will be conserved with the development site.
Locating the project in areas outside of the buffer area around breeding habitat features such as nest trees or caves	The proposal does not contain evidence of nest tree/ caves/breeding habitat for species credit species within the development site. One small stick nest was located within the development site was identified as an Australian Raven nest will be retained and impacts are more than 30 m from the nest.

8.1.1 Designing a project to avoid and minimise on biodiversity values

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

Table 21: Designing a project to avoid and minimise direct and indirect impacts on vegetation and habitat

Approach	How addressed and justification
Reducing the clearing footprint of the project by minimising the number and type of facilities	The project has been designed to minimise impacts to 0.29 ha of PCT 849 in the northern portion of the proposed development site. A total of 0.06 ha of PCT 849 will be impacted under the proposed works. Effort has been made in the design process to retain the patch of PCT 849 where possible. Scattered trees which form part of this vegetation community will be impacted by the development and some incursion of the native vegetation patch will be indirectly impacted. These later impacts will be restored through revegetation works in accordance with the Vegetation Management Plan prepared by ELA.
Locating ancillary facilities in areas that have no biodiversity values	Ancillary facilities will be located where there are no biodiversity values such as exotic grasslands. Ancillary facilities for the purposes of construction (e.g. compound, machinery storage) will be located within the development footprint in previously cleared

Approach	How addressed and justification
	areas. No additional native vegetation will be removed as a result of the ancillary facilities.
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)	Ancillary facilities will not be located in native vegetation areas outside the development footprint. Ancillary features for the purposes of the project will be located within the operational footprint, avoiding additional impacts to areas of native vegetation, or threatened species habitat.
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 (SAII)	Not applicable. Ancillary facilities will not be located in native vegetation areas outside of the development footprint.
Actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.	The proposal will retain 0.29 ha of PCT 849 for conserved including habitat for threatened species and TEC and mapped on the Biodiversity Values Map. The proposed area for conservation will be managed in accordance with a Vegetation Management Plan and include revegetation works characteristic of PCT 849.

8.1.2 Locating a project to avoid and minimise prescribed biodiversity impacts

Habitat connectivity and waterbodies were identified as prescribed impacts in Section 7. The development has been located to avoid and minimise prescribed biodiversity impacts in Table 22.

Table 22: Locating a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed and justification
Locating the surface works to avoid direct impacts on the habitat features	Surface works will impact upon one mapped 1st order stream located within the development footprint. The project has not avoided impacts to this prescribed impact. The works may result in changes to the current hydrological flow and water quality into the TEC in the north. The project design has included a gabion wall and native grassy swale which will reduce impacts of surface works into the TEC to be retained by reducing hydrological flows and improve water quality. The surface works will not further impact upon connectivity or other prescribed impacts.
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	The project will result in changes to the current topography using cut and fill to create flat terrain prior to development (Figure 3). Changes to hydrological flows into the TEC are likely to occur due to changes in topography within the development footprint. Changes to hydrological flow will be mitigated through the design of stormwater basins and revegetation works. The Vegetation Management Plan will assist in the long-term conservation of the TEC in the north through revegetation, weed removal and on-going monitoring works.

Approach	How addressed and justification
Locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The vegetation within the development site is part of a larger patch of PCT 849 which is located in the adjacent property to the north. This patch of native vegetation is isolated from other native vegetation. The exotic grasses and major arterial roads interfere with corridors for majority of threatened species except highly mobile species (i.e. birds and bats). The project will result In changes to the landscape from exotic grassland to residential and commercial development. The project may result in some fauna species avoiding the native vegetation due to changes in the land use. This may will result in an increase distance between stepping-stone habitat for highly mobile species. However, the vegetation within the development site is not part of an important flight path to important habitat or preferred local movement pathway or a connectivity between habitats within the landscape. The project may result in greater distance between stepping-stone habitat; however, it will not result in further isolation of habitat for these species. Landscaping plans have included street tree plantings along the internal roads to assist in retaining connectivity for arboreal species.
Locating the project to avoid direct impacts on water bodies	The project will directly impact upon the headwaters to one mapped 1st order stream located within the development footprint.

8.2 Designing a project to avoid and minimise impacts to prescribed biodiversity impacts

The development has been designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 23.

Table 23: 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	The proposed development footprint has undergone iterations in an attempt to avoid impacts to threatened entities. An ecological constraints assessment was conducted during early consultation between the applicant to identify ways to minimise impacts to the TEC present within the development site. The DA submission in 2023 was assessed by council and a subsequent redesign was prepared for this current resubmission. The resubmission work has reduced impacts to threatened entities. The project will result in removal of 0.002 ha of PCT 849 mapped as Swift Parrot habitat and 0.06 ha of TECs (BC Act listed only). The design of the project avoided impacts to 0.29 ha of PCT 849 and has retained the entire patch of EPBC listed PCT 849. The redesign has reduced the direct impacts on a TEC and threatened species habitat by retaining vegetation within the development site.
Maintain environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation	The project will impact upon one mapped 1st Strahler order stream located within the development footprint. The project will also result in cut and fill across the development footprint which may alter the natural surface water flow across the development site and downstream. The creation of hard surfaces will further alter the natural hydrological flows through the development site. This may result in changes to the habitat features (i.e. water bodies) which flow into the adjacent 2nd order stream to the west of the development site. Impacts to the hydrological flow have been managed through landscaping to re-

Approach	How addressed and justification
	instate the natural flow through stormwater structures and revegetation within the development footprint.
Maintain hydrological processes that sustain threatened entities	No hydrological process that sustain threatened entities were recorded within the development site. However, the design will result in impacts to one mapped 1st order stream located within the development footprint. This stream currently consists of a grassy swale and concrete open drain. The surface water flow currently drains into the concrete drain and at times flow into PCT 849 in the north. PCT 849 is not listed as a threatened entity which relies upon hydrological flow. The proposed design will reduce flooding into PCT 849 which may act as a positive outcome for the TEC and better health to the TEC. The VMP will ensure that the health of the TEC (PCT 849) is monitored and retained in good health.
Controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities	Changes to hydrological flow will occur as part of the design. There are no threatened entities which rely upon hydrological flow identified within the development site.

8.3 Assessment of Impacts

8.3.1 Direct impacts

The direct impacts of the development on:

- native vegetation is outlined in Table 24
- threatened ecological communities are outlined in Table 25
- threatened species and threatened species habitat is displayed in Table 26
- prescribed biodiversity impacts are outlined in Section 8.4.2.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 3.

Table 24: Direct impacts to native vegetation

Veg zone	PCT ID	PCT Name	Condition	Direct impact (ha)
1	849	Cumberland Shale Plains Woodland	Mown	0.06

Table 25: Direct impacts on threatened ecological communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Direct impact (ha)	Listing status	Name	Direct impact (ha)
849	CEEC	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.06	CEEC	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	0

Table 26: Direct impacts on threatened species and threatened species habitat

Species	Common name	Direct impact / number of individuals / habitat (ha)	BC Act listing status	EPBC Act listing status
Lathamus discolor	Swift Parrot	0.002* ha	Endangered	Critically endangered

* NOTE – THE MINIMUM NUMBER OF HECTARES ENTERED INTO THE CREDIT CALCULATOR IS 0.01 HA.

8.4 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 27.

Table 27: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	849	Direct	0.06	57.1	0	-57.1

8.4.1 Indirect impacts

The indirect impacts of the development are outlined in Table 28.

Table 28: Indirect impacts

Indirect impact	Description (nature, extent and frequency)	Biodiversity value affected	Duration/Timing	Consequence
Inadvertent impacts on adjacent vegetation or habitat	Damage to vegetation outside the approved construction/development footprint during construction and operational phases.	Native vegetation, threatened ecological community	Short term impacts Construction and operational phase	Loss of vegetation, loss of potential foraging habitat for threatened species
Reduced viability of adjacent habitat due to edge effects	Removal of vegetation on the edge of the development footprint may cause edge effects. Reduced viability of specialist and/or threatened species. Most likely to occur during the construction phase.	Native vegetation, threatened ecological community and native fauna	Short term impacts Construction phase.	Increase in edge effects, weed species colonising areas of disturbed habitat on edge of the development site, causing reduction in habitat for some flora and fauna species
Reduced viability of adjacent habitat due to noise, dust or light spill	Noise and dust created from machinery during daytime construction. Night work is not expected as part of the construction works therefore, no light spill associated with night works. However, it is expected that outdoor night lighting will be used as part of the operational phase.	Native fauna, native vegetation	Short term impacts (construction phase) Ongoing impacts (life of project)	Noise and dust deter native fauna from the development site in the short term. Dust may inhibit plant growth in the short term. Night lighting may influence fauna behaviour in the long-term, e.g. attraction of invertebrates to lighting, therefore species such as microbats may be increasingly attracted to the area. Night lighting may also disrupt fauna movement and activity, including foraging.
Transport of weeds and pathogens from the site to adjacent vegetation	Weeds and pathogens introduced into development site and adjacent retained vegetation, resulting from transport of topsoil or machinery.	Native vegetation, threatened ecological community	Construction phase. May cause long-term impacts.	Potential for weed spread into adjacent habitat and affect quality of vegetation for native flora and fauna. Potential for pathogens to be introduced into the subject land through use of machinery.

Indirect impact	Description (nature, extent and frequency)	Biodiversity value affected	Duration/Timing	Consequence
Increased risk of starvation or exposure and loss of shade or shelter	Permanent loss of shade/shelter due to loss of canopy. Permanent loss of suitable foraging habitat for Grey-headed Flying-fox	Native fauna	Short and long term impacts, during life of project	Permanent loss of shade or shelter for some fauna species such as reptiles, however, contiguous adjacent habitat will continue to provide shelter, so risk of starvation and exposure is low and short term.
Trampling of threatened flora species	Threatened flora species are unlikely to occur in the development site due to the high exotic groundcover and low condition of native vegetation.	N/A	N/A	N/A
Inhibition of nitrogen fixation and increased soil salinity	The project is unlikely to inhibit nitrogen fixation or increase soil salinity outside the development footprint.	N/A	N/A	N/A
Fertiliser drift	Fertilisers may be used post-construction for landscaping purposes, however as this would be applied to specific areas and not applied aerially, this potential impact is unlikely to occur.	Native vegetation, threatened ecological community	Ongoing impacts Post-construction	Decreased plant diversity and increased exotic cover, as invasive species take advantage of additional nutrients.
Rubbish dumping	Within and adjacent to the development site during construction and operational phases.	Native vegetation, threatened ecological community	Short-term and long-term impacts	Rubbish dumping may impact on quality and health of fauna or flora species and habitat retained adjacent to the development footprint. Dumped rubbish may have downwind effects where it is loose and makes its way into sensitive ecosystems or suffocates fauna.
Wood collection	Removal of wood from development site	Native vegetation, threatened ecological community	Short-term and long-term impacts	Permanent removal of microhabitats could impact native fauna populations in land

Indirect impact	Description (nature, extent and frequency)	Biodiversity value affected	Duration/Timing	Consequence
			Life of project, including construction phase	surrounding the development site.
Removal and disturbance of rocks including bush rock	Potential for disturbance during construction phase and for residents to collect bush rock during operational phase of future residential development.	Native fauna and native vegetation habitat	Construction phase Operational phase	Potential reduction in fauna habitat and decline in rock habitat available.
Increase in predators	Increased predation on native fauna, reduction in vegetation where predators graze on habitat. Resulting from urban development and opportunistic increase in predators.	Native fauna	Long term impacts	Decreased native fauna diversity and population sizes.
Increase in pest animal populations	Resulting from urban development and opportunistic increase in pest/invasive species that thrive in urban spaces. Increased native fauna competition in surrounding habitat. Likely limited effects considering limited existing habitat in surrounds and extensive urban development north of the development site. Increased grazing or degradation of retained native vegetation by rabbits. Trampling of vegetation.	Native vegetation, native fauna	Long term impacts	Decreased native fauna diversity and population sizes. Loss of habitat due to grazing, degradation or trampling.
Changed fire regimes	During construction, working machinery and/or chemicals have the potential to spark fire. Potential fire hazard associated with industrial activities post-construction.	Native vegetation, native fauna	Life of project including construction. Short-term and long-term impacts.	Disturbance to vegetation, loss or damage to old growth trees retained within the development site. Loss of habitat for fauna species. Death of fauna species.
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds	Disturbance/removal of foraging habitat for Eucalypt-dependent and highly mobile species (such as Grey-headed Flying-fox).	Native fauna	Short-term and long-term impacts. Life of project.	Reduced numbers of species in vicinity. Deter or alter breeding and foraging regimes for fauna in proximity to development.

Indirect impact	Description (nature, extent and frequency)	Biodiversity value affected	Duration/Timing	Consequence
	Ongoing light and/or noise impacts to native fauna associated with the operational phase.			
Sedimentation and contaminated and/or nutrient rich run-off	Runoff containing high nutrients and/or contamination into adjacent vegetation during construction and operational phases.	Native vegetation, threatened ecological community	Short-term and long-term impacts. Life of project. Construction phase higher risk (due to machinery/refuelling)	Change in vegetation quality. Habitat loss downwind or downslope of development site.
Vehicle strike	Potential for native fauna to be struck by working machinery and moving vehicles during construction and operational phases	Native fauna	Short-term (construction) Long-term (operational)	Loss of native fauna species. Potential reduction in fauna population numbers.

8.4.2 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 29.

Table 29: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification
Karst, caves, crevices, cliffs, rocks and other geological features of significance	There are no karsts, caves, crevices, cliffs, rocks or other geological features in the development site	N/A	N/A
Human made structures or non-native vegetation	There are no human made structures in the development site. There are some patches of non-native vegetation in the development site including *Populus deltoides* and weeds *Olea europaea* subsp. *cuspidata*. There is no scientific literature which indicates that the Grey-headed Flying-fox utilises these exotic species as foraging habitat. As a precaution, the exotic vegetation is considered very marginal supplementary foraging habitat and would most likely be used in the absence or in conjunction with native foraging resources.	Loss of supplementary / marginal foraging habitat for some highly mobile species	Impacts to marginal, exotic foraging habitat have been justified as it has allowed the retention of native vegetation which also forms Cumberland Plain Woodland.
Habitat connectivity	The vegetation patch in the north will be retained and will maintain the current habitat connectivity. Some loss of native and exotic vegetation within the remainder of the development site and changes in landscape use by result in avoidance of habitat by some native species.	The potential disruptions to habitat connectivity are limited, given that the vegetation to be removed is bordered by cleared land and rural housing.	Connectivity of native vegetation along the northern portion of the development site was prioritised to retain connectivity with the broader landscape.
Water bodies, water quality and hydrological processes	The development site contains one 1st order stream which does not function as a water body as the stream is partly concrete and does not contain a defined bed and bank, pooling of water or semi-aquatic vegetation.	The mapped watercourse does not meet the definition of a watercourse under the WM Act. Hydrological flows will be maintained through the use of gabion walls and revegetation of native sedges consistent with PCT 849.	The vegetation corridor would be managed under a VMP (ELA 2024a).

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification
	There are no water bodies in the development site.		
Wind turbine strikes on protected animals	N/A	N/A	N/A
Vehicle strikes	The patch of native vegetation to be retained in the development site is bordered by perimeter roads.	There is a very low potential for vehicle strike.	The patch of vegetation to be retained, historically, has been poorly connected to other areas of habitat small in extent. It is unlikely that this vegetation provided habitat for a range of fauna likely to be susceptible to vehicle strike. A Fauna Management Plan (FMP) has been prepared for the DA (ELA 2024c).

8.4.3 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 30.

Table 30: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Moderate	Minor	Appropriate controls are to be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into retained lands. Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work.	Erosion and sedimentation will be controlled	For the duration of construction works	Project Manager
Prevent impacts of noise, dust and light spill on fauna species	Moderate	Minor	Construction lights or development lights should be positioned to prevent shine into retained vegetation. Street lights should use ecologically sensitive designs including use of shields and timers and positioned away from retained vegetation. Noise should be limited to construction hours only. Dust should be managed through appropriate dust control management plan.	Avoid impacts from artificial lighting on nocturnal or diurnal species. Reduction of noise outside of operation hours. Management of dust.	For the duration of the construction works and long-term	Project Manager
Prevent damage to vegetation retained on site	High	Moderate	Clearly delineate clearance limits and identify all trees for removal. Install 'No-go' fencing around vegetation to be retained prior to any works on site.	Prevent accidental removal of native vegetation Prevent damage to retained revegetation	For the duration of construction works	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
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	Minor	Removal of vegetation and other works on site must be consistent with the Fauna Management Plan (2024c). These may include, but not limited to, the following: Pre-clearance survey of trees to be removed and identification / location of habitat trees (i.e. for birds or possums) by a suitably qualified ecologist. Trees identified for retention should be clearly delineated as a 'No Go' zone with high visibility bunting. Supervision by a qualified ecologist/licensed wildlife handler during habitat tree removal in accordance with best practise methods. Any tree removal is to be undertaken by a suitably qualified and insured arborist.	Any fauna utilising habitat within the development site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	During clearing works	Project Manager / Ecologist
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	Vehicles, machinery should be cleaned of soil prior to entry into the development site as external soil may contain pathogens or disease. Weed management to be undertaken as part of the VMP.	Spread of weeds prevented	Post-construction	Project Manager
Prevent the displacement of resident fauna	Moderate	Minor	Pre-clearance survey of trees to be removed and identification/location of habitat trees by a suitably qualified ecologist. Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practice methods. Kangaroo exclusion fencing is to be installed prior to works on site.	Resident fauna relocated in a sensitive manner	Prior to and during clearing works	Project Manager/ Ecologist
Timing works to avoid critical life cycle events such as breeding or nursing individuals	Moderate	Minor	Where possible within construction timelines, avoid clearing works in later winter/spring during breeding/ nesting season for animals.	Impacts to fauna during nesting/nursing season avoided	During clearing works	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	Minor	Negligible	Landscaping in the development site is to use locally derived native species and those found within the PCT present (PCT 849). Vegetation will be retained and managed as part of the VMP.	Areas within the development site will be landscaped using appropriate species	Throughout construction and following completion of construction activities.	Project Manager
Prevent the dumping of rubbish found on site	Minor	Negligible	Waste bins to be present on site. Covers to be used to prevent blown litter and the entry of pest animals or rain. Removal and appropriate disposal of general.	Dumping of rubbish during construction prevented	For the duration of the construction works	Project Manager
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	Construction staff to be briefed prior to work commencing to be made aware of any sensitive biodiversity values present and environmental procedures such as: • Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and weeds) • What to do in case of environmental emergency (chemical spills, fire, injured fauna) • Key contacts in case of environmental emergency.	All staff entering the development site are fully aware of all the ecological values present within the Lot and environmental aspects relating to the development and know what to do in case of any environmental emergencies.	To occur for all staff entering/working at the development site. Site briefings should be updated based on phase of the work and when environmental issues become apparent.	Project Manager

8.5 Impact summary

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

8.5.1 Serious and Irreversible Impacts (SAII)

The development has two candidate Serious and Irreversible Impact (SAII) values as outlined in Table 31, and shown on Figure 17. Detailed consideration of whether impacts on candidate TECs are serious and irreversible is included in Table 33- Table 35.

Table 31: Serious and Irreversible Impacts Summary

Species / Community	Common Name	Principle	Direct impact area (ha)
Cumberland Plain Woodland	N/A	1 and 2	0.06
Lathamus discolor	Swift Parrot	1	0.002

Table 32: Determining which Principles apply to serious and irreversible candidate entities (Clause 6.7 of the BC Regulation) – Cumberland Plain Woodland

Determining whether impacts are serious and irreversible	Assessment
Principle 1	
Does the proposal impact on a species, population or ecological community that is a candidate entity because it is in a rapid rate of decline?	Yes, the TBDC has identified that this TEC is a SAII entity due to Principle 1–- the reduction of the population by >80% in the last 10 years or three generations.
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	There are no thresholds identified for this ecological community. The proposed development will result in 0.06 ha of impact to areas mapped as PCT 849.
Principle 2	
Does the proposal impact on a species that is a candidate entity because it has been identified as having a very small population size?	Yes, the TBDC has identified that this TEC has < 50 individuals or <250 individuals where threats are known.
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	There are no thresholds identified for this ecological community. The proposed development will result in 0.06 ha of impact to areas mapped as PCT 849.
Principle 3	
Does the proposal impact on the habitat of a species or an area of an ecological community that is a candidate entity because it has a very limited geographic distribution?	N/A
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	
Principle 4	
Does the proposal impact on a species, a component of species habitat or an ecological community that is a candidate entity because it is irreplaceable?	N/A
b. If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	

Table 33: Evaluation of an impact on a TEC – Cumberland Plain Woodland

Impact Assessment Provisions 10.2.2.1	Assessment
1. the action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	The development footprint has been situated within a section of the site containing predominantly low biodiversity values, based on the ecological constraints assessment. The majority of impacts will occur in areas of exotic grassland and of the 0.06 ha Cumberland Plain Woodland (PCT 849) occurs in a degraded form (i.e. scattered *Eucalyptus tereticornis* in exotic grasses). Approximately 0.29 ha of Cumberland Plain Woodland will be retained within the development site. The redesign has ensured that the entire patch of PCT 849 which is part of the EPBC listed vegetation patch, will be retained. ELA has prepare a Vegetation Management Plan (VMP) for revegetation works and on-going weed management within this vegetation. Indirect impacts in the retained Cumberland Plain Woodland will be minimised through the implementation of a VMP and mitigation measures provided in Section 8.4.3 of this report.
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 to the proposal)	Cumberland Plain Woodland has undergone a substantial reduction in the geographic distribution. The most recent information about the reduction of this TEC in NSW is contained in the Final Determination for Cumberland Plain Woodland, which includes the following: • The total extent of Cumberland Plain Woodland was estimated to be ~8.8% of the community's pre-European distribution by Tozer in 2003 based on aerial photography from 1998. • This estimate was updated in 2007, showing a decline of ~5.2% in 9 years. • There are currently no estimates of the decline in the TEC since 1970.
2b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: - change in community structure - change in species composition - iii. disruption of ecological processes iv. invasion and establishment of exotic species - degradation of habitat, and vi. fragmentation of habitat	The extent of reduction in ecological function for the TEC is also found in the Final Determination, as follows: • The community structure has changed such that almost all of the remaining Cumberland Plain Woodland is considered to be regrowth forest and woodland from past clearing activities. • Species composition has changed such that remnants are largely degraded by weed invasion and regrowth stands with high densities of saplings or shrubs may supress ground flora. • Ecological processes have been disrupted by the chemical and structural modification associated with agricultural land uses and more recent expansion of urban land uses which the Cumberland Plain has historically been subjected to. • The TEC has been identified as being severely fragmented.
2c. evidence of restricted geographic distribution (Principle 3, clause 6.7 (2)I) 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.	Cumberland Plain woodland is highly restricted to the Sydney Basin Bioregion. According to the Final Determination, it was estimated to occur within an extent of 2,810 km^2 and is known from the Auburn, Bankstown, Baulkham Hills, Blacktown, Camden, Campbelltown, Fairfield, Hawkesbury, Holroyd, Liverpool, Parramatta, Penrith and

Impact Assessment Provisions 10.2.2.1	Assessment
	Wollondilly LGAs. These locations are all subject to threats to the TEC, including weed invasion and clearing of native vegetation.
2d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7 (2) (d) BC Regulation).	The Final Determination states that areas where management aims to conserve the TEC suggests that it is capable of some recovery, provided the soil has not been disturbed by earthworks, cultivation, fertiliser application or other means of nutrient or moisture enrichment. The Final Determination also states that opportunities for restoration of the TEC is limited, given that the majority of the former distribution of the community has been subjected to some soil disturbance.
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 – all data is provided in the Final Determination as summarised above.
4a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal: i. in hectares, and Ii. as a percentage of the current geographic extent of the TEC in NSW.	The total area of the TEC to be affected by the proposal is 0.06 ha. Existing vegetation mapping estimates 21,915 ha of Cumberland Plain Woodland (identified as PCT 849 or 850 by previous mapping) is present in NSW. Therefore, the area of TEC to be affected represents an estimate of 0.0004% of the current geographic extent of the TEC. It should be noted that the GIS analysis used existing vegetation mapping datasets and did not include ground truthing the extent of the mapped Cumberland Plain Woodland.
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 fragmentation, such as the area to perimeter ratio for remaining	The vegetation within the development site is contiguous with the vegetation patch in the adjoining land to the north. This patch is approximately 1 ha in total. The second nearest patch is located directly west of the development site approximately 200 m away from the patch of PCT 849 in the development site. These areas are fragmented by the existing shopping centre, hardstands and road infrastructure. Birds and bats may traverse this fragmentation. From a review of aerial photography, the remaining patches within 500 m of the development footprint appear to be small clusters of vegetation scattered within the landscape. The proposed removal of a small amount of PCT 849 within the development would not result in further fragmentation of vegetation as the majority of the patch 0.29 ha of PCT 849 recorded within the development site will be retained. Given the fragmentation throughout the locality, it is likely that seed is dispersed mostly by mobile fauna such as birds and bats. The estimated maximum dispersal distance for Grey-headed Flying-fox would be their average nightly foraging range of 20 km. The condition of the community throughout the development footprint was generally moderate due to the high level of species diversity within the groundlayer. Regular mowing has prevented recruitment of regenerating canopy or shrub layer. The patch of the community was sampled in the area considered to be in best condition and achieved a VI Score of 57.1.

Impact Assessment Provisions 10.2.2.1	Assessment
areas of the TEC as a result of65eveloplopment 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.	

Table 34: Determining which Principles apply to serious and irreversible candidate entities (Clause 6.7 of the BC Regulation) – Swift Parrot

Determining whether impacts are serious and irreversible	Assessment
Principle 1	
Does the proposal impact on a species, population or ecological community that is a candidate entity because it is in a rapid rate of decline?	Yes, the TBDC has identified that this species is a SAII entity due to Principle– 1 - the reduction of the population by >80% in the last 10 years or three generations.
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	There are no thresholds identified for this species. The proposed design will result in 0.002 ha of impact to areas mapped as Important Habitat.
Principle 2	
Does the proposal impact on a species that is a candidate entity because it has been identified as having a very small population size?	N/A
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	
Principle 3	
Does the proposal impact on the habitat of a species or an area of an ecological community that is a candidate entity because it has a very limited geographic distribution?	N/A
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	
Principle 4	
Does the proposal impact on a species, a component of species habitat or an ecological community that is a candidate entity because it is irreplaceable?	N/A
b. If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible?	

Table 35: Evaluation of impacts on candidate species consistent with Section 9.1.2 of the BAM – Swift Parrot

Impact Assessment Provision	Assessment
1. the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these	The majority of the area mapped as Important Habitat for Swift Parrot will be protected within the land proposed for

Impact Assessment Provision	Assessment
have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.	conservation. A small area (0.002 ha of PCT 849) which has been mapped as Important Habitat for Swift Parrot will be affected during development. This area was identified as PCT 849_mown condition vegetation which includes representative species (*Eucalyptus tereticornis*) of PCT 849. The Swift Parrot Important Habitat area in the BOAMs also include 0.33 ha areas which were validated during field surveys as exotic grass, exotic vegetation and built areas. There areas do not provide habitat for this species. The development has retained 0.29 ha of PCT 849 in the development site which have been mapped as Important Habitat for the Swift Parrot.
2a. evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of th iii. i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites	Evidence of rapid decline of the population of Swift Parrot has been documented by Wright (2019) and by Stojanovic et al. (2018). Predictive models indicate that there is an extreme risk of population reduction due to introduced predators (Sugar gliders) in breeding habitats in Tasmania and ongoing logging (Heathcote 2020). It is currently predicted that there is only about 300 Swift Parrots in the wild and that this number is predicted to continue to decline (Heathcote 2020). The proposed development would not affect breeding habitat, and population declines may still occur in the absence of the development.
2b. evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented b iii. i. an estimate of the species' current population size in NSW, and ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations	There is currently no specific data on the current population for Swift Parrot. Estimates of the population suggests there are less than 300 Swift Parrots remain in the wild (Heathcote 2020). The Swift Parrot migrates from breeding sites in Tasmania to NSW and Victoria. There are no estimates on how many Swift Parrots migrate directly to NSW. A regression model conducted over 16 years indicated that this species has sustained a decline of 90% of the entire population (Hingston 2019).
2c. evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation) presented b iii. i. extent of occurrence ii. area of occupancy iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and iv. whether the species' population is likely to undergo extreme fluctuations	The Swift Parrot is a highly mobile species which breeds in Tasmania and migrates annually to mainland Australia in winter. The remaining population of Swift Parrot is considered one whole population due to its highly mobile nature. The area of occupancy has significantly declined since European settlement due to ongoing habitat removal (TSSC 2016). In NSW 70% of box-ironbark forest habitat has been removed (TSSC 2016). The Swift Parrot has a high site fidelity to breeding sites in Tasmania. In NSW the population is not limited by a geographic range. This species will utilise key flowering events throughout NSW and Victoria. Threats to foraging habitat is not defined by geographically or ecologically distinct areas.

Impact Assessment Provision	Assessment
	This species distribution fluctuates in response to availability of foraging resources which in turn, may result in fluctuations to its population.
2d. evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) becaus iii. i. known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).	There are no management actions recorded in the TBDC. This species relies upon foraging resources and nesting hollows in Tasmania. Restoration of breeding and non-breeding habitats will benefit this species.
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.	The TBDC has not identified any criterion as data deficient.
4a. the impact on the species' population (Principles 1 and 2) presented b iii. i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal	The Swift Parrot is a winter migrant to NSW. This species breeds in Tasmania and is considered one population. It is estimated approximately 300 individuals remaining in the wild. A small portion (0.002 ha of PCT 849) of the development site was mapped on the Important Habitat map for Swift Parrot. An additional 0.3 ha of area Important Habitat which includes exotic vegetation, exotic grass and built areas. The mapped Important Habitat present in the development site indicates that there has been a BioNet record for this species and the surrounding PCTs have been included as a buffer around the BioNet record. The Important Habitat map has utilised the same boundary as the Biodiversity Values map. Field surveys identified that vegetation within the Biodiversity Values map is not consistent with a PCT and should be excluded. The development site intercepts with the outer portion of the Important Habitat mapped for the Swift Parrot. This includes 0.06 ha of vegetation mapped as PCT 849_mown to be removed. The vegetation consists of low condition native vegetation with no midstorey and mown ground layer.
4b. impact on geographic range (Principles 1 and 3) presented b iii. i. the area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW	A small area 0.002 ha of the development footprint was mapped as Important Habitat for Swift Parrot under the BOAMs and has been included in the species polygon. The entire population of Swift Parrot is considered one population. This population is not reliant on the vegetation mapped within the development site.

Impact Assessment Provision	Assessment
ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted iii. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species iv. to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.	The proposed development will reduce the habitat available to the population for foraging by direct removal of a small extent of vegetation. Approximately three (3) *Eucalyptus tereticornis* will be removed. The vegetation is unlikely to provide significant habitat for this winter migratory species as this species is likely to utilise a large area and movement is response to presence of foraging resources. Furthermore, the vegetation mapped within the Important Habitat for this species consist of vegetation in low condition, meaning it contains some disturbances and weeds. It is not considered vital to any Swift Parrot utilising the area. The proposed development will result in a reduction of marginal foraging resources for the Swift Parrot, additionally, the proposed development will result in threats to individuals within the population such as a decrease in the quality and quantity of retained vegetation due to changes in fire resume and tree pathogens. The proposed development is unlikely to result in changes to threats affecting the habitat for Swift Parrot. The bushfire assessment will ensure that APZs are located outside of the VMP. The VMP will ensure the protection of the Swift Parrot habitat including revegetation works and the protection against environmental factors. Given that this species is highly mobile the removal of vegetation for the development will not fragment a population. The land retained within the development site will aid in the dispersal of this species by providing a connective corridor to adjacent lands.

8.5.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 36 and shown on Figure 19. The impacts of the development requiring offset for species credit species and their habitat are outlined in Table 37 and shown on Figure 19.

The impacts to hollow-bearing trees in exotic vegetation have been included in Figure 19. It is noted that impacts to species credit species for BAM Assessment Module – Small Areas only includes SAII entities. None of the SAII entities are considered to utilise the small tree hollows within the exotic vegetation. As such, the hollows represent are considered habitat for non-threatened fauna or non-SAII entities. The impacts to hollows have been offset through installation of supplementary nest boxes of suitable small entrance for birds or microbats within the VMP area.

Table 36: Impacts to native vegetation that require offsets

Veg Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1	849	Cumberland Shale Plains Woodland	Coastal Valley Grassy Woodlands	Grassy Woodlands	0.06

Table 37: Impacts on threatened species and species habitat that require offsets

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Lathamus discolor	Swift Parrot	0.002 ha	Endangered	Critically Endangered

8.5.3 Impacts not requiring offsets

The impacts of the development not requiring offset for planted native vegetation (0.13 ha) are outlined in Figure 20.

8.5.4 Areas not requiring assessment

Areas not requiring assessment within the development site include those mapped as exotic (0.59 ha), exotic grass (2.84 ha) and built (1.49 ha). These areas were not mapped as part of a PCT, nor did they contain habitat for threatened species. Areas not requiring assessment are shown on Figure 21.

8.5.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 38. The number of species credits required for the development are outlined in Table 39.

A biodiversity credit report is included in Appendix D.

Table 38: Ecosystem credits required

Veg zone	PCT ID	PCT Name	Like for Like credits / Trading Group	Direct impact (ha)	Credits required
1	849	Cumberland Shale Plains Woodland	PCT 724, 808, 849, 850 with hollow-bearing trees Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo IBRA region OR Any IBRA subregion within 100 km of the outer edge of the impacted site	0.06	2

Table 39: Species credits required

Species	Common name	Direct impact number of individuals / habitat (ha)	Credits required
Lathamus discolor	Swift Parrot	0.002 ha of PCT 849	1

Figure 17: Serious and Irreversible Impacts – Cumberland Plain Woodland

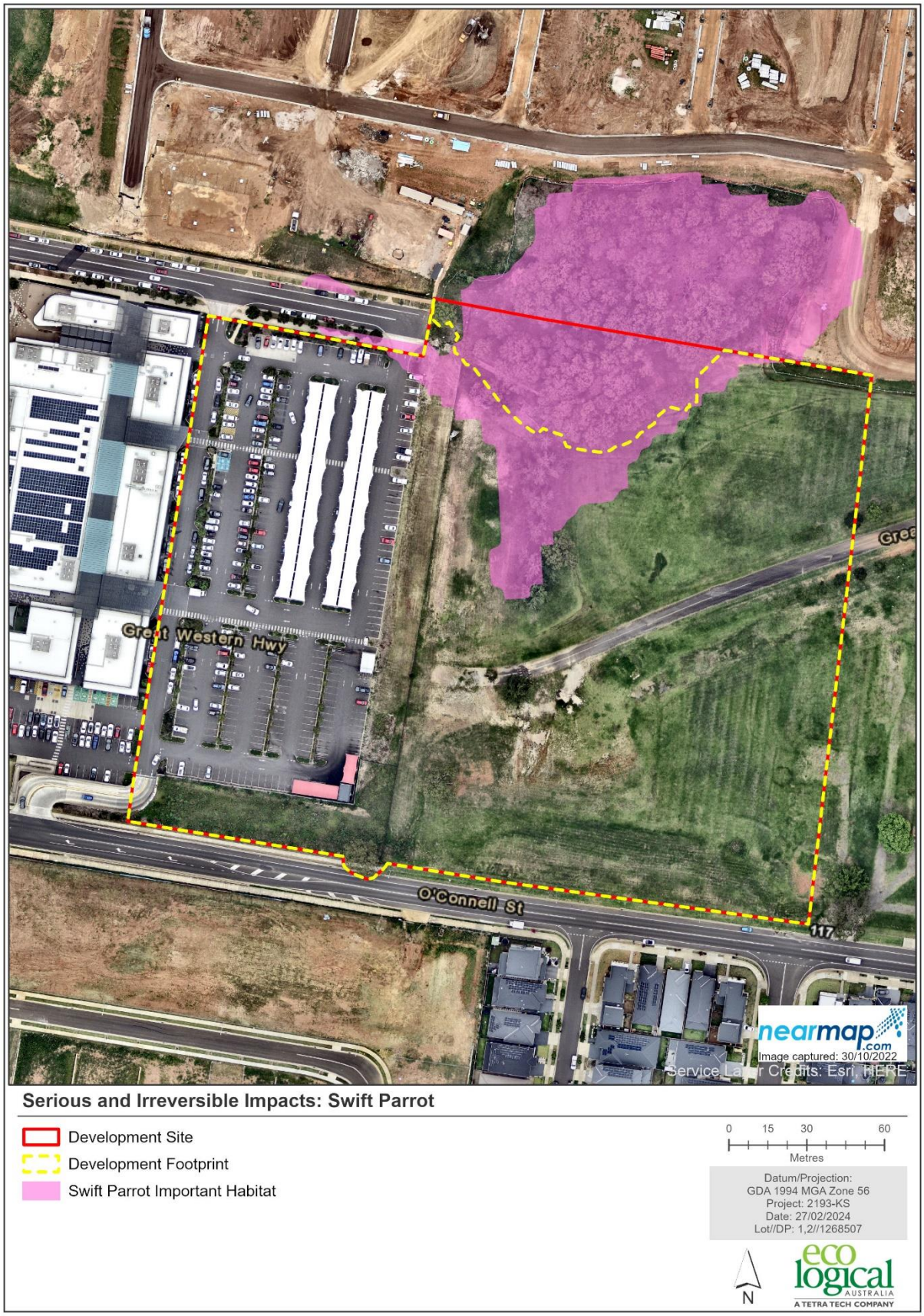

Figure 18: Serious and Irreversible Impacts – Swift Parrot

Figure 19: Impacts requiring offset

Figure 20: Impacts not requiring offset

Figure 21: Areas not requiring assessment

8.6 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 8.6.1.

8.6.1 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

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

The following assessments have been prepared in accordance with the EPBC Act Matters of National Environmental Significance: Significant Impact Guidelines 1.1. These guidelines have been established to assist proponents to determine whether a proposed action is likely to result in a significant impact on MNES.

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. Roost sites are typically located near water, such as lakes, rivers or the coast, but the species has also been known to form camps in urban areas (DCCEEW 2022b).

The closest bat camp is Ropes Creek approximately 6.5 km east of the development site. The last survey count in February 2022 recording 2,500-9,999 individuals. The closest nationally recognised Grey-headed Flying-fox camp is located at Parramatta Park 25 km from the development site (DAWE 2020c).

The vegetation within the development site provides potential seasonal foraging habitat. It is considered likely that this species would use the site on occasion for foraging purposes. According to the National Flying-fox Monitoring Program, no Grey-headed Flying-fox camps currently occur or have been recorded within the development site (DAWE 2020c).

Table 40: EPBC Act Assessment of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	The Grey-headed Flying-fox is considered one population due to the constant exchange of genetic material between individuals and its movement between camps throughout its entire geographic range (DCCEEW 2022b). Maternity or other roosting habitat are considered important habitat for this species. No roosting habitat (i.e. camps) have been recorded within the development site. According to the National Flying-fox Monitoring Program, no camps currently occur or have ever been recorded within the proposed action area (DCCEEW

Criterion	Question	Response
		2022c). The nearest active Grey-headed Flying-fox camp occurs approximately 6.5 km to the east of the proposed action area, within Ropes Creek (DCCEEW 2022c). The proposed action area contains 0.36 ha of potential foraging habitat for the Grey-headed Flying-fox. About 0.06 ha of PCT 849 will be removed and 0.29 ha of potential foraging habitat will be retained in the development site. Additional foraging habitat was recorded within the broader locality of the action, this includes the patch of vegetation in the north and a patch in the west on the Western Sydney University Kingswood site. Given the proximity of suitable habitat within the assessment area, the removal of this potential foraging habitat is unlikely to lead to the long-term decrease in the size of an important population of Grey-headed Flying-fox.
2)	reduce the area of occupancy of an important population	The proposed action will reduce the extent of available foraging habitat for the Grey-headed Flying-fox. About 0.06 ha of potential foraging habitat will be removed, and 0.29 ha will be retained within the action area. The vegetation within the development site may provide supplementary foraging habitat for this species. The proposed action area does not contain breeding or sheltering habitat (i.e. bat camps). The Grey-headed Flying-fox is known to fly long distances (up to 50 km per night) and move between bat camps. As such this species is likely to utilise a large extent of habitat around the nationally important camp at Parramatta Park or local camp at Ropes Creek. Due to the extent of habitat within a 50 km radius of the known bat camps, the removal of a small amount of native vegetation is unlikely to significantly reduce the area of occupancy for this species.
3)	fragment an existing important population into two or more populations	The proposed action will affect 0.06 ha of potential foraging habitat in the form of PCT 849 and 0.13 ha of planted native species within the action area. The proposed action will not affect camps. Additionally, due to the highly fragmented nature of the vegetation within the action area, it is likely that the vegetation affected by the action is considered marginal or supplementary foraging habitat for this species. A large amount of intact better-quality native vegetation was identified directly west of the development site, within Western Sydney University Kingswood. The Grey-headed Flying-fox is a highly mobile species and is considered part of one large population. As the vegetation within the action area is considered supplementary habitat for this species, it is unlikely that the proposed works will result in the fragmentation of populations for this highly mobile species.
4)	adversely affect habitat critical to the survival of a species	The National Recovery Plan for the Grey-headed Flying-fox 2021 identifies 'a continuous temporal sequence of productive foraging habitats and suitable roosting habitat' as habitat critical to the survival of the species. No camps will be affected by the proposed action. The proposed

Criterion	Question	Response
		action will affect 0.06 ha of PCT 849 and 0.13 ha of planted native vegetation, some of which comprises suitable foraging habitat for the Grey-headed Flying-fox. The Grey-headed Flying-fox is recorded as travelling long distances (50 km) on feeding forays and suitable habitat is available outside of the action area.
5)	disrupt the breeding cycle of an important population	The proposed action will affect 0.06 ha of PCT 849 and 0.13 ha of planted native vegetation, some of which comprises suitable foraging habitat for the Grey-headed Flying-fox. The proposed action will not disrupt the breeding cycle of the Grey-headed Flying-fox given that no camps will be impacted by the proposed action and suitable foraging habitat is available adjacent to the development site.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will affect 0.06 ha of PCT 849 and 0.13 ha of planted native vegetation, including foraging habitat for the Grey-headed Flying-fox. Grey-headed Flying-fox camps will not be removed, or disturbed, and suitable habitat is available outside of the action area.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox.
8)	introduce disease that may cause the species to decline, or	Grey-headed Flying-fox are reservoirs for the Australian bat lyssavirus and can cause clinical disease and mortality in Grey-headed Flying-fox. The proposed action would not increase the incidence of this disease.
9)	interfere substantially with the recovery of the species.	The National Recovery Plan for the Grey-headed Flying-fox was developed in 2021. The relatively small amount of foraging habitat to be removed is unlikely to substantially interfere with the recovery of this species.
Conclusion	Is there likely to be a significant impact?	No. The proposed action is unlikely to have a significant impact on the Grey-headed Flying-fox for the following reasons: • No camps will be removed by the proposed action. • No vegetation will be further fragmented resulting in isolation of populations. • More suitable foraging habitat for this highly mobile species is available outside of the action area.

Table 41: EPBC Act Assessment of Significance for Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
1)	reduce the extent of an ecological community	The proposed action was redesigned to avoid direct impacts to vegetation comprising of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest within the development site. The entire patch of 0.29 ha of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest will be retained and protected under a VMP. The local occurrence has been defined as the vegetation patch within the development site and in the adjoining land to the south. It represents approximately 0.9 ha of this TEC. The project will retain 100% of the extent of the critically endangered community mapped within the development site which represents 30% of the local occurrence (assuming the patch of PCT 849 is 1 ha). The project may result in a slight reduction in the ability for the TEC to extend into adjacent (currently cleared lands). However, these cleared lands do not currently contain native species which may represent a native soil seedbank. Additionally, these areas are subject to a regular mowing regime which limits regeneration potential.
2)	fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The proposed action has avoided direct impacts to this TEC through a redesign of the action. Therefore, the action will not result in a reduction in the size of the patch of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest mapped within the local occurrence. This patch of vegetation is contiguous with the patch in the adjoining land in the north. Other patches of this TEC are fragmented by roads and exotic grasslands from a large patch retained to the north west of the development site.
3)	adversely affect habitat critical to the survival of an ecological community	The Approved Conservation Advice for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (DEWHA 2009) states that small remnant patches are important for long-term recovery of this community and may act as corridors and stepping-stone habitat for flora and fauna species. Therefore, the small patch of identified within the development site may represent habitat critical to the survival of this ecological community. The development does not involve direct impact to this TEC. However, there is potential for some indirect impacts from the retaining wall and during construction. The VMP will manage and protect the remaining 0.29 ha of the ecological community on site. An additional 0.42 ha is located in the adjacent lands and is considered part of the same patch (local occurrence). The majority of the vegetation in the local occurrence will be retained within the development site and managed for conservation as part of a vegetation management plan.

Criterion	Question	Response
4)	modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The proposed works are likely to modify non-living factors. The proposed works will result in the clearing of native vegetation for the installation of semi-impervious surface. This may result in the alteration of surface water drainage patterns. These impacts will be mitigated through the vegetation to be retained and through implementation of a VMP.
5)	cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposed action will not directly affect Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. There may be some indirect impacts to the 0.29 ha of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest retained within the site. Indirect impacts will be managed through the implementation of a VMP. The proposed action is unlikely to result in a decline or loss of functionally important species as the area will be actively managed for conservation.
6) i	cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or	The proposed action is unlikely to result in reduction of quality or integrity of the vegetation as the area will be actively managed for conservation. This will include managing the retained vegetation against impacts from invasive species. The vegetation management plan in the long-term will improve the quality and integrity of the retained vegetation through the removal of weeds and implementation of pest management actions.
6) ii	cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	As per above. The implementation of the vegetation management plan will provide guidance on how to actively manage the retained vegetation. This will include the correct use herbicides in the VMP area.
7)	interfere with the recovery of an ecological community.	There is no Recovery Plan for this TEC listed under the EPBC Act. The Approved Conservation Plan lists Regional Priority Actions relating to habitat loss, disturbance and modification.
Conclusion	**Is there likely to be a significant impact?**	No, the proposed action will not directly impact PCT 849 listed under as part of the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest and is unlikely to have a significant impact for the following reasons: • No direct impacts to this vegetation patch will occur. • Indirect impacts will be managed under a VMP. • 0.29 ha will be retained on site • The action does not fragment the vegetation. •

Criterion	Question	Response
		The proposed action will mitigate additional impacts on the retained vegetation through the implementation of a vegetation management plan.

Lathamus discolor (Swift Parrot))

The Swift Parrot is listed as critically endangered under the EPBC Act. The distribution and habitat associations of this threatened species is presented in Appendix F. This species was not recorded within the development site, however, a small portion of the DPE mapped Important Habitat has been identified within the development footprint and within the land for conservation measures. The proposed action will impact 0.002 ha of potential foraging habitat for Swift Parrot.

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility of the following:		
1)	will the action lead to a long-term decrease in the size of a population	The proposed action will affect 0.002 ha of native vegetation which represents potential foraging habitat for the Swift Parrot. The remaining portion of the mapped Important Habitat contains unsuitable habitat for foraging for this species including; 0.004 ha of planted natives, 0.168 ha of exotic grass, 0.123 ha of exotic species and 0.011 ha of built areas. The Swift Parrot is a non-breeding migratory species to NSW. The entire population of Swift Parrot is considered one population. It is not considered that the foraging habitat comprises habitat for an important population, due to the presence of more extensive habitat adjacent to the development site. A small area mapped on the Important Habitat was located within the development footprint and a larger amount within the to be retain within the development site. This area represents non-breeding foraging habitat for Swift Parrot. The development intercepts the outer edge of the mapped habitat. It is unlikely that minor impacts to 0.002 ha of native vegetation mapped on the Important Habitat would result in the long-term decrease in the size of the population of Swift Parrot.
2)	will the action reduce the area of occupancy of the species	The proposed action would reduce the amount of potential foraging habitat for this species by up to 0.002 ha of PCT 849. The Swift Parrot is not known to breed within the development site but may forage within the vegetation mapped within the development site. A small portion 0.002 ha of land mapped on the Important Habitat will be impacted by the development footprint. This area is located within a patch of disturbed native vegetation. It is not considered that the development site comprises of foraging habitat for an important population therefore the proposed

Criterion	Question	Response
		action will not reduce the area of occupancy of an important population.
3)	will the action fragment an existing population into two or more populations	The proposed action will not fragment an existing important population into two or more populations.
4)	will the action adversely affect habitat critical to the survival of a species	The 2011-2015 National Recovery Plan for this species identifies the following as habitat critical to the survival of the species: breeding habitat and over-wintering habitat. No critical habitat for this species was identified within the development site. However, a small portion of the land contains mapped Important Habitat for this species. Considering that only 0.002 ha of suitable foraging habitat will be affected, and more similar, and extensive habitat is available within and adjacent to the development site, the proposed action is considered unlikely to adversely affect critical habitat for this species.
5)	will the action disrupt the breeding cycle of a population	The proposed action will not disrupt the breeding cycle of the Swift Parrot given that no breeding habitat will be affected by the proposed action and suitable foraging habitat is available within and adjacent to the development site.
6) i	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 will affect 0.002 ha of vegetation, including foraging habitat for the Swift Parrot. It is unlikely that the extent of this vegetation removal will cause the species to decline because suitable, and extensive habitat is available within and adjacent to the development site. The removal of vegetation from within the development site will not fragment or isolate any habitat.
6) ii	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 in the habitat of the Swift Parrot.
7)	will the action introduce disease that may cause the species to decline	The action is unlikely to introduce disease that would cause this species to decline.
8)	will the action interfere with the recovery of the species	The 2011-2015 National Recovery Plan for this species identifies the following potential threats: habitat loss and adult mortality. The proposed action will impact foraging habitat; and may result in an increase in vehicles resulting in higher bird collisions. However, the action is unlikely to exacerbate these threats to the extent that it would interfere substantially with the recovery of the species.
Conclusion	**Is there likely to be a significant impact?**	No. The proposed action is unlikely to have a significant impact on the Swift Parrot for the following reasons: • No breeding habitat will be impacted by the action. • The species is highly mobile and will continue to access different areas of habitat.

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Appendix A : Definitions

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.
Buffer area	1500 m buffer created around the development site. This area is used to define the extent of native vegetation.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
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.
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 study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, 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).
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 OEH, 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.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated 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 OEH 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 plot data

Table 42: Species matrix (species recorded by plot)

Species	Common Name	Exotic (*)	High Threat Weed (*)	Growth Form Group	Plot 1		
					Stratum & Layer	Cover	Abundance
Anagallis spp.		*			G	0.1	2
Aristida vagans	Threeawn Speargrass			Grass & grasslike (GG)	G	0.1	2
Asperula conferta	Common Woodruff			Forb (FG)	G	0.1	3
Aster subulatus	Wild Aster	*			G	0.1	1
Bothriochloa macra	Red Grass			Grass & grasslike (GG)	G	0.2	5
Chloris truncata	Windmill Grass			Grass & grasslike (GG)	G	0.1	4
Chloris ventricosa	Tall Chloris			Grass & grasslike (GG)	G	0.2	10
Commelina cyanea	Native Wandering Jew			Forb (FG)	G	0.1	4
Cynodon dactylon	Common Couch			Grass & grasslike (GG)	G	2	100
Cyperus eragrostis	Umbrella Sedge	*	*		G	0.1	3
Cyperus gracilis	Slender Flat-sedge			Grass & grasslike (GG)	G	0.1	5
Desmodium varians	Slender Tick-trefoil			Other (OG)	G	1	100
Dichondra repens	Kidney Weed			Forb (FG)	G	4	500
Ehrharta erecta	Panic Veldtgrass	*	*		G	0.2	5
Eragrostis curvula	African Lovegrass	*	*		G	0.5	100
Eragrostis leptostachya	Paddock Lovegrass			Grass & grasslike (GG)	G	0.2	5
Eucalyptus tereticornis	Forest Red Gum			Tree (TG)	U	25	5
Geranium homeanum				Forb (FG)	G	0.1	2
Glycine clandestina	Twining glycine			Other (OG)	G	0.1	2
Glycine tabacina	Variable Glycine			Other (OG)	G	0.2	10
Hypochaeris radicata	Catsear	*			G	0.2	20
Lonicera japonica	Japanese Honeysuckle	*	*		G	0.1	1
Lotus uliginosus	Birds-foot Trefoil	*			G	0.1	3
Microlaena stipoides var. *stipoides*	Weeping Grass			Grass & grasslike (GG)	G	75	1000
Modiola caroliniana	Red-flowered Mallow	*			G	0.1	20
Nerium oleander	Oleander	*			M	0.2	1
Olea europaea subsp. *cuspidata*	African Olive	*			M	0.2	3
Oxalis corniculata	Creeping Oxalis	*			G	0.1	3
Paspalum dilatatum	Paspalum	*	*		G	0.1	2
Phyllanthus similis				Forb (FG)	G	0.1	1
Plantago lanceolata	Lamb's Tongues	*			G	0.2	50
Senecio madagascariensis	Fireweed	*	*		G	0.2	50

Species	Common Name	Exotic (*)	High Threat Weed (*)	Growth Form Group	Plot 1		
					Stratum & Layer	Cover	Abundance
Setaria parviflora		*			G	0.1	3
Sida rhombifolia	Paddy's Lucerne	*			G	0.1	20
Solanum nigrum	Black-berry Nightshade	*			G	0.1	1
Solanum pseudocapsicum	Madeira Winter Cherry	*			M	0.1	1
Solanum sisymbriifolium		*			M	0.1	1
Sonchus oleraceus	Common Sowthistle	*			G	0.1	2
Sporobolus creber	Slender Rat's Tail Grass			Grass & grasslike (GG)	G	0.1	3
Trifolium repens	White Clover	*			G	0.1	3
Verbena rigida var. *rigida*	Veined Verbena	*			G	0.1	2

G = GROUND, M = MIDSTOREY, U = UNDERSTOREY. TG = TREE, SG = SHRUB, GG = GRASS AND GRASSLIKE, FG = FORB, EG = FERN, OG = OTHER
C = COVER A = ABUNDANCE

Table 43: Vegetation integrity data (Composition, structure and function)

Plot No.	PCT	Veg zone	Condition	Zone	Easting	Northing	Bearing
1	849	1	mown	56	290391	6261171	98

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	1	0	9	5	0	3

Plot no.	Large trees	Hollows	Litter cover (%)	Length fallen logs (m)	Tree stem 5-9 cm	Tree stem 10-19 cm	Tree stem 20-29 cm	Tree stem 30-49 cm	Tree stem 50-79 cm	Tree stem 80+ cm	Tree regen	HTW cover %
1	6	1	43	0	0	1	1	1	1	1	0	1.2

FOR STEM SIZE CLASS 0 = ABSENCE, 1 = PRESENCE

Table 44: Other species recorded

Species Name	Common Name	Exotic (*)
Anredera cordifolia	Madeira vine	x
Callistemon viminalis	Weeping Bottlebrush	

Species Name	Common Name	Exotic (*)
Ehrharta erecta	Panic Veldtgrass	x
Galium gaudichaudii	Rough Bedstraw	
Ipomoea indica	Blue morning glory	x
Nerium oleander	Oleander	x
Olea europaea subsp. *cuspidata*	African olive	x
Senecio madagascariensis	Fireweed	x
Solanum nigrum	Black-berry Nightshade	x
Lycium ferocissimum	African Boxthorn	x
Solanum sisymbriifolium		x

Table 45: Fauna species observed in the development site

Class	Family	Scientific Name	Common Name	Observation Type	Exotic (*)
Amphibia	Myobatrachidae	*Crinia signifera*	Common Eastern Froglet	W	
Aves	Artamidae	*Cracticus tibicen*	Australian Magpie	O	
Aves	Artamidae	*Strepera graculina*	Pied Currawong	O	
Aves	Cacatuidae	*Calyptorhynchus funereus*	Yellow-tailed Black-cockatoo	F/O	
Aves	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo Shrike	F/O	
Aves	Charadriidae	*Vanellus miles*	Masked Lapwing	F/O	
Aves	Corvidae	*Corvus coronoides*	Australian Raven	O	
Aves	Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	W	
Aves	Hirundinidae	*Hirundo neoxena*	Welcome Swallow	F/O	
Aves	Meliphagidae	*Manorina melanocephala*	Noisy Miner	O	
Aves	Monarchidae	*Grallina cyanoleuca*	Magpie-lark	O	
Aves	Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant	F/O	
Aves	Psittaculidae	*Psephotus haematonotus*	Red-rumped Parrot	O	
Aves	Pycnonotidae	*Pycnonotus jocosus*	Red Whiskered Bulbul	W	*
Aves	Sturnidae	*Sturnus tristus*	Common Myna	O	*
Aves	Sturnidae	*Sturnus vulgaris*	Common Starling	F/O	*
Aves	Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	F/O	
Mammalia	Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	O	

O= OBSERVED. W = HEARD. F/O = FLYOVER

Appendix C : Floristic analysis results

Plot / vegetation zone	Vegetation analysis tool (Tozers Metro)	Selected PCT rational
Plot 1 / vegetation zone 1	Shale Plains Woodland (PCT 849 and a sub-community of Cumberland Plains Woodland)	Shale Plains Woodland (SPW) had 15 diagnostic species. It had the most number of diagnostic species and was identified as the most appropriate PCT for the vegetation within the development site.

Community Type	DSF p1	GW p2	DSF p6	DSF p7	DSF p4	GW p28	GW p29	DSF p50	WSF p87	FoW p33	WSF p68	WSF p26	RF p38	RF p39	GW p514	FoW p44	DSF p64	WSF p10	wsf p153	FoW p58	DSF p14	DSF p142	DSF p143	DSF p148	DSF p13	DSF p238	HL p50	FrW p55	SL p509	FoW p10	SL p109	FrW p313
Correct ID	CIF	SSTF	BNHW	CSGW	CSW	SHW	SPW	SGTF	STIF	CRFF	NSCF	SHSW	GMDR	WSDR	MSW	SSF	CSF	LBMWF	BGHF	SRS	CSGF	HSGF	SSICF	SHTW	CSRW	ABW	SCS	RHf	ESm	EFF	EMF	CFL
tal diagnostic species	2	5	1	1	1	13	15	6	5	10	0	0	6	6	10	1	2	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0
equired minimum +ve diagnostic species	21	26	17	30	19	20	26	25	23	16	6	3	18	22	19	9	10	20	15	8	23	26	26	31	31	20	16	2	1	1	1	2
Achieved?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
o. by which required minimum +ve diagnostic spp. is exceeded?																																
atio of actual : required +ve diagnostic species	10%	19%	6%	3%	5%	65%	58%	24%	22%	63%	0%	0%	33%	27%	53%	11%	20%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	50%	0%	0%	0%	0%
tal native species	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
equired minimum total native species	35	39	37	43	37	31	31	37	40	26	27	25	31	32	30	17	21	35	39	25	38	36	43	42	41	30	24	8	2	2	2	4
Achieved?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
atio of +ve diagnostic species : total native species	9%	22%	4%	4%	4%	57%	65%	26%	22%	43%	0%	0%	26%	26%	43%	4%	9%	0%	0%	0%	0%	0%	0%	13%	0%	0%	0%	4%	0%	0%	0%	0%

Appendix D : EPBC Likelihood of Occurrence

An assessment of the likelihood of occurrence was made for threatened and migratory species identified from the Protected Matters Search Tool. 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 development site 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 development site 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 development site intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to Commonwealth legislation was not considered necessary.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Data Collection.

Table 46: Likelihood of occurrence of threatened ecological communities listed under the EPBC Act.

Community Name	EPBC Act Status	Distribution	Habitat	Likelihood of occurrence	Impact Assessment Required
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	CE	Occurs in western Sydney, 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.	Mainly occurs on clay soils derived from the deposits of ancient river systems (alluvium), or on shale soils of the Wianamatta Shales.	No – this community was not identified during field survey	No
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	CE	Endemic to the shale hills and plains of the Sydney Basin Bioregion in NSW, occurring primarily in, but not limited to, the Cumberland Sub-region.	Flat to undulating or hilly terrain, at elevations up to approximately 350 metres above sea level. Predominantly associated with clay soils, that are derived from Wianamatta Shale geology. Minor occurrences may be present on other soil groups, notably Holocene Alluvium and soils derived from the Mittagong Formation.	Yes	Yes
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	E	Sydney Basin Bioregion, mostly in the Cumberland IBRA sub-region, with small occurrences in the Sydney Cataract, Wollemi and Burragorang sub-regions. It occurs primarily in the Castlereagh area in the north-west of the Cumberland Plain with other known occurrences near Holsworthy, Kemps Creek and Longneck Lagoon.	Occurs primarily on Tertiary sands and gravels of the Hawkesbury-Nepean river system. At Agnes Banks it primarily occurs on aeolian (wind-blown) sands overlying Tertiary alluvium. Found on flat or gently undulating terrain in rain shadow areas typically receiving 700–900 mm annual rainfall. The ecological community occurs primarily at low elevations up to 80 m above sea level (ASL), including old ridges, dunes and terraces.	No – this community was not identified during field survey	No
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	CE	Found on the river flats of the coastal floodplains. Known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong,	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains.	No – this community was not identified during field survey	No

Community Name	EPBC Act Status	Distribution	Habitat	Likelihood of occurrence	Impact Assessment Required
		Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and Bega Valley.			
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	E	Occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales.	Typically found where groundwater is saline or brackish, but can occur in areas where groundwater is relatively fresh. It is typically found on coastal flats, floodplains, drainage lines, lake margins, wetlands and estuarine fringes where soils are at least occasionally saturated, water-logged or inundated	No – this community was not identified during field survey	No
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	CE	Occurs at the edges of the Cumberland Plain in western Sydney, most now occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas.	Intergrade between clay soils from the shale rock and earthy and sandy soils from sandstone, or where shale caps overlay sandstone.	No – this community was not identified during field survey	No
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	E	Occurs on the mainland and islands near to the coast (within 20 km) within the following IBRA2 Bioregions: South East Queensland (SEQ); NSW North Coast (NNC); Sydney Basin (SYB); and the Bateman subregion of the South East Corner (SEC2).	Occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dunes.	No – this community was not identified during field survey	No
Western Sydney Dry Rainforest and Moist Woodland on Shale	CE	Cumberland Plain Sub-region of the Sydney Basin Bioregion.	It generally occurs in rugged terrain and other patches may occur on undulating terrain, with dry rainforest patches typically occupying steep lower slopes and gullies, and moist woodland patches typically occupying upper sections of the slope. Occurs almost exclusively on clay soils derived from Wiannamatta Group shales.	No – this community was not identified during field survey	No

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

Table 47: Likelihood of occurrence of threatened fauna listed under the EPBC Act.

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Actitis hypoleucos	Common Sandpiper	M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland.	Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	-	No – no records of species within 5 km and unsuitable habitat (no wetlands)	No	No
Anthochaera phrygia	Regent Honeyeater	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions.	Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).	2	Unlikely – habitat marginal (Eucalypt woodland), but minimal records of species within 5 km	No	No
Apus pacificus	Fork-tailed Swift	M	Recorded in all regions of NSW.	Riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	-	No – no records of species within 5 km and unsuitable habitat (no riparian, farmland or	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
						sand dune vegetation)		
Botaurus poiciloptilus	Australasian Bittern	E	Found over most of NSW except for the far north-west.	Permanent freshwater wetlands with tall, dense vegetation, particularly Typha spp. (bullrushes) and Eleocharis spp. (spikerushes).	-	No – no records of species within 5 km and unsuitable habitat (no wetland)	No	No
Calidris acuminata	Sharp-tailed Sandpiper	M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions.	Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	-	No – no records of species within 5 km and unsuitable habitat (no wetland)	No	No
Calidris ferruginea	Curlew Sandpiper	CE, M	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.	-	No – no records of species within 5 km and unsuitable habitat (no estuarine habitat)	No	No
Calidris melanotos	Pectoral Sandpiper	M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina	Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks,	-	No – no records of species within 5 km and unsuitable habitat (no wetland)	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			and Lower Western regions.	floodplains and artificial wetlands.				
Calyptorhynchus lathami lathami	Glossy Black-Cockatoo, Riverina population	V	Within the Narrandera Range and to the north-west in the Brobenah Hills, McPhersons Range, Cocoparra Range, Lachlan Range and Jimberoo State Forests, and the Naradhan Range.	Largely restricted to hills and low ridges where suitable stands of its food plant *Allocasuarina verticillata* (Drooping Sheoak) remain.	12	No – records of species within 5 km, but unsuitable habitat (no *Allocasuarina* or *Casuarina* and no large hollows)	No	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	-	Unlikely – habitat marginal (woodland), but no records of species within 5 km	No	No
Dasyurus maculatus	Spotted-tailed Quoll	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld.	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	1	Unlikely – habitat marginal (woodland), but minimal records of species within 5 km	No	No
Delma impar	Striped Legless Lizard	V	In NSW, occurs in the Southern Tablelands, the	Natural Temperate Grassland, secondary and	-	Unlikely – habitat marginal (box-	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			South West Slopes and possibly on the Riverina.	modified grassland, open Box-Gum Woodland.		gum woodland), but no records of species within 5 km		
Gallinago hardwickii	Latham's Snipe	M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW.	Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	-	No – no records of species within 5 km and unsuitable habitat (no wetland)	No	No
Grantiella picta	Painted Honeyeater	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas.	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	-	Unlikely – habitat marginal (box-gum woodland), but no records of species within 5 km	No	No
Heleioporus australiacus	Giant Burrowing Frog	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria.	Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	-	Unlikely – habitat marginal (woodland on clay/loam soil), but no records of species within 5 km	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Hirundapus caudacutus	White-throated Needletail	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide.	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	-	Unlikely – habitat marginal (remnant woodland), but no records of species within 5 km	No	No
Lathamus discolor	**Swift Parrot**	**CE**	**Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes.**	**Box-ironbark forests and woodlands.**	**13**	**Potential – habitat is marginal (woodland) and BioNet records within 5 km**	**Yes**	**Yes**
Litoria aurea	Green and Golden Bell Frog	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region.	Marshes, dams and stream-sides, particularly those containing Typha spp. (bullrushes) or Eleocharis spp. (spikerushes). Some populations occur in highly disturbed areas.	3	No – records of species within 5 km, but unsuitable habitat (no marshes or dams)	No	No
Monarcha melanopsis	Black-faced Monarch	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi	Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal	-	Unlikely – habitat marginal (woodland), but no records of	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			National Park and Wombeyan Caves. It is rarely recorded farther inland.	scrub, mangroves, parks and gardens.		species within 5 km		
Motacilla flava	Yellow Wagtail	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.	Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	-	Unlikely – habitat marginal (lawns), but no records of species within 5 km	No	No
Myiagra cyanoleuca	Satin Flycatcher	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains.	Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	-	Unlikely – habitat marginal (eucalypt-dominated woodland), but no records of species within 5 km	No	No
Numenius madagascariensis	Eastern Curlew	CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records.	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	-	No – no records of species within 5 km and unsuitable habitat (no estuaries or bays)	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Petauroides volans	Greater Glider population in the Eurobodalla local government area	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west.	Eucalypt forests and woodlands.	-	No – marginal habitat (eucalypt woodland), but no records of species within 5 km and outside geographic range	No	No
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	Widespread but patchy distribution from south-eastern Queensland (Qld) to far south-eastern SA, near the SA-Vic border. In NSW, it predominantly occurs in forests along the eastern coast, from the NSW-Qld border to the NSW-Vic border	Occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests.	1	Unlikely – habitat marginal (eucalypt-dominated woodland), but minimal records of species within 5 km	No	No
Petrogale penicillata	Brush-tailed Rock-wallaby	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.	Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	-	No – no records of species within 5 km and unsuitable habitat (no rocky escarpments)	No	No
Phascolarctos cinereus	Koala	E	In NSW it mainly occurs on the central and north	Eucalypt woodlands and forests.	-	Unlikely – habitat	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands.			marginal (eucalypt woodland), but no records of species within 5 km		
Pluvialis squatarola	Grey Plover	M	Regular summer migrant to coastal Australia, including NSW. Rarely inland, on passage.	Mudflats, saltmarsh, tidal reefs and estuaries.	1	No – records of species within 5 km, but unsuitable habitat (no mudflats or estuaries)	No	No
Pseudomys novaehollandiae	New Holland Mouse	V	Fragmented distribution across eastern NSW.	Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	-	No – no records of species within 5 km and unsuitable habitat (no heathland understorey)	No	No
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria.**	**Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**244**	**Potential – habitat is marginal (foraging habitat in PCT 849, but no camps) and**	**Yes**	**Yes**

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
						species known to occur within 5 km		
Pycnoptilus floccosus	Pilotbird	V	Endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria. Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne	Wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and dry sclerophyll forests and woodlands occupying dry slopes and ridges.	-	Unlikely – habitat marginal (woodlands), but no records of species within 5 km	No	No
Rhipidura rufifrons	Rufous Fantail	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW.	Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	-	Unlikely – habitat marginal (woodland), but no records of species within 5 km	No	No
Rostratula australis	Australian Painted Snipe	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands	Swamps, dams and nearby marshy areas.	-	No – no records of species within 5 km and unsuitable	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			on the Hawkesbury River and the Clarence and lower Hunter Valleys.			habitat (no swamps or dams)		
Tringa nebularia	Common Greenshank	M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions.	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, harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).	-	No – no records of species within 5 km and unsuitable habitat (no wetlands)	No	No

M = Migratory, V= Vulnerable; E= Endangered, E2 = Endangered Population, CE = Critically Endangered, PE= Presumed extinct.

Table 48: Likelihood of occurrence of threatened flora listed under the EPBC Act.

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Acacia bynoeana	Bynoe's Wattle	V	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.	-	No – unsuitable habitat	No	No
Acacia pubescens	Downy Wattle	V	Restricted to the Sydney region around the Bankstown-Fairfield-Rookwood and Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon.	Open woodland and forest, 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.	1	No – habitat marginal (Cumberland Plain Woodland), but minimal records of species within 5 km and outside geographic range	No	No
Allocasuarina glareicola		E	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 *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora.*	1	No – records of species within 5 km, but unsuitable habitat (no Castlereagh woodland)	No	No
Cynanchum elegans	White-flowered Wax Plant	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in	Dry rainforest; littoral rainforest; *Leptospermum laevigatum-Banksia*	-	Unlikely – habitat marginal	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			the Illawarra region, and as far west as Merriwa in the upper Hunter River valley.	*integrifolia* subsp. *integrifolia* (Coastal Tea-tree– Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) or *Corymbia maculata* (Spotted Gum) open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle) scrub.		(woodland with *E. tereticornis*), but no records of species within 5 km		
Genoplesium baueri	Bauer's Midge Orchid	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens.	Dry sclerophyll forest and moss gardens over sandstone.	-	No – no records of species within 5 km and unsuitable habitat (no sandstone)	No	No
Haloragis exalata subsp. *exalata*	Square Raspwort	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW.	Protected and shaded damp situations in riparian habitats.	-	No – no records of species within 5 km and unsuitable habitat (no riparian habitat)	No	No
Isotoma fluviatilis subsp. *fluviatilis*		X	Currently known from only one property at Erskine Park in the Penrith LGA. Previously sighted at Homebush and at Agnes Banks.	Damp places on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland, and alluvial	1	No – records of species within 5 km, but unsuitable habitat (no	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
				woodland/shale plains woodland.		damp places or alluvial)		
Melaleuca deanei	Deane's Paperbark	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas.	Heath on sandstone.	-	No – no records of species within 5 km and unsuitable habitat (no sandstone)	No	No
Micromyrtus minutiflora		V	Restricted to the general area between Richmond and Penrith, western Sydney.	Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	1	No – records of species within 5 km, but unsuitable habitat (no alluvium or river sediment)	No	No
Persicaria elatior	Tall Knotweed	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests).	Beside streams and lakes, swamp forest or disturbed areas.	-	No – records of species within 5 km, but unsuitable habitat (no stream/lakes – only the concreted creek)	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Persoonia hirsuta	Hairy Geebung	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west.	Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	-	No – no records of species within 5 km and unsuitable habitat (no sandstone)	No	No
Persoonia nutans	Nodding Geebung	E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south.	Northern populations: sclerophyll forest and woodland (Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland and Cooks River / Castlereagh Ironbark Forest) on aeolian and alluvial sediments. Southern populations: tertiary alluvium, shale sandstone transition communities and Cooks River / Castlereagh Ironbark Forest.	1	Unlikely – habitat marginal (woodland), but minimal records of species within 5 km	No	No
Pimelea curviflora var. *curviflora*		V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south.	Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	-	Unlikely – habitat marginal (woodland on shale), but no records of species within 5 km	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
Pimelea spicata	Spiked Rice-flower	E	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).	Well-structured clay soils. *Eucalyptus moluccana* (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	101	Potential – habitat is marginal (clay soils and Cumberland Plains Woodland) and species known to occur within 5 km	No	No
Pomaderris brunnea	Brown Pomaderris	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands.	Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	-	No – no records of species within 5 km and unsuitable habitat (no moist woodland)	No	No
Pterostylis saxicola	Sydney Plains Greenhood	E	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.	-	No – no records of species within 5 km and unsuitable habitat (no sandstone rock shelves)	No	No
Pultenaea parviflora		V	Endemic to the Cumberland Plain. Mainly from Windsor to Penrith and east to Dean Park, with outlier	Dry sclerophyll forest, especially Castlereagh Ironbark Forest, Shale Gravel Transition Forest	7	Unlikely – habitat marginal (PCT 849), but	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
			populations at Kemps Creek and Wilberforce.	and transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.		minimal records of species within 5 km		
Rhizanthella slateri	Rhizanthella slateri (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	E	The population occurs near Bulahdelah (within the Great Lakes LGA).	Sclerophyll forest in shallow to deep loams.	-	No – habitat marginal (PCT 849), but no records of species within 5 km and outside geographic range	No	No
Rhizanthella slateri	Eastern Australian Underground Orchid	E	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.	Sclerophyll forest in shallow to deep loams.	-	No – habitat marginal (PCT 849), but no records of species within 5 km and outside geographic range	No	No
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	CE	Occurs in coastal districts north from Batemans Bay in New South Wales (NSW), approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland.	Subtropical Rainforests, Northern Warm Temperate Rainforests, Littoral Rainforest, North Coast Wet Sclerophyll Forests, Northern Hinterland WSF, Northern	-	No – no records of species within 5 km and unsuitable habitat (no rainforest or wet sclerophyll vegetation)	No	No

Scientific Name	Common Name	EPBC Act Status	Distribution	Habitat	Number of records within 5km	Likelihood of occurrence on site	Habitat on the site directly or indirectly impacted	Impact assessment required
				Escarpment WSF, Southern Lowland WSF, and probably the northern patches of South Coast WSF and Southern Escarpment WSF				
Syzygium paniculatum	Magenta Lilly Pilly	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	Subtropical and littoral rainforest on gravels, sands, silts and clays.	1	No – records of species within 5 km, but unsuitable habitat (no rainforest vegetation)	No	No
Thesium australe	Austral Toadflax	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands.	Grassland on coastal headlands or grassland and grassy woodland away from the coast.	-	Unlikely – habitat marginal (grassy woodland), but no records of species within 5 km	No	No

M = Migratory, V= Vulnerable; E= Endangered, E2 = Endangered Population, CE = Critically Endangered, PE= Presumed extinct.

Appendix E : Biodiversity credit report

NSW GOVERNMENT

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00036225/BAAS18159/22/00036226	80 OConnell Street BDAR	22/06/2023
Assessor Name	Assessor Number	BAM Data version *
Belinda Jane Failes	BAAS18159	61
Proponent Name(s)	Report Created	BAM Case Status
	27/02/2024	Finalised
Assessment Revision	Assessment Type	Date Finalised
2	Part 4 Developments (Small Area)	27/02/2024
BOS entry trigger	* 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.	
BOS Threshold: Biodiversity Values Map		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Lathamus discolor / Swift Parrot		

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

BAM Biodiversity Credit Report (Variations)

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater

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
849-Cumberland shale plains woodland	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	0.1	2	0	2.00

849-Cumberland shale plains woodland

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest This includes PCT's: 724, 849, 850, 3319, 3320, 3448	-	849_Mown	Yes	2	Cumberland,Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Grassy Woodlands	Tier 1	849_Mown	Yes (including artificial)	2	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Lathamus discolor / Swift Parrot	**849_Mown**	0.0	1.00

Credit Retirement Options

Like-for-like options

Lathamus discolor/ Swift Parrot	Spp	IBRA region	
	Lathamus discolor/Swift Parrot	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

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