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# Biodiversity Development Assessment Report (BDAR)

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172 RUSSELL ST, EMU PLAINS 2750 (LOT 2 / DP 1273251)

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## Final Report:

28<sup>th</sup> April 2025

## Development Proposal:

Transport of Soil Stockpiles to adjacent Lot.

## Prepared by:

Jesse McIvor

Biodiversity Assessment Method (BAM) Officer

Accreditation Number: BAAS24051

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## DOCUMENT CONTROL

|                  |                                                                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TITLE            | Biodiversity Development Assessment Report (BDAR)                                                                                                                                |
| SUBJECT PROPERTY | 172 Russell St., Emu Plains NSW 2560                                                                                                                                             |
| LGA              | Penrith City Council                                                                                                                                                             |
| CLIENT           | Dominic Hogan (Glenstone Group)<br><u>Email:</u> dominic@glenstone.com.au                                                                                                        |
| DATE             | 28 <sup>th</sup> April 2025                                                                                                                                                      |
| REVISION         | REV A <b>Authors:</b> J. Mclvor, S. Hoft<br><b>Details:</b> Final Draft                                                                                                          |
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## DECLARATIONS

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i) **Certification under Clause 6.15 Biodiversity Conservation Act 2016**

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

**Name:** Jesse McIvor

**Signature:** 

**Date:** 18/02/2025

**Biodiversity Assessment Method (BAM) Officer**

**BAM Assessor Accreditation no:** BAAS24051

This BDAR has been prepared to meet the requirements of BAM 2020.

## ii) Details of Authors / Contributors

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### iii) Conflict of Interest

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

**Name:** Jesse McIvor

**Signatur** 

**Date:** 18/02/2025

**BAM Assessor Accreditation no:** BAAS24051

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## EXECUTIVE SUMMARY

The development assessed in this BDAR is proposed to occur at 172 Russell Street, Emu Plains (Lot 2/DP 1273251), within the Penrith City Council Local Government Area (LGA). The Subject Land is identified on the NSW Department of Planning and Environment's Sensitive Biodiversity Values Map, which necessitates the preparation of this BDAR (refer to Figure 1).

This BDAR has been prepared as a site-based 'Streamlined assessment module – small area development that requires consent,' as it does not exceed the area clearing threshold for small area developments as outlined in the BAM (DPIE 2020a; Table 1).

The proposed works include the transfer of stockpiled soil/mounds from several sections of Lot 2 to a designated area on Lot 1 to raise the ground level. There are no trees to be removed, and the impact on native vegetation is low due to the mounds being covered largely with exotic vegetation, though some regenerating *Acacia* species will be impacted by the removal of soil.

Field surveys confirmed the presence of one Plant Community Type (PCT) within the Subject Land: PCT 4025: Cumberland Red Gum Riverflat Forest, which is listed as Endangered under the BC Act 2016 but not under the EPBC Act 1999. Serious and Irreversible Impacts (SIIIs) assessments were not required for this PCT or any threatened species. No hollow-bearing trees were identified within the Subject Land, and no significant habitat will be impacted by the proposed development.

The proposed development incorporates several measures aimed at avoiding, minimising, and managing potential impacts on biodiversity values within the Subject Land, including retaining all native trees, managing weeds, and restoring disturbed areas with locally indigenous species representative of the PCT.

To identify and assess threatened species for this BDAR, a combination of tools and data sources was utilised. The Biodiversity Assessment Method Calculator (BAM-C) generated a preliminary list of potentially occurring threatened species, which was refined using recent listings of threatened species under the BC Act (5km radius search) and field surveys and on-site assessments conducted as part of this report. No threatened flora or fauna species were directly recorded during field surveys. One threatened flora species was identified as requiring further targeted surveys within the Subject Land.

The proposed development will impact 0.68 ha of residual poor condition PCT 4025: Cumberland Red Gum Riverflat Forest. No native trees have been identified for removal within this PCT. All native trees on the property are to be retained.

The final offset requirements are presented in the table below.

Summary of impacts that require an offset (ecosystem credits).

| Vegetation Zone      | PCT                                                                                                                                                                     | TEC | Area (ha) | Current VI Score | Future VI Score | Change in VI | Number of Ecosystem Credits Required |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|------------------|-----------------|--------------|--------------------------------------|
| Zone A               | 4025: Cumberland Red Gum Riverflat Forest                                                                                                                               | No  | 0.38      | 4.3              | 0               | -4.3         | 0                                    |
| Zone B               | 4025: Cumberland Red Gum Riverflat Forest                                                                                                                               | No  | 0.3       | 17.9             | 0               | -17.9        | 3                                    |
| <b>PCT Class</b>     | Coastal Floodplain Wetlands This includes PCT's: 4015, 4023, 4024, 4025, 4026, 4027, 4029, 4034, 4035, 4036, 4037, 4041, 4042, 4044, 4046, 4049, 4050, 4051, 4055, 4059 |     |           |                  |                 |              |                                      |
| <b>Trading Group</b> | Coastal Floodplain Wetlands - $\geq 70\%$ - $<90\%$ cleared group (including Tier 2 or higher threat status).                                                           |     |           |                  |                 |              |                                      |

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## Glossary and Abbreviations

|               |                                                                                        |
|---------------|----------------------------------------------------------------------------------------|
| APZ           | Asset Protection Zone                                                                  |
| BAM           | Biodiversity Assessment Method                                                         |
| BAM-C         | Biodiversity Assessment Method Calculator                                              |
| BC Act 2016   | NSW <i>Biodiversity Conservation Act 2016</i>                                          |
| BC Regulation | Biodiversity Conservation Regulation 2017 (NSW)                                        |
| BDAR          | Biodiversity Development Assessment Report                                             |
| BOAMS         | Biodiversity Offsets and Agreement Management System                                   |
| BOS           | Biodiversity Offsets Scheme                                                            |
| CEEC          | Critically Endangered Ecological Community                                             |
| DBH           | Diameter at Breast Height over bark                                                    |
| DA            | Development Application                                                                |
| DCEEW         | Department of Climate Change, Energy, the Environment and Water (Commonwealth)         |
| DECCW         | Department of Environment, Climate Change and Water (now part of the DPIE) (NSW State) |
| DNG           | Derived Native Grassland                                                               |
| DPIE          | Department of Planning, Industry and Environment (NSW State)                           |
| EPA           | Environment Protection Authority (NSW State)                                           |
| EPBC Act      | Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>      |
| EP&A Act      | NSW <i>Environmental Planning and Assessment Act 1979</i>                              |
| FM Act        | <i>Fisheries Management Act 1994</i>                                                   |
| HBT           | Hollow-bearing Tree                                                                    |
| IBRA          | Interim Biogeographic Regionalisation for Australia                                    |
| LLS Act       | <i>Local Land Services Act 2013</i> (NSW)                                              |
| LGA           | Local Government Area                                                                  |
| MNES          | Matters of National Environmental Significance (Commonwealth)                          |
| mm/cm/m/km    | millimetres/centimetres/metres/kilometres                                              |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NPW Act</b>          | <i>National Parks and Wildlife Act 1974 (NSW)</i>                                                                                                                                                                                                                                                                                                                                              |
| <b>NSW</b>              | New South Wales                                                                                                                                                                                                                                                                                                                                                                                |
| <b>OEH</b>              | Office of Environment and Heritage (NSW State)                                                                                                                                                                                                                                                                                                                                                 |
| <b>PCT</b>              | Plant Community Type                                                                                                                                                                                                                                                                                                                                                                           |
| <b>SAII</b>             | Serious and Irreversible Impact                                                                                                                                                                                                                                                                                                                                                                |
| <b>SEARs</b>            | Secretary's Environmental Assessment Requirements                                                                                                                                                                                                                                                                                                                                              |
| <b>SEPP 2021</b>        | <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>                                                                                                                                                                                                                                                                                                                |
| <b>Subject Land</b>     | Land subject to a development, activity, clearing, biodiversity certification or biodiversity stewardship proposal. It excludes the assessment area which surrounds the subject land [i.e. the 1,500 m or 500 m buffer zone described in BAM Subsection 3.1.2(b)]. In the case of a biodiversity certification proposal, subject land includes the biodiversity certification assessment area. |
| <b>Subject Property</b> | All land within the cadastral boundaries of the specified property.                                                                                                                                                                                                                                                                                                                            |
| <b>TBDC</b>             | Threatened Biodiversity Data Collection                                                                                                                                                                                                                                                                                                                                                        |
| <b>TEC</b>              | Threatened Ecological Community                                                                                                                                                                                                                                                                                                                                                                |
| <b>VEC</b>              | Vulnerable Ecological Community                                                                                                                                                                                                                                                                                                                                                                |
| <b>Vegetation SEPP</b>  | <i>State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)</i>                                                                                                                                                                                                                                                                                                          |



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## STAGE 1: BIODIVERSITY ASSESSMENT

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### 1. INTRODUCTION

McIvor Environmental has been commissioned by Rolling Stone Landscapes ('the proponent') to provide a Biodiversity Development Assessment Report (BDAR) for the proposed action at 172 Russell St, Emu Plains, within the Penrith City Council Local Government Area (LGA). The Subject Land is identified on the NSW Department of Planning and Environment's Sensitive Biodiversity Values Map, which necessitates the preparation of this BDAR (refer to Figure 1).

This BDAR will be prepared as a site-based 'Streamlined assessment module – small area development that requires consent,' as it does not exceed the area clearing threshold for small area developments as outlined in the BAM (DPIE 2020a; Table 1).

## 1.1 Proposed Development and Site Overview

**Table 1.** Details of the site and proposed development.

|                                              |                                                                                                                                                                                                                                                            |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lot / DP                                     | 2 / 1273251                                                                                                                                                                                                                                                |
| Subject Property                             | 172 Russell St, Emu Plains NSW 2750                                                                                                                                                                                                                        |
| Locality Description                         | The subject property is located in Emu Plains, New South Wales, approximately 3.5 km west of Penrith City. It is adjacent to residential, industrial, and rural areas of the suburb. The property lies approximately 2 km to the west of the Nepean River. |
| LGA                                          | Penrith City Council                                                                                                                                                                                                                                       |
| IBRA Bioregion                               | Sydney Basin                                                                                                                                                                                                                                               |
| IBRA Subregion                               | Cumberland                                                                                                                                                                                                                                                 |
| Mitchell Landscape                           | Hawkesbury - Nepean Channels and Floodplains                                                                                                                                                                                                               |
| Lot Size                                     | Lot 1 = 2.1 ha<br><b>Lot 2 = 21.4 ha</b>                                                                                                                                                                                                                   |
| Zoning                                       | Deferred Matter                                                                                                                                                                                                                                            |
| Development Description                      | The proposed works, as outlined to me, include the transfer of stockpiled soil/mounds from several sections of Lot 2 to a designated area on Lot 1 to raise the ground level.                                                                              |
| Impact Summary                               | There are no trees to be removed for any of the proposed work. The impact to native vegetation is very low due to the mounds being covered largely with exotic vegetation, however, some regenerating acacias will be impacted by the removal of the soil. |
| Subject Land                                 | The Subject Land encompasses several zones where the soil mounds are located. Refer to Figure 5)                                                                                                                                                           |
| Legislative Pathway for Proposed Development | Seeking consent under Part 4 of the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act).                                                                                                                                                      |

1.2 Project GIS Maps

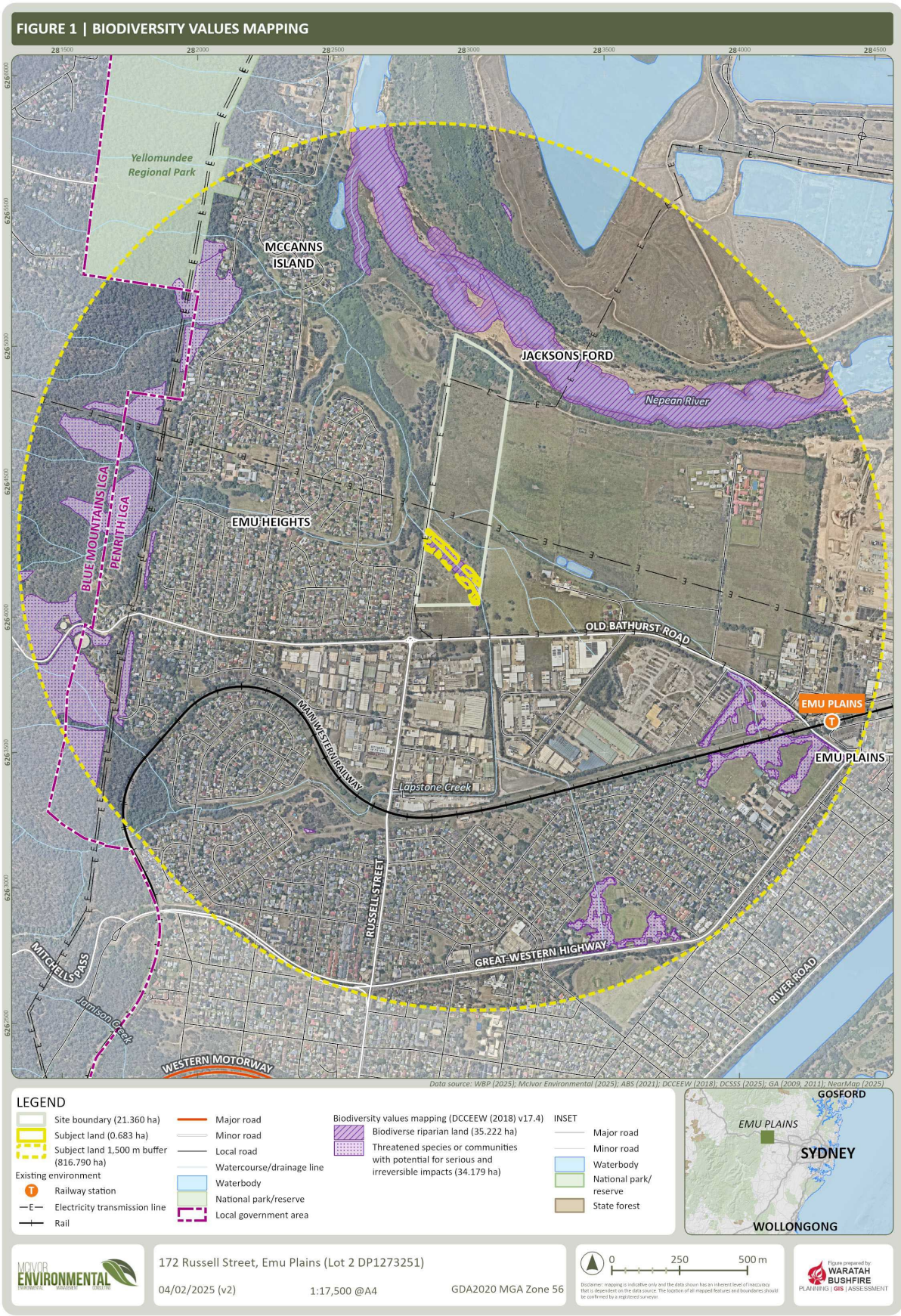


Figure 1. Biodiversity Values Mapping for the Subject Property and Assessment Area.

FIGURE 2 | LOCATION MAP

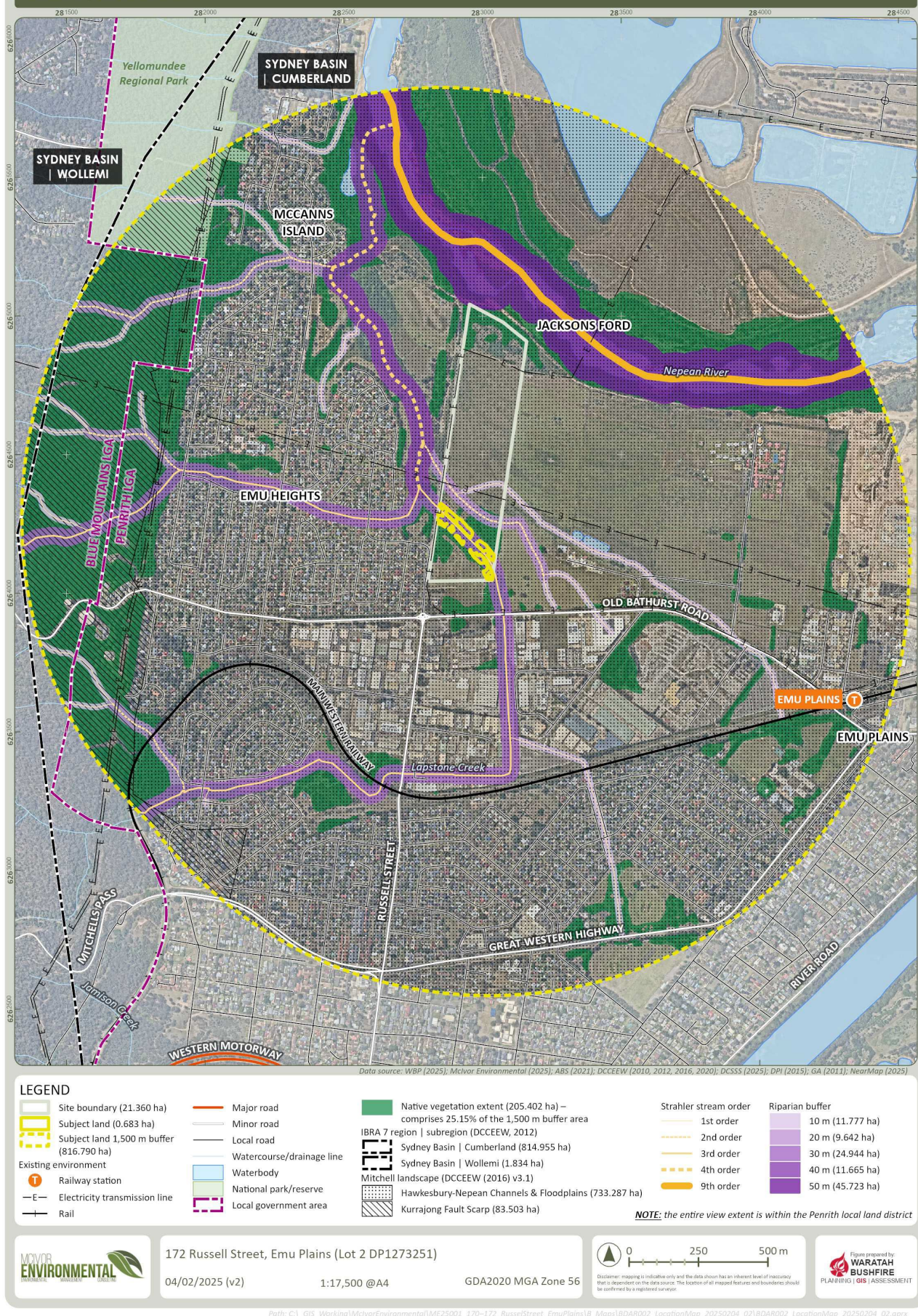
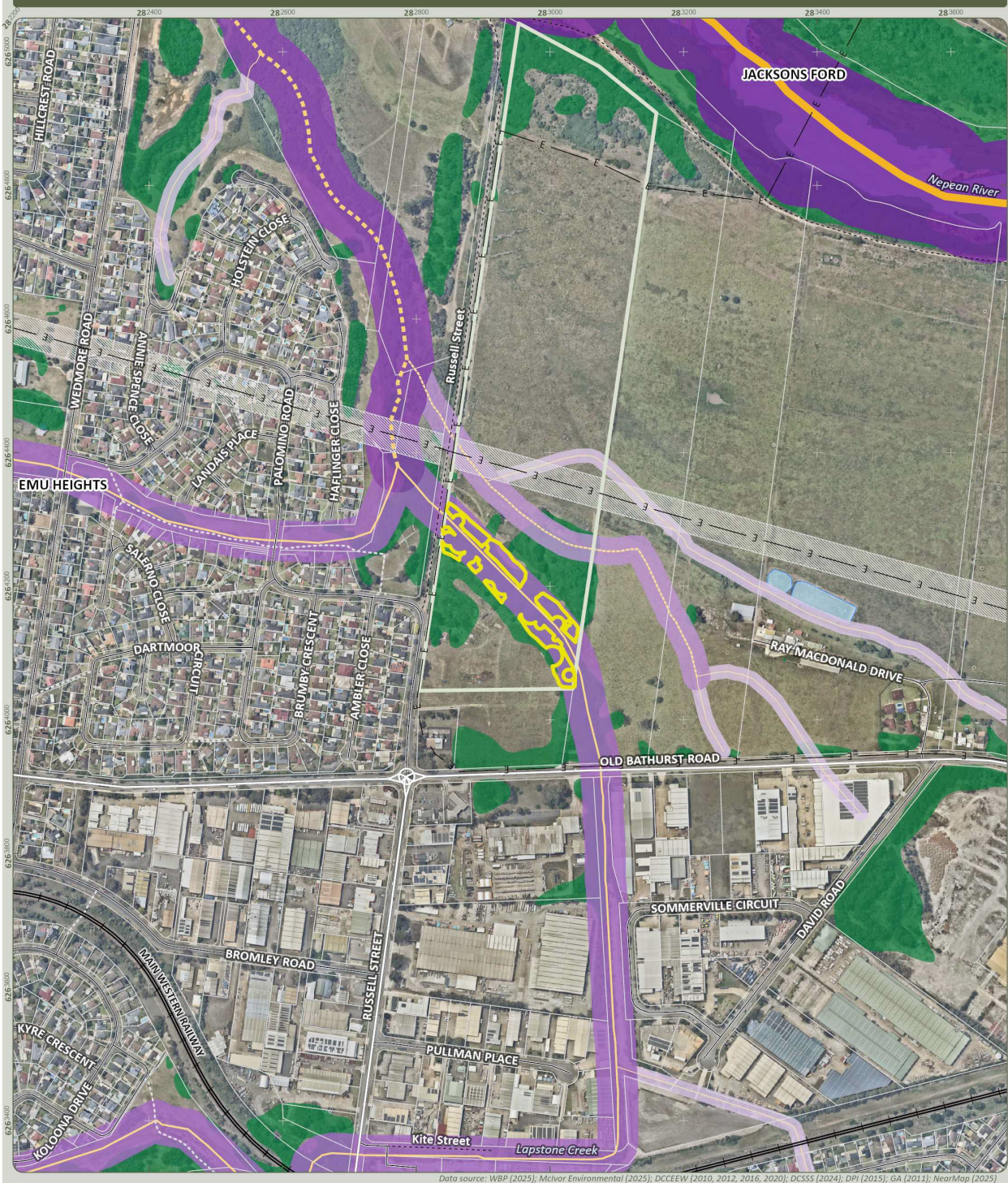


Figure 2. Location Map indicating the native vegetation extent within Assessment Area.

FIGURE 3 | SITE MAP



Data source: WBP (2025); McIvor Environmental (2025); DCCCEW (2010, 2012, 2016, 2020); DCCSS (2024); DPI (2015); GA (2011); NearMap (2025)

LEGEND

- Site boundary (21.360 ha)
- Subject land (0.683 ha)
- Existing environment
- Electricity transmission line
- Rail
- Minor road
- Local road

- Vehicular track
- Path
- Lot boundary
- Easement
- Waterbody
- Native vegetation extent

- Strahler stream order
- 1st order
- 2nd order
- 3rd order
- 4th order
- 9th order

- Riparian buffer
- 10 m
- 20 m
- 30 m
- 40 m
- 50 m

**NOTE:** the entire view extent is within the:

- Penrith local government area
- Penrith local land district
- Sydney Basin IBRA 7 region
- Cumberland IBRA 7 subregion
- Hawkesbury - Nepean Channels & Floodplains Mitchell landscape



172 Russell Street, Emu Plains (Lot 2 DP1273251)

04/02/2025 (v2)

1:8,000 @A4

GDA2020 MGA Zone 56



Disclaimer: mapping is indicative only and the data shown has an inherent level of inaccuracy that is dependent on the data source. The location of all mapped features and boundaries should be confirmed by a registered surveyor.



Path: C:\GIS\_Working\McIvorEnvironmental\ME25001\_170-172\_RussellStreet\_EmuPlains\8\_Maps\BDAR003\_SiteMap\_20250204\_02\BDAR003\_SiteMap\_20250204\_02.aprx

Figure 3. Site Map indicating landscape features in the locality.

FIGURE 4 | NSW STATE VEGETATION TYPE MAP (SVTM)



Figure 4. NSW SVTM for the Assessment Area.

FIGURE 5 | FIELD VALIDATED VEGETATION & BAM SURVEY PLOT LOCATIONS



**Figure 5. Field Validated Vegetation & BAM Survey Plot Locations.**

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### 1.3 Biodiversity Offsets Scheme Entry

The Biodiversity Offset Scheme (BOS) applies to the proposed development at 172 Russell St, Emu Plains, as the Subject Land is mapped as containing Biodiversity Value (BV) under the Biodiversity Conservation Act 2016 (BC Act) (refer to Figure 1). The Biodiversity Mapping and Threshold (BMAT) tool confirms that the development footprint intersects with BV mapping, necessitating the preparation of a Biodiversity Development Assessment Report (BDAR).

Given the expected impacts to vegetation within the mapped BV area, the development may impact biodiversity values associated with this vegetation. Under section 7.2 of the BC Act, this type of impact on BV-mapped areas triggers the requirement for BOS entry to mitigate impacts on threatened species, populations, and ecological communities.

---

### 1.4 Matters of National Environmental Significance (MNES)

The proposed development is not deemed a controlled action and does not need referral under the EPBC Act.

## 1.5 Legislative Context

**Table 2.** Summary of legislation and applicability to the current development proposal.

| Commonwealth Legislation                                                             |                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Title                                                                                | Relevance to the Project                                                                                                                                                                                                                                                                                                                                                        |
| <i>Environment Protection &amp; Biodiversity Conservation Act 1999</i><br>(EPBC Act) | The EP&A Act provides the legal framework for land use planning and environmental assessment in NSW. The BAM 2020 is a tool developed under this Act to assess biodiversity impacts of developments. The proposed development requires consent under the Penrith Local Environmental Plan (LEP) 2010 and is to be assessed under Part 4 of the EP&A Act.                        |
| NSW State Legislation                                                                |                                                                                                                                                                                                                                                                                                                                                                                 |
| Title                                                                                | Relevance to the Project                                                                                                                                                                                                                                                                                                                                                        |
| <i>Environmental Planning &amp; Assessment Act 1979</i><br>(EP&A Act)                | <p>The EP&amp;A Act provides the legal framework for land use planning and environmental assessment in NSW. The BAM 2020 is a tool developed under this Act to assess biodiversity impacts of developments.</p> <p>The proposed development requires consent under the <i>Penrith Local Environmental Plan 2010</i> and is to be assessed under Part 4 of the EP&amp;A Act.</p> |
| <i>Biodiversity Conservation Act 2016</i><br>(BC Act 2016)                           | This legislation aims to conserve biodiversity and promote sustainable land use practices. The BAM 2020 is directly linked to the objectives of this Act, providing the assessment process for determining impacts on biodiversity values.                                                                                                                                      |
| <i>Local Land Services Amendment Act 2016</i><br>(LLS Act)                           | The LLS Act applies to rural land management and biodiversity conservation through Local Land Services. However, the Vegetation SEPP applies to the Penrith City Council LGA, making certain provisions of the LLS Act not applicable.                                                                                                                                          |
| <i>Fisheries Management Act 1994</i> (FM Act)                                        | The development does not involve impacts to Key Fish Habitat, harm to marine vegetation, dredging, reclamation, or obstruction of fish passage. A permit or consultation under the FM Act is not required.                                                                                                                                                                      |
| <i>Water Management Act 2000</i> (WM Act)                                            | The project does not involve work on waterfront land and therefore does not require a Controlled Activity Approval under s91 of the WM Act.                                                                                                                                                                                                                                     |

## Planning Instruments

*State Environmental Planning Policy (Coastal Management) 2018*

(Coastal Management SEPP)

The development site is not located on land to which the Coastal Management SEPP applies.

*State Environmental Planning Policy (Koala Habitat Protection) 2021*  
(Koala SEPP)

Chapter 4 of this SEPP focuses on protecting koala habitats, providing guidance on assessing and mitigating impacts on koalas through biodiversity assessments, including BAM assessments. The Koala SEPP 2021 applies to the Penrith City Council LGA, requiring council assessment of potential impacts on koala habitat.

## Local Plans

Penrith City Council LEP and DCP

LEPs are instruments that guide land use and development at the local level. They often incorporate provisions that reference the BAM for biodiversity assessments related to specific developments.

- Penrith LEP 2010
- Penrith DCP 2014

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## 1.6 Information Sources

To inform the assessment of ecological and legislative requirements within the locality and Penrith City Council LGA, a comprehensive review of relevant literature and resources was conducted. These sources provided an understanding of the natural environment and ecology of the Subject Land and its surroundings. A search for sightings and reports of threatened species within a 5km radius of the Subject Land was conducted on BioNet Atlas (NSW OEH). These species were assessed against a range of criteria to ascertain the degree of impact that may occur to these species as a result of the proposed development. This data also aided the identification of ecological characteristics potentially present on or adjacent to the Subject Land of threatened species and habitats during the site assessment.

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### 1.6.1 Development Application (DA) Documentation

The assessment in this report utilises information from the following documents:

| TITLE                            | AUTHOR                                   | DATE       | REFERRED TO IN THIS REPORT AS: |
|----------------------------------|------------------------------------------|------------|--------------------------------|
| Site Survey                      | RHCO Surveying & Development Consultants | 22/10/2024 | Site Survey                    |
| Arboricultural Impact Assessment | Concept Arbor Consulting                 | 28/02/2025 | AIA                            |

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### 1.6.2 State and Commonwealth Databases & Datasets

#### Internet Databases:

- NSW BioNet – Atlas of NSW Wildlife (DPE 2023a)
- NSW BioNet – Threatened Biodiversity Data Collection (DPE 2023b)
- NSW BioNet – Vegetation Classification System (DPE 2023c)
- NSW EScape – Department of Planning and Environment (DPE 2023d). Soil Landscapes: 1:100,000 Sheet (Chapman and Murphy 2009).
- NSW Government Spatial Services – Six Maps Clip & Ship (NSW Government Spatial Services 2023)

- NSW State Vegetation Type Map (DPE 2022)

**NSW State Guidelines:**

- Biodiversity Development Assessment Method (DPIE 2020a)
- Guidance for Determining Serious and Irreversible Impact (DPIE 2019a)
- Biodiversity Assessment Method Calculator Version 1.4.0.00 (DPE 2023f)
- Biodiversity Offsets and Agreement Management System (BOAMS)
- Surveying Threatened Plants and Their Habitats – NSW Survey Guide for the Biodiversity Assessment Method (DPIE 2020b)
- *Threatened Species Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004)
- *Threatened species test of significance guidelines*. Office of Environment and Heritage. (2018).

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## 2. AIM AND METHODS

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### 2.1 Aim

This report follows the Biodiversity Assessment Method (BAM) (DPIE 2020a) to:

- Describe biodiversity values within the Subject Land, including native vegetation extent, vegetation integrity, and any Threatened Ecological Communities (TECs);
- Assess habitat suitability for candidate threatened species within the Subject Land;
- Provide an impact assessment on potential biodiversity impacts from the proposed development, including prescribed impacts and any Serious and Irreversible Impacts (SIIIs);
- Recommend measures to avoid and minimise impacts on biodiversity values; and
- Calculate the biodiversity credits (ecosystem and species credits) required to quantify the potential impacts of the secondary dwelling. This calculation will guide the decision-maker on the number and type of offset credits needed for purchase and retirement as a result of the development.

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## 2.2 Methodology

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### 2.2.1 Determination of Assessment Type

This BDAR applies Appendix C: Streamlined Assessment Module – Small Area of the Biodiversity Assessment Method (BAM-C) (DPIE 2020a). The streamlined module is used to assess:

- Biodiversity values of small area developments.
- Impacts on biodiversity and offset requirements.

The Subject Land meets the criteria under Table 12 for small area development, with clearing thresholds based on lot size. The streamlined module is applicable to land within Biodiversity Values Map areas, excluding core koala habitat under the *State Environmental Planning Policy (Koala Habitat Protection) 2019*.

| Minimum Lot Size           | Maximum Clearing Limit |
|----------------------------|------------------------|
| Less than 1 ha             | ≤1 ha                  |
| 1 ha to less than 40 ha    | ≤2 ha                  |
| 40 ha to less than 1000 ha | ≤3 ha                  |
| 1000 ha or more            | ≤5 ha                  |

**Figure 6.** Area Clearing Limits for Small Area Development (Table 12 from BAM 2020)

Lot size is based on the LEP lot size map or actual lot size where no minimum applies. The Subject Land complies with these requirements, ensuring alignment with the streamlined assessment module.

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## 2.2.2 Existing Information Analysis

For this project, the Biodiversity Values Map and Threshold (BMAT) tool was utilised to determine the applicable clearing thresholds. The tool identified the minimum lot size as 1,500 sqm and the area clearing threshold as 2,500 sqm. Since the Subject Land meets these thresholds, the BAM applies to assess and address potential impacts on biodiversity values.

Database analysis for the locality, defined as a 5 km radius around the Subject Land, was conducted using the following resources:

- **BioNet Atlas:** Used to generate records of threatened flora and fauna species and populations listed under the BC Act and/or EPBC Act within the locality. Abundance, distribution, and age of records provided supplementary information to assess the potential presence of threatened species on the Subject Land.
- **EPBC Protected Matters Search Tool:** Used to compile a list of potentially occurring EPBC Act-listed entities within the locality.

Additionally, the following databases and mapping tools were interrogated to provide further insights into the biodiversity values of the Subject Land:

- BioNet Vegetation Classification database (EES 2022b);
- NSW BioNet Threatened Biodiversity Data Collection (EES 2022a); and
- Biodiversity Values Map and Threshold Tool.

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## 2.2.3 PCT Justification Methods

Table 13 in Appendix C of the BAM 2020 outlines the key steps to assess small areas and identify and verify Plant Community Types (PCTs) and Threatened Ecological Communities (TECs). PCTs were allocated using a combination of BioNet data, regional vegetation datasets, and council mapping resources, providing a comprehensive understanding of native vegetation characteristics and potential TECs.

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## 2.2.4 Identification of Ecosystem and Species Credit Species

In addition to the BioNet Atlas search and benchmark data for the surrounding landscape, the Biodiversity Assessment Method Calculator (BAM-C) was used to generate a list of threatened flora and fauna species relevant to the Subject Land. These include ecosystem credit species and species credit species, as defined by the Biodiversity Assessment Method (BAM). The identified species

represent those with the potential to occur within the Subject Land and require further consideration during the development assessment (DA) stage of the proposed development.

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### 2.2.5 Mapping Native Vegetation Extent

A qualified and experienced GIS professional was contracted to conduct all mapping for this BDAR. Native vegetation extent within the Subject Land was mapped using a combination of field assessments and available mapping resources. The GIS professional used GPS and aerial imagery to verify and delineate vegetation extents accurately. The BMAT tool confirmed that the area met the streamlined clearing thresholds, supporting the assessment approach under the BAM streamlined module.

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### 2.2.6 Plot-based Vegetation Surveys

Field surveys were conducted on the 29<sup>th</sup> of November and 21<sup>st</sup> December by the BAM Officer: J. McIvor. Surveys were conducted following BAM Subsection 4.2.1 for systematic plot-based floristic vegetation surveys.

Survey plots were established following BAM guidelines to assess vegetation integrity (BAM Subsections 4.3.3 and 4.3.4). The following methods were used to ensure representative sampling:

- **Vegetation Zone A:** A 400 m<sup>2</sup> plot (20 m × 20 m) was established to assess composition and structure attributes. A 1000 m<sup>2</sup> plot (20 m × 50 m) was also established to assess function attributes, including the number of large trees, tree regeneration, and fallen logs.
- **Vegetation Zone B:** A single 400 m<sup>2</sup> plot (20 m × 20 m) was established to evaluate the composition and structure attributes within this highly modified zone dominated by HTE species. A 1000 m<sup>2</sup> plot (20 m × 50 m) was also established to assess function attributes, including the number of large trees, tree regeneration, and fallen logs.

Plots were located to avoid ecotones, vehicle tracks, or other disturbed areas, ensuring a focus on the broad condition state of each vegetation zone. The presence of hollow-bearing trees was also assessed within each plot, as required under BAM guidelines for habitat suitability and ecosystem credit determination.

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### 2.2.7 Vegetation Integrity Assessment

The following attributes were measured in the survey plots to determine vegetation integrity for each zone (refer to BAM Table 2):

- **Composition:** The number and richness of native plant species across various growth form groups (e.g., trees, shrubs, grasses, forbs).
- **Structure:** The summed species foliage cover within each growth form group.
- **Function:** The number of large trees, tree stem size classes, tree regeneration, total length of fallen logs, and average litter cover.

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## 2.3 Threatened Flora Survey Methods

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### 2.3.1 Review of Existing Information

A comprehensive review of existing ecological data was conducted, including BioNet records and council vegetation maps, to identify potential habitat constraints and microhabitats suitable for threatened species. This background data guided field assessments.

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### 2.3.2 Field Surveys

Threatened species surveys were conducted within designated plots in accordance with the BAM 2020 and the *Surveying Threatened Plants and Their Habitats: NSW Survey Guide for the Biodiversity Assessment Method* (Department of Planning, Industry and Environment, 2020). Each plot was systematically surveyed to identify flora and fauna species, ensuring compliance with BAM standards and survey guidelines.

#### Methodology for Threatened Flora Surveys:

- **Targeted Search Approach:** Surveys employed targeted searches for threatened flora species identified as having potential to occur within the Subject Land. This included intensive ground searches across plots to detect flowering and non-flowering plants, consistent with the seasonal requirements for detecting each species.
- **Seasonality Consideration:** Surveys were conducted during optimal flowering or detection periods for species likely to occur within the Subject Land, in accordance with the survey timing specified in the guidelines.
- **Search Method:** The survey approach included walking transects systematically within plots, ensuring full coverage of each plot. Surveyors searched at ground level and within the mid-stratum where relevant.
- **Data Recording:** For each threatened species observed, data recorded included plant health, phenological stage (e.g., flowering, fruiting), population density, and location. Locations were mapped using GPS with a high degree of accuracy.

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## 2.4 Threatened Fauna Survey Methods

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### 2.4.1 Review of Existing Information

To identify potential habitat constraints and microhabitats for threatened fauna, a thorough review of existing information was conducted. This review included analysis of data from the NSW BioNet Atlas, which provided records of threatened fauna species previously recorded within the locality, as well as information on habitat preferences and ecological requirements. The review also incorporated data from the EPBC Protected Matters Search Tool, which identified species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that could potentially occur within or adjacent to the Subject Land. Local ecological reports, council vegetation mapping, and previous flora and fauna surveys within the region were also consulted to gain further insights into habitat suitability and microhabitat features relevant to threatened species in the area.

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### 2.4.2 Habitat Constraints Assessment

Field surveys were conducted to assess habitat constraints and identify specific microhabitats for threatened species within the Subject Land, following BAM Section 5.1 guidelines. Targeted assessments focused on essential habitat features, such as tree hollows, fallen logs, and ground cover complexity, which provide critical resources for various fauna, including hollow-dependent and ground-dwelling species.

Each tree within the survey area was inspected for the presence of hollows, with particular attention to those that could serve as habitats for threatened fauna. Evidence-based justifications were applied in cases where certain features were not surveyed directly due to access limitations, though representative assessments ensured comprehensive data collection across the site. Additional field observations were cross-referenced with BioNet data and other existing sources to confirm habitat suitability for key species, including Koalas and other hollow-dependent fauna, according to the *Survey Guidelines for Australia's Threatened Mammals* (Commonwealth of Australia, 2011).

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### 2.4.3 Field Surveys

Field surveys were conducted with a focus on species identified as likely to be present, based on habitat suitability and the results of prior data analyses. Survey methods included systematic searches within designated plots to detect signs of threatened fauna. All field surveys were conducted by walking transects through the Subject Land and were designed to target species likely to be affected by the proposed development, such as hollow-dependent mammals and birds.

The survey also included opportunistic observations of fauna activity, with species presence noted through direct sightings, calls, and indirect signs, such as scats or tracks. The survey locations are shown in Figure 6, detailing the field survey areas and transect routes.

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## **2.5      Limitations**

The Subject Land was accessible, allowing for thorough flora and fauna surveys. Weather conditions were favourable, supporting identification of most flora. While some species may not have been recorded, the majority of native species were documented, providing a reliable basis for conservation assessment.

For most species targeted fauna surveys were not conducted; instead, habitat evaluations and incidental fauna observations were relied upon. Database searches supplemented fauna data, providing an adequate overview of species likely present.

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## **3. SITE CONTEXT**

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### **3.1 Assessment Area**

The assessment area encompasses the Subject Land, 172 Russell St, Emu Plains, and extends to include a 1500-metre buffer surrounding the Subject Land, as required for site-based developments. This buffer zone captures adjacent habitats and ecological features that could influence or be affected by the proposed development. Refer to Figure 2 and Figure 3 for GIS aerial images of vegetation and landscape features within the Assessment Area.

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### **3.2 Landscape Features**

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#### **3.2.1 IBRA Bioregions and IBRA Subregions**

The Subject Land is located within the 'Cumberland' Subregion of the Interim Biogeographic Regionalisation for Australia, Version 7 (IBRA7), which is part of the broader 'Sydney Basin' Bioregion (refer to Figure 2).

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#### **3.2.2 Rivers, streams, estuaries and wetlands**

A concreted culvert is located within a purple mapped riparian zone on Lot 2 of the subject property.

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#### **3.2.3 Karst, caves, crevices, cliffs, rocks or other geological features of significance**

There are no karst, caves, crevices, cliffs, rocks or other geological features of significance identified within the Subject Land or Subject Property. The Subject Land is not mapped as occurring on Acid Sulfate Soils.

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#### **3.2.4 Areas of outstanding biodiversity value**

No Areas of Outstanding Biodiversity Value occur on the Subject Land or within the surrounding area.

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### 3.2.5 NSW (Mitchell) Landscape

Mitchell Landscapes categorise ecosystems into larger meso-ecosystems that reflect natural formations based on topography and geology. This classification system standardises ecosystem names to convey both locational context and descriptive landscape features, aiding in ecological assessment and management across regions.

The Subject Land is situated within the 'Hawkesbury - Nepean Channels and Floodplains' Mitchell Landscape Ecosystem (refer to Figure 3). Landscape features for 'Hawkesbury - Nepean Channels and Floodplains' are characterised by:

- **Geology:** Meandering channels and moderately wide floodplains on Quaternary sand and gravel. Sand is dominant upstream of the Warragamba River junction, with elevation from 0 to 20m and local relief under 10m. Alluvial sand transitions to sandy loam or clay loam soils.
- **Vegetation:** River flats support forest species such as *Eucalyptus baueriana*, *Angophora subvelutina*, *Eucalyptus viminalis*, and *Eucalyptus elata*, with *Casuarina cunninghamiana* dominating lower sectors. Aquatic species like *Phragmites australis* and *Typha orientalis* are common. Deep loams support *Eucalyptus saligna*, *Eucalyptus deanei*, *Eucalyptus tereticornis*, *Eucalyptus amplifolia*, *Angophora floribunda*, and *Casuarina cunninghamiana*. *Tristaniopsis laurina* is found in protected sections, with swamps supporting *Eleocharis sphacelata*, *Juncus* spp., *Melaleuca* spp., and *Lepidosperma* spp., and tidal zones hosting *Casuarina glauca*, *Phragmites australis*, *Aegiceras corniculatum*, and *Avicennia marina*.

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### 3.2.6 Additional landscape features identified in SEARs

This section is not relevant to this BDAR.

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### 3.2.7 Topography, Geology and Soils

The Subject Land is situated within the Richmond soil landscape (9030ri), characterised by

#### **Landscape**

Quaternary terraces of the Nepean and Georges Rivers. Mainly flat (slopes <1%). Splays and levees provide local relief (<3 m). Tree cover, now almost completely cleared, was formerly a low open-woodland (dry sclerophyll).

#### **Soils**

Poorly structured orange to red clay loams, clays and sands. Texture may increase with depth. Ironstone nodules may be present. Plastic Clays (U46.12) in drainage lines. Deep acid nonCalcic Brown Soils (Gn3.14, Gn4.34), Red Earths (Gn2.11) and Red Podzolic Soils (Dr2.41), occur on terrace surfaces with Earthy Sands (Uc5.21, Uc1.23) on terrace edges.

#### **Limitations**

Localised flood hazard, localised seasonal waterlogging, localised water erosion hazard on terrace edges.

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### 3.3 Native Vegetation Cover and Connectivity

Native vegetation cover and connectivity have been assessed in line with the Biodiversity Assessment Method (BAM) guidelines. The native vegetation cover surrounding the Subject Land was evaluated to determine habitat suitability for threatened species, while areas of connectivity were examined to assess potential movement corridors for fauna across their range.

Table 3 below outlines the native vegetation extent within a 1500-metre buffer around the Subject Land (refer to Figure 2 for mapping). This assessment utilised site data collected during field surveys, supplemented by aerial imagery, to confirm areas classified as native vegetation. Non-native areas, including sports fields, parks, and exotic plantings, were excluded from the assessment.

**Table 3.** Extent of native vegetation cover within the assessment area

| Assessment area                       | 817 ha (1500m radius) |
|---------------------------------------|-----------------------|
| Total area of native vegetation cover | 205.4 ha              |
| Percentage of native vegetation cover | 25.15%                |
| Class (0-10, >10-30, >30-70 or >70%)  | >10-30                |

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## 4. NATIVE VEGETATION ASSESSMENT

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### 4.1 Stockpiles and Vegetation Zones

The soil stockpiles within the Subject Land have been divided into eight sections (refer to Figure 5) to minimise impacts on native vegetation. Their geometry was carefully designed using Tree Protection Zone (TPZ) data from the Arborist Report and precise Geographic Information System (GIS) mapping. This process ensured the protection of retained native vegetation.

The stockpiles are distributed on both sides of the drainage culvert, with Stockpiles 1 to 5 located on the southern side of the culvert and included within Vegetation Zone B. Stockpile 6 is situated just north of the culvert, with Stockpiles 7 and 8 positioned further north; these northern stockpiles are included within Vegetation Zone A.

Although some of the stockpiles fall within the area mapped as Plant Community Type (PCT) 4025, as indicated on the NSW State Vegetation Type Map (SVTM), ground-truthing surveys were conducted to assess the actual vegetation composition within these zones. The surveys confirmed that native vegetation within the stockpiled areas is minimal, with the majority of the vegetation comprising exotic species, including a significant presence of High Threat Exotic (HTE) species.

To ensure data collection across the site, the stockpiles have been grouped into two Vegetation Zones. This approach provided a clear framework for assessing vegetation across the site and facilitated accurate data collection to determine the number and class of biodiversity credits required to offset residual impacts on biodiversity values, as calculated using the Biodiversity Assessment Method Calculator (BAM-C).

Vegetation Zone A, located to the north of the drainage culvert, encompasses Stockpiles 6, 7, and 8. Vegetation Zone B, located to the south of the drainage culvert, includes Stockpiles 1 through 5. The following sections provide more detailed descriptions of these Vegetation Zones, including vegetation composition, condition, and relevant management considerations.

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#### 4.1.1 Vegetation Zone A

**Location:** Vegetation Zone A is located to the north of the drainage culvert on the Subject Property and includes the soil stockpiles situated within the Subject Land, specifically those positioned to the north of the drain.

**Description:** The area is extensively covered by *Cenchrus clandestinus*, *Sida rhombifolia*, and *Solanum sisymbriifolium*, with other exotic forbs and groundcovers scattered throughout. This vegetation reflects the opportunistic recolonisation of invasive exotic species in response to the significant disturbance caused by the historical excavation of soil during the construction of the drainage culvert.

These soil stockpiles are likely composed of material piled during the excavation process, creating disturbed conditions that have since been recolonised by predominantly exotic species, with a high proportion of High Threat Exotic (HTE) species.

Species such as *Ligustrum sinense*, *Lantana camara*, and *Cinnamomum camphora* are also present, contributing to the dominance of exotic vegetation within this area. The groundcover layer is primarily made up of exotic grasses like *Cenchrus clandestinus* and *Eragrostis curvula*, along with forbs such as *Plantago lanceolata* and *Verbena bonariensis*.

Despite the dominance of exotic species, *Glycine tabacina* was observed in this patch, representing the only native species recorded in the vegetation plot for this area. The overall scarcity of native vegetation in this area makes it difficult to accurately assign a Plant Community Type (PCT) based solely on the vegetation present on the stockpiles. Consequently, remnant vegetation surrounding the stockpiles was assessed to determine the appropriate PCT using the BioNet Vegetation Classification System.

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#### 4.1.2 Vegetation Zone B

**Location:** *Vegetation Zone B* is located to the south of the drainage culvert on the Subject Property. This area includes soil stockpiles that were most likely created during the historical excavation of soil for the drainage culvert. The stockpiles in this section have again been carefully mapped using Tree Protection Zone (TPZ) data from the Arborist Report and Geographic Information System (GIS) software to avoid impacting native trees and shrubs. The vegetation data recorded from Vegetation Plot B is representative of the vegetation found on these stockpiles within the Subject Land, to the south of the drainage culvert.

**Description:** Although there is a greater representation of native groundcover species in Vegetation Zone B compared to the northern stockpiles, the area remains dominated by invasive exotic species, with 50% of the ground layer comprising High Threat Exotic (HTE) species. This zone also contains more exposed patches of bare earth, which may result from frequent disturbance by cattle accessing the area.

Native vegetation recorded in this zone consists of *Dichondra repens*, *Wahlenbergia gracilis*, and *Solanum prinophyllum* in the forb layer, with *Cynodon dactylon* forming a moderate groundcover layer. *Glycine tabacina* was recorded in low abundance, consistent with observations from the stockpiles to the north of the culvert.

Exotic vegetation dominates the zone, with *Cenchrus clandestinus*, *Sida rhombifolia*, and *Solanum sisymbriifolium* forming a thick groundcover layer. Woody exotic species, such as *Melia azedarach* and *Cinnamomum camphora*, were also recorded, along with scattered individuals of *Ligustrum sinense*. Other exotic species present include *Eragrostis curvula*, *Paspalum dilatatum*, and *Plantago lanceolata*, which were interspersed throughout the stockpiles.

The disturbed nature of this zone, coupled with the dominance of exotic species and the lack of a consistent native species composition, makes it difficult to accurately assign a Plant Community Type (PCT) based solely on the vegetation recorded within the stockpiles. As a result, the surrounding remnant vegetation was used to assist in determining the appropriate PCT classification using the BioNet Vegetation Classification System.

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#### 4.1.3 Lot 1 / DP 1273251

**Location:** Lot 1 / DP 1273251 is situated to the south of Lot 2, where Vegetation Zones A and B are located. This area has been designated for the relocation of soil stockpiles from these zones. It is not mapped on the Biodiversity Values Map and does not contain any native trees. Historically, it has been intensively used for agricultural purposes, particularly cattle grazing, which has significantly influenced both the soil condition and the vegetation composition.

**Description:** The vegetation within Lot 1 / DP 1273251 predominantly consists of exotic species, with a high abundance of *Panicum spp.* (panic grasses) along with *Paspalum dilatatum* (paspalum) and *Cirsium vulgare* (spear thistle). The prolonged agricultural use of this area has resulted in a highly disturbed environment dominated by pasture grasses and other invasive species. No native trees species were recorded within this area, and the soil reflects compaction and nutrient depletion typical of heavily grazed agricultural land. The relocation of soil stockpiles to this area is unlikely to impact native biodiversity due to the limited native vegetation which mostly includes Couch Grass, and its history of agricultural use.



**Figure 7.** Aerial map of Lot 1/DP1273251

## 4.2 Vegetation Observations

This section details the vegetation observed and documented during the site investigation and vegetation surveys. Comprehensive data collected during the BAM vegetation plot surveys are provided in Appendix B for reference. The vegetation assessments were conducted to accurately capture the composition, structure, and condition of the flora within the study area, offering a clear representation of the site's ecological characteristics. The native species recorded on the site is presented in and exotic species in Table 8 and Table 9.

As detailed in the *Arboricultural Impact Assessment by Concept Arbor Consulting dated 28th February 2025*, a total of 45 trees were assessed within the Subject Land. Seven of these trees (Tree Nos. 06, 07, 09, 15, 34, 37 and 41) are *Cinnamomum camphora* (Camphor laurel), a declared weed species under the *Biosecurity Act 2015*, and are recommended for removal. These trees are exotic and not considered native vegetation under the BC Act 2016. Their removal does not generate offset requirements and is consistent with the proposed restoration and weed control actions.

**Table 4.** Native species recorded within and in the immediate surrounds of the Subject Land.

| GF Code | Species Name                                  | Common Name           | Foliage Cover |            | Family         |
|---------|-----------------------------------------------|-----------------------|---------------|------------|----------------|
|         |                                               |                       | Veg Plot A    | Veg Plot B |                |
| TG      | <i>Eucalyptus amplifolia</i>                  | Cabbage Gum           | -             | -          | Myrtaceae      |
| TG      | <i>Eucalyptus tereticornis</i>                | Forest Red Gum        | -             | -          | Myrtaceae      |
| TG      | <i>Acacia parramattensis</i><br>(see Note b.) | Parramatta Wattle     | 3             | 2          | Fabaceae       |
| SG      | <i>Exocarpos cupressiformis</i>               | Native Cherry         | -             | -          | Santalaceae    |
| SG      | <i>Bursaria spinosa</i>                       | Australian Blackthorn | -             | -          | Pittosporaceae |
| FG      | <i>Dichondra repens</i>                       | Kidney Weed           | -             | 1          | Convolvulaceae |
| FG      | <i>Wahlenbergia gracilis</i>                  | Australian Bluebell   | -             | 1          | Campanulaceae  |
| FG      | <i>Solanum prinophyllum</i>                   | Forest Nightshade     | -             | 2          | Solanaceae     |
| GG      | <i>Cynodon dactylon</i>                       | Couch Grass           | -             | 21         | Poaceae        |
| OG      | <i>Glycine tabacina</i>                       | Glycine               | 1             | 1          | Fabaceae       |

**Note:**

a. If a species has a “-” in the foliage cover cell, it indicates that it was not recorded within a vegetation plot. However, it was observed during the broader flora diversity survey of the Subject Property to provide a more

comprehensive understanding of the remnant vegetation community, assisting in the accurate determination of the appropriate PCT as classified by the BioNet Vegetation Classification System.

b. The *Acacia parramattensis* recorded in the vegetation plots consists of regenerating juvenile specimens, classified as tree regeneration with a diameter of less than 5 cm in the BAM-C. Several mature individuals of this species were observed growing near the drainage culvert, outside of the Subject Land. The boundaries of the Subject Land were carefully defined to avoid any mature or medium-sized native trees.

**Table 5.** Exotic species recorded within and in the immediate surrounds of the Subject Land.

**a) Vegetation Plot A: North side of drain.**

| Species Name                     | Common Name         | Exotic (E or HTE) | Foliage Cover (%) |
|----------------------------------|---------------------|-------------------|-------------------|
| <i>Cenchrus clandestinus</i>     | Kikuyu Grass        | HTE               | 40                |
| <i>Sida rhombifolia</i>          | Paddy's Lucerne     | HTE               | 30                |
| <i>Solanum sisymbriifolium</i>   | Sticky Nightshade   | HTE               | 15                |
| <i>Cestrum parqui</i>            | Green Cestrum       | HTE               | 1                 |
| <i>Melia azedarach</i>           | White Cedar         | HTE               | 1                 |
| <i>Solanum mauritianum</i>       | Wild Tobacco        | HTE               | 1                 |
| <b>Total HTE Cover</b>           |                     |                   | <b>88</b>         |
| <i>Paspalum sp.</i>              | Paspalum Grass      | E                 | 3                 |
| <i>Verbena bonariensis</i>       | Purpletop           | E                 | 5                 |
| <i>Plantago lanceolata</i>       | Ribwort Plantain    | E                 | 2                 |
| <i>Cirsium vulgare</i>           | Spear Thistle       | E                 | 1                 |
| <i>Lepidium didymum</i>          | Lesser Swinecress   | E                 | 1                 |
| <i>Pavonia hastata</i>           | Pink Pavonia        | E                 | 1                 |
| <i>Bidens subalternans</i>       | Beggarticks         | E                 | 1                 |
| <i>Eragrostis curvula</i>        | African Lovegrass   | E                 | 1                 |
| <i>Paspalum dilatatum</i>        | Dallis Grass        | E                 | 1                 |
| <i>Centaureum tenuiflorum</i>    | Slender Centaury    | E                 | 1                 |
| <i>Oxalis alpina</i>             | Alpine Oxalis       | E                 | 1                 |
| <i>Modiola caroliniana</i>       | Bristly Mallow      | E                 | 1                 |
| <i>Bromus catharticus</i>        | Prairie Grass       | E                 | 1                 |
| <i>Solanum chenopodioides</i>    | Whitetip Nightshade | E                 | 1                 |
| <i>Cyclospermum leptophyllum</i> | Marsh Parsley       | E                 | 1                 |
| <i>Cyperus brevifolius</i>       | Shortleaf Flatsedge | E                 | 1                 |

**b) Vegetation Plot B: south-side of drain**

| Species Name                     | Common Name         | Exotic (E or HTE) | Foliage Cover (%) |
|----------------------------------|---------------------|-------------------|-------------------|
| <i>Cenchrus clandestinus</i>     | Kikuyu Grass        | HTE               | 15                |
| <i>Melia azedarach</i>           | White Cedar         | HTE               | 5                 |
| <i>Sida rhombifolia</i>          | Paddy's Lucerne     | HTE               | 10                |
| <i>Lantana camara</i>            | Lantana             | HTE               | 1                 |
| <i>Solanum sisymbriifolium</i>   | Sticky Nightshade   | HTE               | 5                 |
| <i>Solanum mauritianum</i>       | Wild Tobacco        | HTE               | 1                 |
| <i>Ligustrum sinense</i>         | Small-leaved Privet | HTE               | 3                 |
| <i>Cinnamomum camphora</i>       | Camphor Laurel      | HTE               | 10                |
| <b>Total HTE Cover</b>           |                     |                   | <b>50</b>         |
| <i>Eragrostis curvula</i>        | African Lovegrass   | E                 | 10                |
| <i>Paspalum dilatatum</i>        | Dallis Grass        | E                 | 10                |
| <i>Verbena bonariensis</i>       | Purpletop           | E                 | 5                 |
| <i>Plantago lanceolata</i>       | Ribwort Plantain    | E                 | 5                 |
| <i>Cirsium vulgare</i>           | Spear Thistle       | E                 | 1                 |
| <i>Bidens Pilosa</i>             | Cobbler's Pegs      | E                 | 2                 |
| <i>Bidens subalternans</i>       | Beggarticks         | E                 | 1                 |
| <i>Cyclospermum leptophyllum</i> | Marsh Parsley       | E                 | 1                 |
| <i>Centaureum tenuiflorum</i>    | Slender Centaury    | E                 | 1                 |
| <i>Oxalis alpina</i>             | Alpine Oxalis       | E                 | 1                 |
| <i>Desmanthus sp.</i>            | Desmanthus          | E                 | 1                 |
| <i>Modiola caroliniana</i>       | Bristly Mallow      | E                 | 1                 |
| <i>Solanum chenopodioides</i>    | Whitetip Nightshade | E                 | 1                 |
| <i>Cyperus brevifolius</i>       | Shortleaf Flatsedge | E                 | 1                 |

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## 4.3 Plant Community Types (PCTs)

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### 4.3.1 PCT Mapping

The NSW SVTM PCT mapping (refer to Figure 4) for the Subject Land for both Vegetation Zones indicates that this section contains:

- **PCT 4025: Cumberland Red Gum Riverflat Forest**

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## 4.4 Justification of PCT Selection

The selection of a suitable Plant Community Type (PCT) was guided by the process outlined in Table 13 of the BAM 2020, which details steps for identifying and verifying PCTs and Threatened Ecological Communities (TECs) in small areas. This assessment utilised BioNet data, regional vegetation datasets, and council mapping resources to ensure an accurate classification of the native vegetation.

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### 4.4.1 PCT Shortlisting Process

Two vegetation plots, one within each Vegetation Zone, were surveyed to capture ecological characteristics required for assessing Vegetation Integrity (VI) under BAM 2020. Analysis confirmed that one vegetation community was present across the Subject Land, with both sets of plot data integrated into the BAM-C to calculate VI scores and biodiversity loss for each zone.

The PCT shortlisting process employed the BioNet Vegetation Classification System and the PCT Filter Tool, applying criteria such as:

- **IBRA Bioregion:** Sydney Basin
- **IBRA Subregion:** Cumberland
- **Vegetation Formation:** Forested Wetlands
- **Species:**
  - *Eucalyptus amplifolia*
  - *Eucalyptus tereticornis*
  - *Acacia parramattensis*
  - *Exocarpos cupressiformis*
  - *Bursaria spinosa*
  - *Dichondra repens*
  - *Wahlenbergia gracilis*
  - *Solanum prinophyllum*
  - *Cynodon dactylon*
  - *Glycine tabacina*

Due to the disturbed understorey and ground cover, these elements were not relied upon for PCT determination. The final selection of the PCT was based upon:

- **Species Composition:** Alignment with observed dominant species in the surrounding areas.
- **Structural Characteristics:** Matching vegetation structure and landscape context.

## Height Data

The PCT shortlisting process utilised site-specific data, including GNSS-derived height data referenced to the Australian Height Datum (AHD) using AUSGeoid2020. Elevation data was obtained from a survey mark on the Subject Land through the Survey Control Information Management System (SCIMS), a tool that enables users to discover and download data related to each survey mark within the system. This accurate elevation information refined the environmental parameters such as topography and landscape position, ensuring that PCTs considered for the Subject Land aligned with the site's actual elevation, contributing to an accurate and defensible assessment in accordance with the *Biodiversity Assessment Method 2020*.

Height on Subject Land: **23.17 metres**

GDA2020

SCIMS SURVEY MARK SUMMARY REPORT AS AT: 17-FEB-2025

Your Reference:

Search Number:

SURVEY MARK

Mark

Name

Alias

PM 51217

Status

Date

Comments

Location

Monument

Date Placed

Placed By

GROUND LEVELUNKNOWN

GDA2020

Horizontal coordinates are adjusted (or initialised) in GDA2020

Class

Positional Uncertainty

Local Uncertainty

GDA Updated

B0.020.0313-NOV-2024

Source

Type

Method

Date issued

Issued By

301719ADJUSTMENTDYNADJUST22-OCT-2024JOEL HAASDYK

Previous Reference

Location

File Number

n/an/an/a

Comments

GDA2020 STATE ADJUSTMENT NOV 2024

MGA2020 Combined Scale Factor

MGA2020 Convergence

1.000174-1° 18' 08.76"

AusGeoid2020(N)

23.717

**Figure 8.** Survey mark data from the Subject Land (Source: [maps.six.nsw.gov.au/scims.html](https://maps.six.nsw.gov.au/scims.html))

## Rainfall Data

Rainfall data from the closest weather station was used as part of the assessment process. Rainfall measurements include all forms of precipitation such as rain, drizzle, hail, and snow.

Station Details: Penrith Lakes AWS (Station No. 67113) – 3.5km from Subject Land

- Location: Latitude 33.72°S, Longitude 150.68°E
- Elevation: 25 metres above sea level
- Opened in 1995 and remains operational.

Average Total Rainfall per year: **754.3 mm**

### Summary statistics for all years

Move mouse over highest daily rainfall to view dates.

| Statistic     | Jan   | Feb   | Mar   | Apr   | May  | Jun  | Jul   | Aug  | Sep  | Oct  | Nov  | Dec  |
|---------------|-------|-------|-------|-------|------|------|-------|------|------|------|------|------|
| Mean          | 94.2  | 118.8 | 104.7 | 57.6  | 36.1 | 46.0 | 37.0  | 29.7 | 30.6 | 53.8 | 81.7 | 64.1 |
| Median        | 89.7  | 91.6  | 67.4  | 38.6  | 27.2 | 32.3 | 19.2  | 20.2 | 25.4 | 45.2 | 65.7 | 59.3 |
| Highest Daily | 101.8 | 139.0 | 130.6 | 167.0 | 63.0 | 81.6 | 101.6 | 60.6 | 57.2 | 75.2 | 89.0 | 49.6 |

**Figure 9.** Rainfall data for the Subject Land (Source: <http://www.bom.gov.au/climate/data/>)

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#### 4.4.2 PCT Shortlist Results

The PCT selection process involved using the BioNet Vegetation Classification System and the PCT Filter Tool to generate a shortlist of five (5) potential Plant Community Types occurring within the Sydney Basin Bioregion and Cumberland Subregion, which met all applied filters. Each shortlisted PCT was then assessed by comparing its vegetation characteristics, geographical distribution, geology, landscape position, rainfall, and elevation data with those of the Subject Land and Study Area.

The shortlisted PCTs included:

- PCT 3320: Cumberland Shale Plains Woodland
- PCT 3321: Cumberland Shale-Sandstone Ironbark Forest
- PCT 3448: Castlereagh Ironbark Forest
- PCT 4025: Cumberland Red Gum Riverflat Forest
- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest

**Table 6.** Analysis of PCT shortlist from the PCT Filter Tool.

| PCT  | Formation                                           | Class                              | Vegetation Type                            | Correlation between PCT characteristics (eg. vegetation, geology and distribution) compared to Subject Land. (High, Med., Poor)                                                                                                                                                                                                                                                  |
|------|-----------------------------------------------------|------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3320 | Grassy Woodlands                                    | Coastal Valley Grassy Woodlands    | Cumberland Shale Plains Woodland           | Medium. This PCT is found on undulating shale plains of western Sydney, including Penrith LGA, with a median elevation of 64.9 m and rainfall range of 746–938 mm. Vegetation includes <i>Eucalyptus tereticornis</i> and <i>Acacia parramattensis</i> , aligning with the Subject Land, but lacks <i>Eucalyptus amplifolia</i> . Ground cover and elevation slightly differ.    |
| 3321 | Grassy Woodlands                                    | Coastal Valley Grassy Woodlands    | Cumberland Shale-Sandstone Ironbark Forest | Medium. This PCT is found in the Sydney Basin with similar rainfall (773–1069 mm) and <i>Acacia parramattensis</i> , but dominant ironbark species ( <i>Eucalyptus crebra</i> ) differ from the Subject Land's <i>Eucalyptus amplifolia</i> and <i>Eucalyptus tereticornis</i> .                                                                                                 |
| 3448 | Dry Sclerophyll Forests (Shrub/grass sub-formation) | Cumberland Dry Sclerophyll Forests | Castlereagh Ironbark Forest                | Low. Found on Tertiary alluvium with ironstone gravels, this PCT has dense mid-stratum <i>Melaleucas</i> not observed on the Subject Land. Rainfall (774–1040 mm) and vegetation differ.                                                                                                                                                                                         |
| 4025 | Forested Wetlands                                   | Coastal Floodplain Wetlands        | Cumberland Red Gum Riverflat Forest        | High. Elevation (52.5 m median) and rainfall range (742–1002 mm) align with the Subject Land's 23.17 m elevation and 754.3 mm annual rainfall. Canopy species ( <i>Eucalyptus amplifolia</i> , <i>Eucalyptus tereticornis</i> ) match observed species. <i>Angophora floribunda</i> absent on Subject Land but sparse mid-stratum with <i>Acacia parramattensis</i> aligns well. |
| 4058 | Forested Wetlands                                   | Coastal Floodplain Wetlands        | Sydney Hinterland Red Gum Riverflat Forest | Medium. While canopy species ( <b>EUCALYPTUS AMPLIFOLIA</b> , <b>EUCALYPTUS TERETICORNIS</b> ) match, this PCT's typical range (848 mm rainfall, elevation 129 m median) and presence of mesic shrubs like <b>BREYNIA OBLONGIFOLIA</b> differ from the Subject Land's disturbed understorey.                                                                                     |

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## 4.5 PCT Assigned to the Subject Land

This section provides detailed information on the vegetation observed within the Subject Land and Study Area, including native and invasive species composition and alignment with potential Threatened Ecological Communities (TECs). It also describes the selected Plant Community Type (PCT) and its characteristics.

The Subject Land was divided into two Vegetation Zones based on the proposed development layout and observed vegetation condition. This allowed for an independent assessment of vegetation types within each zone, considering native and exotic species presence.

**Vegetation Zone A:** Adjacent vegetation aligned to PCT 4025: Cumberland Red Gum Riverflat Forest. Native canopy species observed include *Eucalyptus amplifolia* and *Eucalyptus tereticornis*, with a sparse mid-stratum dominated by *Acacia parramattensis*. However, the vegetation structure is impacted by the presence of exotic and high-threat exotic (HTE) species, contributing to a disturbed condition.

**Vegetation Zone B:** Also contains predominantly exotic groundcovers with limited native representation. The assigned PCT for this zone is also PCT 4025, based on observations from surrounding vegetation within the Study Area, despite the disturbed condition.

**Table 7.** Summary of vegetation characteristics for the PCT allocated to the Subject Land.

| PCT 4025: Cumberland Red Gum Riverflat Forest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| PCT ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4025                                |
| PCT Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cumberland Red Gum Riverflat Forest |
| Vegetation Formation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Forested Wetlands                   |
| Vegetation Class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Coastal Floodplain Wetlands         |
| Median Native Richness / Plot (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 32                                  |
| Percent Cleared Value (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 70.5                                |
| Extent within Subject Land (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.68                                |
| Condition State                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Poor                                |
| BC Act Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Not listed                          |
| EPBC Act Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Not listed                          |
| Alignment with TECs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | N/A                                 |
| TEC area within Subject Land (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | N/A                                 |
| TEC Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | N/A                                 |
| Summary description of vegetation within the Subject Land                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |
| <p><b>Vegetation Zone A:</b> Adjacent vegetation aligned to PCT 4025: Cumberland Red Gum Riverflat Forest. Native canopy species observed include <i>Eucalyptus amplifolia</i> and <i>Eucalyptus tereticornis</i>, with a sparse mid-stratum dominated by <i>Acacia parramattensis</i>. However, the vegetation structure is impacted by the presence of exotic and high-threat exotic (HTE) species, contributing to a disturbed condition.</p> <p><b>Vegetation Zone B:</b> Also contains predominantly exotic groundcovers with limited native representation. The assigned PCT for this zone is also PCT 4025, based on observations from surrounding vegetation within the Study Area, despite the disturbed condition.</p> |                                     |

**PCT 4025: Cumberland Red Gum Riverflat Forest****PCT 4025 Description****Attributes** (Source: BioNet Vegetation Classification Community Profile)

A tall to extremely tall sclerophyll open forest with a mid-stratum of soft-leaved shrubs and small trees and dense, grassy ground layer situated on the alluvial flats alongside streams that drain the Cumberland Plain or more rarely the broad alluvial flats of the Hawkesbury and Nepean river systems to the west of Sydney. The canopy almost always includes red gums (*Eucalyptus tereticornis*, *Eucalyptus amplifolia*), occasionally associated with an apple (*Angophora floribunda*, *Angophora subvelutina*), which may be locally prominent. A sparse mid-stratum almost always includes *Bursaria spinosa* and one or more *Acacia* species, of which *Acacia parramattensis* is the most frequent and abundant. The ground layer is typically characterised by a dense cover of grasses along with soft-leaved forbs and ferns. A high cover of *Microlaena stipoides* is almost always present with more scattered *Dichondra repens*, *Oplismenus aemulus*, and *Solanum prinophyllum* being very frequent. The largest remaining areas are situated along the smaller streams and, while widespread, this PCT primarily occurs in small, often disturbed patches and is threatened by ongoing weed invasion following flood events. It typically occurs in a warm, moist climate at low elevation with a mean of 60 metres asl, however may occur up to 320 metres in southern parts of the Cumberland Plain. Where saline soils occur on the floodplain, this PCT grades into PCT 4023 which includes *Casuarina glauca* in its canopy. Where the floodplain narrows in valleys with sandstone escarpments upslope, it grades into PCT 4058 which includes a wider range of shrubs and scramblers including *Sigesbeckia orientalis* subsp. *orientalis*, *Breynia oblongifolia*, and *Rubus parvifolius*. As elevation or distance from the margin of the floodplain increases, this PCT grades into grassy woodlands of the Cumberland Plain (PCT 3320) in which *Eucalyptus moluccana* is common.



**Photograph 1.** View SE over Stockpile 6.



**Photograph 2.** View NW over Stockpile 7.



**Photograph 3. View NW over Stockpile 8.**



**Photograph 4. View from Stockpile 4 towards Stockpile 3.**



**Photograph 5. View NW from Stockpile 2.**

## 4.6 Patch Size

A patch, as defined by the BAM (DPIE 2020a), is an area of native vegetation on the Subject Land that includes vegetation with gaps of less than 100 m to the next area of native vegetation (or  $\leq 30$  m for non-woody ecosystems). Patches may extend beyond the Subject Land and onto adjoining properties.

The patch size was determined in hectares and classified into one of the following categories:

- <5 ha
- 5–<25 ha
- 25–<100 ha
- $\geq 100$  ha.

The patch size class is an important factor for assessing habitat suitability for threatened species. Where vegetation zones consist of two or more discontinuous areas of native vegetation with differing patch sizes, more than one patch size class may be assigned.

For this assessment, patch size was determined using data collected during the site assessment, supported by aerial imagery and Google Earth to assess the broader landscape. Vegetation in these zones was classified as woody vegetation, and as such, the patch size includes all areas of woody native vegetation within 100 m of each other.

In accordance with Section D of the BAM (DPIE 2020a), areas classified as planted native or exotic vegetation are not subject to assessment under Chapter 4 of the BAM. Consequently, patch size calculations were not undertaken for non-native vegetation areas.

**Table 8.** Patch size class for each PCT and associated vegetation zone.

| PCT  | Zone                  | Patch Size Class |
|------|-----------------------|------------------|
| 4025 | Vegetation Zone A & B | 5–<25 ha         |

## 4.7 Vegetation Integrity (Vegetation Condition)

### 4.7.1 Vegetation Integrity (VI) Survey Plots

Vegetation integrity assessments provide a metric-based evaluation of vegetation condition by comparing the composition, structure, and function attributes of vegetation zones against benchmarks for the relevant Plant Community Types (PCTs). For this Biodiversity Development Assessment Report (BDAR), two vegetation zones were identified within the Subject Land and were assessed using vegetation integrity survey plots in accordance with the Biodiversity Assessment Method (BAM) 2020 guidelines.

### 4.7.2 VI Scores

Summaries of the Vegetation Integrity (VI) scores are presented in the following tables.

**Table 9.** Vegetation Integrity (VI) score for Vegetation Zone A

| Vegetation zone ID | Composition condition score | Structure condition score | Function condition score (where relevant) | Vegetation integrity score | Hollow bearing trees present? |
|--------------------|-----------------------------|---------------------------|-------------------------------------------|----------------------------|-------------------------------|
| Vegetation Zone A  | 3.4                         | 1.6                       | 15                                        | 4.3                        | No                            |

**Table 10.** Vegetation Integrity (VI) score for Vegetation Zone B

| Vegetation zone ID | Composition condition score | Structure condition score | Function condition score (where relevant) | Vegetation integrity score | Hollow bearing trees present? |
|--------------------|-----------------------------|---------------------------|-------------------------------------------|----------------------------|-------------------------------|
| Vegetation Zone B  | 12.4                        | 17.2                      | 26.9                                      | 17.9                       | No                            |

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## 5. THREATENED SPECIES ASSESSMENT

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### 5.1 Identification of Threatened Species for Assessment

No threatened flora or fauna species were directly recorded during field surveys conducted for this assessment. However, the Biodiversity Assessment Method Calculator (BAM-C) was used to generate a list of ecosystem credit species potentially occurring on or using the Subject Land. The following criteria were applied in the BAM-C to predict species likely to occur:

- **IBRA Subregion:** Sydney Basin
- **Associated PCTs:** PCT 4025 (Cumberland Red Gum Riverflat Forest)
- **Percent Native Vegetation Cover in the Assessment Area:** 25%
- **Patch Size/Class:** 5—<25 ha
- **Credit Type:** Ecosystem and/or Species

The BAM-C list was verified and informed by additional sources, including recent threatened species listings under the BC Act, site-specific ecological reports, council vegetation mapping, and data collected during field surveys.

#### Adjustments to the BAM-C List

The species list generated by the BAM-C was refined in accordance with BAM Subsections 5.2.1 and 5.2.2 to ensure accuracy:

- **Species Added:** Additional species identified based on ecological reports, council data, or updated Threatened Biodiversity Data Collection (TBDC) information not yet reflected in the BAM-C.
- **Species Removed:** Species excluded due to unsuitable habitat features or other limiting factors identified during field surveys and habitat analysis.

#### Sensitivity to Gain Class

For each species identified, sensitivity to gain class, as defined by the TBDC, was considered to ensure accurate representation of biodiversity offsets.

### **Sources for Allocating Threatened Species for Assessment**

Ecosystem credit species were identified using vegetation surrogates and landscape features. Sources of information included:

- Auto-populated data from the BAM-C (which is gathered from the Threatened Biodiversity Data Collection (TBDC)).
- Recent listings under the BC Act not yet incorporated into the TBDC.
- NSW OEH BioNet Atlas 'Species sightings search' (5km radius).
- Previous ecological reports, scientific literature, and council vegetation mapping.
- Observations and data collected during site-specific field surveys. This includes any specific geographical or environmental constraints identified during the surveys.

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## 5.2 Ecosystem Credit Species (Habitat suitability: Predicted)

The predicted ecosystem credit species for the vegetation zones within the Subject Land, based on the Sydney Cataract IBRA subregion, are listed in Table 11 below. These species were reviewed against habitat constraints, geographic limitations, vagrancy, and the quality of microhabitats. Following this assessment species were removed due to unsuitable habitat quality, geographic constraints, habitat limitations, or absence from mapped important areas.

One tree (Tree 17) was identified in the AIA as a potential habitat tree. However, no confirmed hollows, nests, or signs of use by threatened fauna were observed during ecological surveys. This tree does not meet the definition of a hollow-bearing tree under the BAM 2020 and was therefore not considered a significant fauna habitat feature for offset purposes.

**Table 11.** Details of Ecosystem Credit Species and their Biodiversity Values

| Species Name                           | Common Name                         | BC Act Status         | Included in Assessment?<br>(Justifications) |
|----------------------------------------|-------------------------------------|-----------------------|---------------------------------------------|
| <i>Anthochaera phrygia</i>             | Regent Honeyeater                   | Critically Endangered | Yes                                         |
| <i>Artamus cyanopterus cyanopterus</i> | Dusky Woodswallow                   | Vulnerable            | Yes                                         |
| <i>Botaurus poiciloptilus</i>          | Australasian Bittern                | Endangered            | No: Habitat Constraints                     |
| <i>Callocephalon fimbriatum</i>        | Gang-gang Cockatoo                  | Vulnerable            | Yes                                         |
| <i>Calyptorhynchus lathami lathami</i> | South-eastern Glossy Black-Cockatoo | Vulnerable            | No: Habitat Constraints                     |
| <i>Chthonicola sagittata</i>           | Speckled Warbler                    | Vulnerable            | Yes                                         |
| <i>Circus assimilis</i>                | Spotted Harrier                     | Vulnerable            | Yes                                         |
| <i>Climacteris picumnus victoriae</i>  | Brown Treecreeper                   | Vulnerable            | Yes                                         |
| <i>Daphoenositta chrysoptera</i>       | Varied Sittella                     | Vulnerable            | Yes                                         |
| <i>Dasyurus maculatus</i>              | Spotted-tailed Quoll                | Vulnerable            | Yes                                         |
| <i>Ephippiorhynchus asiaticus</i>      | Black-necked Stork                  | Vulnerable            | No: Habitat Constraints                     |
| <i>Falco subniger</i>                  | Black Falcon                        | Vulnerable            | Yes                                         |
| <i>Glossopsitta pusilla</i>            | Little Lorikeet                     | Vulnerable            | Yes                                         |
| <i>Haliaeetus leucogaster</i>          | White-bellied Sea-Eagle             | Vulnerable            | No: Habitat Constraints                     |
| <i>Hieraaetus morphnoides</i>          | Little Eagle                        | Vulnerable            | Yes                                         |
| <i>Hirundapus caudacutus</i>           | White-throated Needletail           | Vulnerable            | Yes                                         |
| <i>Irediparra gallinacea</i>           | Comb-crested Jacana                 | Vulnerable            | No: Habitat Constraints                     |
| <i>Lathamus discolor</i>               | Swift Parrot                        | Endangered            | Yes                                         |
| <i>Limosa limosa</i>                   | Black-tailed Godwit                 | Vulnerable            | Yes                                         |
| <i>Lophoictinia isura</i>              | Square-tailed Kite                  | Vulnerable            | Yes                                         |
| <i>Micronomus norfolkensis</i>         | Eastern Coastal Free-tailed Bat     | Vulnerable            | Yes                                         |
| <i>Miniopterus australis</i>           | Little Bent-winged Bat              | Vulnerable            | Yes                                         |
| <i>Miniopterus orianae oceanensis</i>  | Large Bent-winged Bat               | Vulnerable            | Yes                                         |
| <i>Neophema pulchella</i>              | Turquoise Parrot                    | Vulnerable            | Yes                                         |
| <i>Pandion cristatus</i>               | Eastern Osprey                      | Vulnerable            | Yes                                         |

| Species Name                    | Common Name                   | BC Act Status | Included in Assessment?<br>(Justifications) |
|---------------------------------|-------------------------------|---------------|---------------------------------------------|
| <i>Petroica phoenicea</i>       | Flame Robin                   | Vulnerable    | Yes                                         |
| <i>Pteropus poliocephalus</i>   | Grey-headed Flying-fox        | Vulnerable    | Yes                                         |
| <i>Pycnoptilus floccosus</i>    | Pilotbird                     | Vulnerable    | No: Habitat Constraints                     |
| <i>Rostratula australis</i>     | Australian Painted Snipe      | Endangered    | Yes                                         |
| <i>Saccolaimus flaviventris</i> | Yellow-bellied Sheathtail-bat | Vulnerable    | Yes                                         |
| <i>Stagonopleura guttata</i>    | Diamond Firetail              | Vulnerable    | Yes                                         |
| <i>Varanus rosenbergi</i>       | Rosenberg's Goanna            | Vulnerable    | Yes                                         |

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### 5.3 Species Credit Species

The initial list of 'Species credit species' is generated in the BAM-C under the Habitat suitability: Candidate tab. These species cannot be reliably predicted solely through vegetation surrogates or landscape features. Their presence on the Subject Land is either assumed or confirmed through targeted threatened species surveys, expert reports, or habitat mapping. This section summarises the species credit species identified for the Subject Land using the BAM-C. Where applicable, it includes details of targeted surveys, their results, and whether offsetting is necessary.

Species credit species for the vegetation zones within the Subject Land were assessed considering habitat constraints, geographic limitations, vagrancy, and the quality of microhabitats. Under Section 5.2 of the BAM, species credit species can be excluded from further assessment if habitat constraints and microhabitats within the Subject Land are found to be substantially degraded, making it unlikely for the species to occur.

Habitat assessments were undertaken to identify features relevant to species credit species predicted by the BAM-C. These assessments examined the presence or absence of specific habitat constraints and evaluated the condition of these habitats and associated microhabitats. The surveys also assessed whether the habitat required for any species credit species (or relevant breeding components for dual credit species) was absent or so degraded that the species is unlikely to utilise the Subject Land or specific vegetation zones. This approach aligns with the requirements Section 5.2 of the BAM.

Following these assessments, several species were excluded from further consideration due to the absence of required habitat constraints or the degraded condition of potential habitats. The results of these exclusions are summarised in the table below.

The assessment for the Regent Honeyeater and Swift Parrot considers their association with Mapped Important Areas designated for breeding habitats. An evaluation of these areas determined that no suitable breeding habitat for either species occurs within the Subject Land or the surrounding survey area.

**Habitat suitability:** Habitat features relevant to candidate species from BAM-C were assessed, with degraded or absent habitats identified where applicable.

**Survey findings:** Confirmed or assumed presence of species credit species based on habitat condition and mapped important areas.

The final list of species credit species, including any exclusions or confirmations, is presented in the Table 11 below.

**Table 12.** Details of Candidate Species and their Biodiversity Values.

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Common Name                         | Inclusion/exclusion in assessment and justifications.                                                                                                                                                                                                                                                                                         | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <i>Anthochaera phrygia</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Regent Honeyeater                   | No: Not identified on Important Habitat Map.                                                                                                                                                                                                                                                                                                  | No                         | No                           | High                | No               |
| <i>Burhinus grallarius</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bush Stone-curlew                   | No: Habitat constraints; absence of fallen/standing dead timber including logs.                                                                                                                                                                                                                                                               | No                         | No                           | High                | No               |
| <i>Callocephalon fimbriatum</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Gang-gang Cockatoo                  | No: Habitat constraints; no hollow-bearing trees with suitable hollows $\geq 7$ cm diameter at $\geq 3$ m height.                                                                                                                                                                                                                             | No                         | No                           | High                | No               |
| <i>Calyptorhynchus lathami lathami</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | South-eastern Glossy Black-Cockatoo | No: Habitat constraints; no hollow-bearing trees with suitable hollows $\geq 15$ cm diameter at $\geq 8$ m height.                                                                                                                                                                                                                            | No                         | No                           | High                | No               |
| <i>Cercartetus nanus</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Eastern Pygmy-possum                | No: Habitat degraded; absence of suitable dense understorey and tree hollows.                                                                                                                                                                                                                                                                 | No                         | No                           | High                | No               |
| <p><b>Habitat Degraded Analysis:</b> The Eastern Pygmy-possum prefers habitats with a dense shrub layer and abundant nectar-producing flora, such as <i>Banksia</i>, <i>Callistemon</i>, and <i>Eucalyptus</i> species. It relies on tree hollows, abandoned nests, or dense vegetation thickets for shelter and breeding. Due to its small home range (0.35–0.68 ha), the species requires a high density of foraging and sheltering resources.</p> <p>The Subject Land lacks key habitat features. There is an absence of <i>Banksia</i> species, which are a primary nectar source, and no tree hollows, abandoned nests, or dense mid-stratum thickets suitable for nesting. The Vegetation Integrity (VI) score is low, particularly in Management Zone A, due to the dominance of exotic grasses and the absence of a complex understorey. While Management Zone B has a slightly higher VI score, this is primarily due to <i>Cynodon dactylon</i> (couch grass), which does not provide suitable habitat. The ongoing disturbance and lack of structurally complex vegetation further reduce habitat suitability for this species.</p> |                                     |                                                                                                                                                                                                                                                                                                                                               |                            |                              |                     |                  |
| <i>Chalinolobus dwyeri</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Large-eared Pied Bat                | No: Habitat constraints: This species is typically found within two kilometres of rocky habitats that include caves, overhangs, escarpments, outcrops, crevices, or old mines or tunnels. These geological features were not identified within or adjacent to the Subject Land. Therefore, this species was excluded from further assessment. | No                         | No                           | Very High           | No               |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Common Name              | Inclusion/exclusion in assessment and justifications.                                        | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <i>Deyeuxia appressa</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Deyeuxia appressa        | No: Habitat degraded; area contains primarily exotic species and degraded native vegetation. | No                         | No                           | High                | No               |
| <p><u>Habitat Degraded Analysis:</u> <i>Deyeuxia appressa</i> is a grass species historically recorded in moist environments; however, the vegetation integrity score on the Subject Land is very low. Frequent slashing and a long history of grazing have further degraded habitat conditions, reducing the likelihood of this species occurring. Given the highly disturbed state of the vegetation, <i>Deyeuxia appressa</i> was excluded from further assessment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                                                                              |                            |                              |                     |                  |
| <i>Eucalyptus benthamii</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Camden White Gum         | No: Habitat degraded; area contains primarily exotic species and degraded native vegetation. | No                         | No                           | High                | No               |
| <p><u>Habitat Degraded Analysis:</u> <i>Eucalyptus benthamii</i> is restricted to alluvial flats along the Nepean River and its tributaries, requiring deep alluvial sands and a natural flooding regime for successful seedling establishment. The Subject Land consists of soil mounds piled after the construction of a concrete drainage culvert, raising it above flood levels. This has removed the natural hydrological processes necessary for <i>Eucalyptus benthamii</i> recruitment. Additionally, the vegetation integrity score is very low, and past land use, including frequent slashing and a long history of grazing, has further degraded habitat conditions. Given the absence of suitable soil conditions and hydrological processes, <i>Eucalyptus benthamii</i> was excluded from further assessment.</p>                                                                                                                       |                          |                                                                                              |                            |                              |                     |                  |
| <i>Grevillea juniperina</i> subsp. <i>juniperina</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Juniper-leaved Grevillea | No: Habitat degraded; absence of suitable sandy soils and open woodland.                     | No                         | No                           | Moderate            | No               |
| <p><u>Habitat Degraded Analysis:</u> <i>Grevillea juniperina</i> subsp. <i>juniperina</i> occurs in Western Sydney, typically on red sandy to clay soils, often lateritic, associated with Cumberland Plain Woodland and Castlereagh Woodland. It is found in small, localised populations, often along road verges and within remnants of native vegetation. The Subject Land does not provide suitable habitat for this species. The soil is not lateritic or sandy-clay, but instead consists of disturbed mounds from drainage culvert construction. Additionally, the vegetation integrity score is very low, and the long history of frequent slashing and grazing has significantly degraded native vegetation, reducing the likelihood of this species persisting. Given the absence of suitable soil conditions and intact remnant vegetation, <i>Grevillea juniperina</i> subsp. <i>juniperina</i> was excluded from further assessment.</p> |                          |                                                                                              |                            |                              |                     |                  |
| <i>Haliaeetus leucogaster</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | White-bellied Sea-Eagle  | No: absence of nest trees - live (occasionally dead) large old trees within vegetation)      | No                         | No                           | High                | No               |
| <i>Hibbertia</i> sp. <i>Bankstown</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Bankstown Hibbertia      | No: Habitat degraded; area contains primarily exotic species and degraded native vegetation. | No                         | No                           | High                | No               |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Common Name                | Inclusion/exclusion in assessment and justifications.                                              | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <p><u>Habitat Degraded Analysis:</u> <i>Hibbertia sp. Bankstown</i> is restricted to a single population at Bankstown Airport, where it occurs on sandy alluvium with a high silt content, within remnants of Castlereagh Ironbark Forest. It is typically associated with open vegetation and a diverse understorey, including species such as <i>Acacia suaveolens</i>, <i>Themeda australis</i>, and <i>Hibbertia diffusa</i>. The Subject Land does not provide suitable habitat for this species. The soil is not sandy alluvium but consists of disturbed mounds from drainage culvert construction. The vegetation integrity score is very low, with a dominance of exotic grasses and a highly degraded understorey. Frequent slashing and a long history of grazing have further degraded habitat conditions, reducing the likelihood of this species persisting. Given the absence of suitable soil conditions and intact native vegetation, <i>Hibbertia sp. Bankstown</i> was excluded from further assessment.</p> |                            |                                                                                                    |                            |                              |                     |                  |
| <i>Hieraaetus morphnoides</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Little Eagle               | No: Habitat degraded; absence of large old nest trees within native vegetation.                    | No                         | No                           | Moderate            | No               |
| <i>Lathamus discolor</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Swift Parrot               | No: Not identified in Important Habitat Map                                                        | No                         | No                           | Moderate            | No               |
| <i>Limosa limosa</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Black-tailed Godwit        | No: Not identified in Important Habitat Map                                                        | No                         | No                           | High                | No               |
| <i>Litoria aurea</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Green and Golden Bell Frog | No: Habitat Constraints; no semi-permanent/ephemeral wetlands, swamps, or waterbodies within 1 km. | No                         | No                           | High                | No               |
| <p><u>Habitat Degraded Analysis:</u> The Green and Golden Bell Frog inhabits marshes, dams, and stream edges, particularly those with <i>Typha</i> and <i>Eleocharis</i> species, unshaded waterbodies, and nearby grassy areas for basking. It requires waterbodies free of predatory fish and with suitable refuge sites, such as vegetation and debris. The Subject Land does not provide suitable habitat for this species. It lacks permanent or ephemeral waterbodies and the associated wetland vegetation required for breeding and foraging. The soil mounds from drainage culvert construction have further altered natural hydrology, preventing the formation of standing water. The vegetation integrity score is very low, with an understorey dominated by exotic grasses and a history of frequent slashing and grazing. Given the absence of suitable hydrological conditions, aquatic refuges, and breeding habitat, <i>Litoria aurea</i> was excluded from further assessment.</p>                           |                            |                                                                                                    |                            |                              |                     |                  |
| <i>Lophoictinia isura</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Square-tailed Kite         | No: Habitat degraded; absence of large nest trees within native vegetation.                        | No                         | No                           | Moderate            | No               |
| <p><u>Habitat Degraded Analysis:</u> The Square-tailed Kite inhabits open forests and woodlands, particularly along watercourses, and relies on large hunting ranges exceeding 100 square kilometres. Nesting typically occurs in mature trees, often near water, with a diet primarily consisting of small passerines, especially nestlings. The Subject Land does not provide suitable habitat for this species. It lacks mature trees for nesting, and there are no timbered watercourses present. The existing vegetation is highly degraded, with a low vegetation integrity score due to frequent slashing and a long history of grazing. These disturbances have significantly reduced the availability of foraging resources, particularly for a species that relies on intact tree canopies for hunting. Given the absence of key habitat features, <i>Lophoictinia isura</i> was excluded from further assessment.</p>                                                                                                |                            |                                                                                                    |                            |                              |                     |                  |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Common Name                 | Inclusion/exclusion in assessment and justifications.                                                                                                                                                                                                                                                                    | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                           | No: Habitat degraded; absence of suitable woodland habitats within the Penrith LGA.                                                                                                                                                                                                                                      | No                         | No                           | Moderate            | No               |
| <p><b>Habitat Degraded Analysis:</b> The <i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> population listed as endangered in NSW is primarily associated with vine thickets and open shale woodlands, with recent records from sites such as Prospect, Bankstown, Smithfield, Cabramatta Creek, and St Marys. This species relies on relatively intact habitat with minimal disturbance and benefits from stable soil conditions for the development of its underground tubers. The Subject Land does not provide suitable habitat for this species. The land has been significantly disturbed, consisting of soil mounds piled after the construction of a concrete drainage culvert, which has altered the natural soil structure and hydrological conditions. Additionally, the vegetation integrity score is very low due to a history of slashing and grazing, further reducing habitat suitability. The absence of remnant vine thicket vegetation, as well as the lack of appropriate host structures for twining growth, makes recruitment unlikely. Given these factors, <i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> was excluded from further assessment.</p>                                                                                                                      |                             |                                                                                                                                                                                                                                                                                                                          |                            |                              |                     |                  |
| <i>Meridolum corneovirens</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Cumberland Plain Land Snail | No: Habitat degraded; absence of suitable leaf litter and native groundcover.                                                                                                                                                                                                                                            | No                         | No                           | High                | No               |
| <p><b>Habitat Degraded Analysis:</b> The <i>Meridolum corneovirens</i> (Cumberland Plain Land Snail) is primarily associated with remnant patches of Cumberland Plain Woodland, Shale Gravel Transition Forest, Castlereagh Swamp Woodland, and the margins of River-flat Eucalypt Forest. This species requires ground cover such as leaf litter, logs, and loose soil for shelter and reproduction. It is a fungus specialist and relies on undisturbed soil and organic matter for food and habitat. The Subject Land does not provide suitable habitat for <i>M. corneovirens</i>. The area has been significantly altered by past land use, including slashing and grazing, resulting in a highly degraded vegetation structure with limited accumulation of leaf litter and woody debris. The presence of soil mounds from drainage culvert construction has further disturbed the natural soil composition and microhabitat conditions required for this species. Additionally, no evidence of suitable fungal food sources, such as decomposing wood or stable litter layers, has been identified. Due to the lack of required sheltering and foraging habitat, <i>M. corneovirens</i> is considered unlikely to occur on the Subject Land, and the species was excluded from further assessment.</p> |                             |                                                                                                                                                                                                                                                                                                                          |                            |                              |                     |                  |
| <i>Miniopterus australis</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Little Bent-winged Bat      | No: This species is known to utilise caves, tunnels, mines, and culverts for breeding. However, no such features were identified within or adjacent to the Subject Land. Consequently, breeding habitat for this species will not be impacted by the proposed development, and it has been excluded from the assessment. | No                         | No                           | Very High           | No               |
| <i>Miniopterus orianae oceanensis</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Large Bent-winged Bat       | No: Habitat Constraints; absence of caves, tunnels, or other breeding structures.                                                                                                                                                                                                                                        | No                         | No                           | Very High           | No               |
| <i>Myotis macropus</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Southern Myotis             | No: Habitat Constraints; no permanent waterbodies $\geq 3$ m wide within 200 m.                                                                                                                                                                                                                                          | No                         | No                           | High                | No               |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Common Name        | Inclusion/exclusion in assessment and justifications.                                                             | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <i>Ninox connivens</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Barking Owl        | No: Habitat Constraints; absence of hollow-bearing trees with hollows $\geq 20$ cm diameter at $\geq 4$ m height. | No                         | No                           | High                | No               |
| <i>Ninox strenua</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Powerful Owl       | No: Habitat Constraints; absence of hollow-bearing trees with hollows $\geq 20$ cm diameter at $\geq 4$ m height. | No                         | No                           | High                | No               |
| <i>Pandion cristatus</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Eastern Osprey     | No: Habitat Constraints; absence of stick nests in trees $\geq 15$ m near floodplain habitats.                    | No                         | No                           | Moderate            | No               |
| <i>Persoonia hirsuta</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hairy Geebung      | No: Habitat Constraints; absence of suitable native woodland habitat.                                             | No                         | No                           | High                | No               |
| <i>Petaurus norfolcensis</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Squirrel Glider    | No: Habitat Constraints; absence of connected native vegetation with suitable hollows and foraging resources.     | No                         | No                           | High                | No               |
| <i>Phascolarctos cinereus</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Koala              | No: Habitat Constraints; absence of suitable koala-use trees in Subject Land.                                     | No                         | No                           | High                | No               |
| <i>Pimelea spicata</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Spiked Rice-flower | No: Habitat degraded; absence of suitable native grassland or woodland habitat.                                   | No                         | No                           | High                | No               |
| <p><u>Habitat Degraded Analysis:</u> The <i>Pimelea spicata</i> (Spiked Rice-flower) is primarily associated with well-structured clay soils within the Cumberland Plain and Illawarra regions. It occurs within Grey Box (<i>Eucalyptus moluccana</i>) communities, particularly Cumberland Plain Woodland and Moist Shale Woodland, as well as in areas dominated by <i>Eucalyptus tereticornis</i> and <i>E. crebra</i>. The species is known to persist in grassy groundcover dominated by <i>Themeda australis</i>, often with <i>Bursaria spinosa</i> providing some protection from grazing. The Subject Land does not provide suitable habitat for <i>Pimelea spicata</i>. The site has been historically disturbed, resulting in a highly modified vegetation structure and soil profile inconsistent with the species' known habitat requirements. Past land use, including slashing and potential changes to hydrology, has likely affected any capacity for the species to persist. Additionally, the presence of soil mounds from drainage culvert construction has altered the natural topography and soil composition, further reducing the potential for <i>Pimelea spicata</i> recruitment. Due to the absence of suitable habitat, <i>Pimelea spicata</i> is considered unlikely to occur on the Subject Land, and the species has been excluded from further assessment.</p> |                    |                                                                                                                   |                            |                              |                     |                  |
| <i>Pomaderris brunnea</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Brown Pomaderris   | No: Habitat degraded; unsuitable soil and vegetation structure.                                                   | No                         | No                           | High                | No               |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Common Name            | Inclusion/exclusion in assessment and justifications.                                                             | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
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| <p><b>Habitat Degraded Analysis:</b> <i>Pomaderris brunnea</i> is primarily associated with riparian and floodplain habitats within the Sydney region, including the Hawkesbury–Nepean catchment and areas within the Northern Tablelands and East Gippsland. The species occurs on clay and alluvial soils along creek lines, riverbanks, and moist woodland or open forest habitats. Associated vegetation communities include River-flat Eucalypt Forest, Shale/Sandstone Transition Forest, and Cumberland Plain Shale Woodlands. Overstorey species commonly found in suitable habitat include <i>Eucalyptus amplifolia</i>, <i>E. tereticornis</i>, and <i>Angophora floribunda</i>, with an understorey consisting of <i>Bursaria spinosa</i>, <i>Kunzea ambigua</i>, and <i>Lomandra longifolia</i>. The Subject Land does not provide suitable habitat for <i>Pomaderris brunnea</i>. The site has undergone historical disturbance, resulting in a highly modified vegetation structure and an altered soil profile that is inconsistent with the species' habitat requirements. Past land use activities, including clearing, slashing, and potential hydrological changes, have likely reduced any capacity for the species to persist. Additionally, the presence of soil mounds from drainage culvert construction has further altered the natural topography and soil composition, diminishing the potential for <i>Pomaderris brunnea</i> recruitment. Due to the absence of suitable habitat, <i>Pomaderris brunnea</i> is considered unlikely to occur on the Subject Land, and the species has been excluded from further assessment.</p>                                                                                                                 |                        |                                                                                                                   |                            |                              |                     |                  |
| <i>Pteropus poliocephalus</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Grey-headed Flying-fox | No: Habitat Constraints; absence of breeding camps and limited foraging resources.                                | No                         | No                           | High                | No               |
| <i>Syzygium paniculatum</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Magenta Lilly Pilly    | No: Habitat degraded; absence of suitable moist forest habitat.                                                   | No                         | No                           | High                | No               |
| <p><b>Habitat Degraded Analysis:</b> <i>Syzygium paniculatum</i> is a small to medium-sized rainforest tree primarily found within remnant littoral and riverside gallery rainforests along a narrow coastal strip from Upper Lansdowne to Conjola State Forest in New South Wales. The species occurs on grey soils over sandstone in the south and on gravels, sands, silts, and clays in riparian zones on the central coast. It is commonly associated with closed rainforest communities, where it benefits from a stable microclimate and minimal disturbance. Key threats to the species include habitat loss, invasion by exotic weeds such as <i>Lantana camara</i> and <i>Chrysanthemoides monilifera</i> (Bitou Bush), and susceptibility to Myrtle Rust (<i>Austropuccinia psidii</i>). The Subject Land does not provide suitable habitat for <i>Syzygium paniculatum</i>. The site has undergone extensive disturbance, resulting in a highly modified vegetation structure that lacks the closed canopy conditions and soil stability required for the species. Frequent disturbance, including slashing and grazing, has further contributed to the degradation of the habitat, preventing the establishment of rainforest-associated species and leading to the suppression of shrub recruitment. Additionally, soil mounds from drainage culvert construction and past land modifications have altered the natural hydrology and topography, reducing the potential for <i>Syzygium paniculatum</i> to establish or persist. Due to the absence of suitable habitat and the frequent disturbance limiting shrub growth, <i>Syzygium paniculatum</i> is considered unlikely to occur on the Subject Land and has been excluded from further assessment.</p> |                        |                                                                                                                   |                            |                              |                     |                  |
| <i>Tyto novaehollandiae</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Masked Owl             | No: Habitat Constraints; absence of hollow-bearing trees with hollows $\geq 20$ cm diameter at $\geq 4$ m height. | No                         | No                           | High                | No               |
| <i>Wahlenbergia multicaulis</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tadgell's Bluebell     | No: Habitat degraded; absence of suitable native grassland habitat in listed LGAs.                                | No                         | No                           | High                | No               |

| Scientific Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Common Name | Inclusion/exclusion in assessment and justifications. | Targeted Survey Conducted? | Present within Subject Land? | Sensitivity to Gain | Credits Required |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------|----------------------------|------------------------------|---------------------|------------------|
| <p><u>Habitat Degraded Analysis:</u> <i>Wahlenbergia multicaulis</i> is a tufted perennial herb that occurs in a variety of habitats, including forest, woodland, scrub, grassland, and wetland edges. It is typically associated with damp, disturbed sites, particularly those with natural or human-induced soil disturbance that promotes germination. The species is primarily found on the Villawood Soil Series in Western Sydney, characterised by poorly drained yellow podsolic soils with fine, concretionary ironstone (laterite). In Hornsby LGA, the species occurs on the 'Hawkesbury' soil landscape, often in or adjacent to sandstone gully forests. It has been recorded in remnants of Cooks River/Castlereagh Ironbark Forest and responds favourably to soil disturbance when exposure to sunlight is high. However, excessive disturbance can exhaust the seedbank, leading to local extinctions. The Subject Land does not provide suitable habitat for <i>Wahlenbergia multicaulis</i>. The site has undergone extensive modification, leading to altered soil composition and hydrological processes inconsistent with the species' habitat requirements. Frequent disturbance, including slashing and ongoing ground disturbance, has contributed to a highly modified vegetation structure where shrubs and ground-layer species struggle to establish. Additionally, competition with exotic weeds has altered the native groundcover, reducing the likelihood of <i>Wahlenbergia multicaulis</i> persisting. The presence of soil mounds from drainage culvert construction and deposition of industrial refuse has further modified the microhabitat, limiting suitable germination conditions. Due to the absence of suitable habitat, ongoing disturbance, and competition from exotic species, <i>Wahlenbergia multicaulis</i> is considered unlikely to occur on the Subject Land and has been excluded from further assessment.</p> |             |                                                       |                            |                              |                     |                  |

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## 5.4 Threatened Species Surveys

No targeted threatened species surveys were required due to either habitat constraints, degraded habitat, not being mapped on the suitable habitat map, or geographic limitations.

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## 6. KOALA HABITAT ASSESSMENT

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### 6.1 SEPP 2021 in Relation to the Proposed Development

Chapter 4 (Koala Habitat Protection 2021) of SEPP 2021 applies to each local government area listed in Schedule 2 of the SEPP.

- The Penrith City Council LGA is listed in Schedule 2 of SEPP 2021.

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### 6.2 Determining the Applicability of SEPP 2021 to the Subject Land

#### 1. Land Threshold

- The Subject Property does meet the 1-hectare threshold outlined in Chapter 4 of *SEPP 2021*.

#### 2. Potential Koala Habitat

- The Subject Land does not meet the criteria for “potential koala habitat” as there are no suitable koala-use trees present.

#### 3. Core Koala Habitat

- The Subject Land does not meet the criteria for core koala habitat as no suitable koala-use trees are present and no evidence of koalas was identified.

#### Conclusion:

In accordance with the criteria outlined in SEPP 2021 – Koala Habitat Protection, the Subject Land does not contain suitable koala-use trees and therefore no Koala Assessment was required. The Subject Land is identified as not meeting the requirements for Core Koala Habitat. As the proposed development does not require the removal of native trees or impact identified koala habitat, no additional koala management measures are required.

## 7. PRESCRIBED IMPACTS

Prescribed impacts, as defined under Clause 6.1 of the *Biodiversity Conservation Regulation 2017*, refer to impacts beyond the clearing of native vegetation and associated habitat. These impacts require an assessment of their effects on the habitat of threatened species or ecological communities. Many prescribed impacts are challenging to quantify, replace, or offset, making it essential to avoid and minimise them wherever possible. The prescribed impacts associated with the proposed development are detailed and assessed in Table 13.

**Table 13.** Assessment of prescribed impacts.

| Feature                                                                            | Present | Description                                                                                                                                                                                                                                                                     | Threatened Entities Impacted |
|------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Karst, caves, crevices, cliffs, rocks or other geological features of significance | No      | There are no karsts, caves, crevices, cliffs and other features of geological significance on or near the Subject Land.                                                                                                                                                         | N/A                          |
| Human-made structures                                                              | No      | No human-made structures are proposed for removal or will be impacted.                                                                                                                                                                                                          | N/A                          |
| Non-native vegetation                                                              | No      | Non-native vegetation was present within the Subject Land in the form of common environmental weeds. This does not provide significant habitat or have ecological value.                                                                                                        | N/A                          |
| Habitat connectivity                                                               | No      | The proposed development is unlikely to disrupt connectivity for any threatened species, as extensive habitat connectivity will remain in the vegetated areas surrounding the Subject Land.                                                                                     | N/A                          |
| Waterbodies, water quality and hydrological processes                              | No      | No threatened species or ecological communities within the Subject Land are reliant on water bodies or hydrological processes. Additionally, the removal of vegetation within the Subject Land is not anticipated to impact groundwater processes in the surrounding landscape. | N/A                          |
| Wind turbine strikes (wind farm development only)                                  | No      | No wind farms are associated with the proposed development.                                                                                                                                                                                                                     | N/A                          |
| Vehicle strikes                                                                    | No      | A minor increase in vehicular activity is expected as a result of the proposed development, however this is considered unlikely to impact any potentially occurring threatened species.                                                                                         | N/A                          |

## STAGE 2: IMPACT ASSESSMENT

### 8. AVOID AND MINIMISE IMPACTS

#### 8.1 Direct and Indirect Impacts

This section outlines the measures implemented to avoid and minimise both direct and indirect impacts on biodiversity values throughout the project lifecycle. Table 14 provides a detailed breakdown of the actions undertaken, the outcomes sought, and the specific measures employed to mitigate potential impacts. It also includes the timing for each action and identifies the parties responsible for their implementation.

**Table 14.** Details of measures to avoid, minimise and manage the impacts of the project.

| Action                  | Outcome / Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Timing                 | Responsibility |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|
| <b>Project Location</b> | The location of the proposed development has been positioned to avoid and minimise potential impacts on biodiversity values within the Subject Land wherever possible. The development footprint is primarily situated over a paddock area with high abundance of exotic and weedy species. This placement reduces impacts on native vegetation and habitat, aligning with efforts to minimise ecological disturbance.                                                                                                                                                                                                                                                                                                                                | Pre-construction phase | Proponent      |
| <b>Project Design</b>   | <p>The development footprint is primarily situated over a paddock area with high abundance of exotic and weedy species. The design generally avoids and minimises impacts on native vegetation and habitat within the Subject Land wherever possible. Mitigation measures include avoiding impacts to existing trees and implementing revegetation in areas currently infested with weeds and exotic species to restore ecological function.</p> <p>Although some impacts on native vegetation are unavoidable, these remain above the Biodiversity Offset Scheme threshold. The design incorporates the retention of the majority of trees on the property and includes replanting with locally indigenous species to support ecological values.</p> | Pre-construction phase | Proponent      |
| <b>Tree Protection</b>  | <p>Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970) establishes the Tree Protection Zone (TPZ) as the primary mechanism for safeguarding trees during development activities. The TPZ is an area designed to be isolated from construction disturbance, ensuring the tree remains viable. Ideally, no works should occur within the TPZ.</p> <p>AS-4970 categorises encroachments into two types:</p> <ul style="list-style-type: none"> <li>• Minor Encroachment: This involves less than 10% of the TPZ and occurs outside the Structural Root Zone (SRZ). Such</li> </ul>                                                                                                                                        | Pre-construction phase | Proponent      |

| Action                                                | Outcome / Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Timing                                         | Responsibility                                                 |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------|
|                                                       | <p>encroachments are considered acceptable when compensated for elsewhere within the contiguous TPZ.</p> <ul style="list-style-type: none"> <li>Major Encroachment: This involves more than 10% of the TPZ or occurs within the SRZ. Major encroachments typically require root investigations conducted using non-destructive methods or the adoption of tree-sensitive construction techniques.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                |                                                                |
| <b>Avoidance of hollow-bearing trees</b>              | No hollow-bearing trees were identified within or in the immediate surrounds of the Subject Land.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Construction phase                             | Proponent<br>Arborist<br>Ecologist                             |
| <b>Avoidance of woody debris</b>                      | Woody debris within the development footprint should be relocated, by the proponent to areas of native vegetation on the Subject Property.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Construction phase                             | Proponent                                                      |
| <b>Erosion and sedimentation</b>                      | <p>Implementing and maintaining appropriate erosion and sediment control measures throughout the construction period is essential. Adhering to these guidelines helps ensure compliance with industry standards and environmental protection obligations.</p> <p>The NSW Department of Planning and Environment has released draft guidelines titled Guidelines for Erosion and Sediment Control on Building Sites. These updated guidelines are designed to assist builders, certifiers, and stormwater specialists in preventing erosion and sediment pollution, thereby protecting waterways. They are specifically applicable to construction sites smaller than 2,500 square meters.</p> <p>For local council-specific requirements, the Resource Guide for Local Councils: Erosion and Sediment Control provides recommendations and resources to promote consistent and effective erosion and sediment control practices across various operations.</p> | Construction phase                             | Construction Contractor                                        |
| <b>Erosion protection fencing</b>                     | Temporary fencing should be installed around the boundaries of native vegetation designated for retention to minimise disturbance during construction activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Construction phase                             | Construction Contractor                                        |
| <b>Storage and Stockpiling (Soil and Materials)</b>   | All storage, stockpile, and laydown areas should be located well away from native vegetation designated for retention. To minimise the risk of introducing weeds and pathogens, no soil should be imported from outside the Subject Property.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Construction phase                             | Construction Contractors                                       |
| <b>Weed eradication and Native revegetation works</b> | Moderate to high levels of weed invasion were recorded on the Subject Property, necessitating the eradication of all priority weeds across the Subject Land. Weeds should be continually suppressed and managed to prevent their re-establishment within retained native vegetation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Construction phase and Post-construction phase | Proponent<br>Landscaper<br>Ecologist                           |
| <b>Landscaping</b>                                    | Any future landscaping efforts within the Subject Property should incorporate locally indigenous species representative of PCT 4025: Cumberland Red Gum Riverflat Forest.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Post-construction phase                        | Applicant<br>Construction Architect<br>Landscaper<br>Ecologist |

| Action            | Outcome / Measure                                                                                                                                                                                                                                                                                                                                                                                           | Timing                  | Responsibility                      |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------|
| <b>Stormwater</b> | The proposed development is not expected to cause significant changes to stormwater runoff, and therefore, no adverse impacts on native flora and fauna are anticipated. Stormwater from future dwellings and hard surfaces will be directed to newly installed water storage tanks. Before any discharge, stormwater will be piped through these tanks as required by the relevant regulatory authorities. | Post-construction phase | Proponent<br>Construction Architect |
| <b>Wastewater</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                     | N/A                                 |

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## 9. IMPACT ASSESSMENT

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### 9.1 Direct Impacts

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#### 9.1.1 Residual Direct Impacts

This section outlines the impacts anticipated on the Subject Land following the implementation of measures to avoid and minimise impacts.

- The proposed development will impact 0.68 ha of residual poor condition PCT 4025: Cumberland Red Gum Riverflat Forest.
- Some native grass species, forbs and regenerating Acacia species will be impacted by the soil transportation.
- No native trees have been identified for removal within this PCT
- All native trees in the Subject Land and numerous native trees and bushland outside of the Subject Land are to be retained.

## 9.1.2 Change in Vegetation Integrity Score

**Table 15.** Change in VI for Vegetation Zone A

| Vegetation zone | PCT ID | Vegetation Zone | Area (ha) | Before development |           |          |          | After development |           | Change   |          |                    |
|-----------------|--------|-----------------|-----------|--------------------|-----------|----------|----------|-------------------|-----------|----------|----------|--------------------|
|                 |        |                 |           | Composition        | Structure | Function | VI score | Composition       | Structure | Function | VI score | Change in VI score |
| Zone A          | 4025   | Subject Land    | 0.1       | 3.4                | 1.6       | 15       | 4.3      | 0                 | 0         | 0        | 0        | -4.3               |

**Table 16.** Change in VI for Vegetation Zone B

| Vegetation zone | PCT ID | Vegetation Zone | Area (ha) | Before development |           |          |          | After development |           | Change   |          |                    |
|-----------------|--------|-----------------|-----------|--------------------|-----------|----------|----------|-------------------|-----------|----------|----------|--------------------|
|                 |        |                 |           | Composition        | Structure | Function | VI score | Composition       | Structure | Function | VI score | Change in VI score |
| Zone B          | 4025   | Subject Land    | 0.03      | 12.4               | 17.2      | 26.9     | 17.9     | 0                 | 0         | 0        | 0        | -17.9              |

## 9.2 Indirect Impacts

Indirect impacts arise when activities associated with the construction or operation of the proposed development affect native vegetation, Threatened Ecological Communities (TECs), and threatened species habitat beyond the boundaries of the Subject Land. These impacts may also result from changes in land-use patterns, such as increased vehicular access and human activity, which can influence native vegetation, TECs, and threatened species habitat. The specific indirect impacts of the proposed development are detailed in this section.

Minor encroachments into Tree Protection Zones (TPZs) may occur for trees retained adjacent to the soil stockpile zones. All works in proximity to these trees will follow *AS 4970-2009 Protection of Trees on Development Sites*. Works will be supervised by a qualified Level 5 arborist as outlined in the AIA. No structural root zones (SRZs) will be impacted and tree retention viability is considered high.

**Table 17.** Details of indirect impacts associated with the proposed development.

| Indirect Impact                                                      | Nature, Extent and Duration                                                                                                                                                                               | Threatened Entities Likely Affected | Consequences                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(a)</b> Inadvertent impacts on adjacent habitat or vegetation     | Vegetation and habitat directly adjacent to the Subject Land may experience indirect impacts such as increased weed infestations during construction and operation, potentially decreasing habitat value. | None.                               | Localised impacts on vegetation condition and habitat quality may occur but are not expected to affect bioregional persistence. Surrounding areas of native vegetation provide connectivity and habitat options, and protective measures, such as fencing, will be implemented. |
| <b>(b)</b> Reduced viability of adjacent habitat due to edge effects | Edge effects from construction may increase weed infiltration into adjacent habitat. Impacts are expected to be limited to a few metres into the vegetation.                                              | None.                               | Localised impacts are not expected to significantly impact bioregional persistence due to extensive habitat connectivity in the surrounding landscape.                                                                                                                          |

| Indirect Impact                                                                     | Nature, Extent and Duration                                                                                                                                                          | Threatened Entities Likely Affected                                                                                                                                                                                                 | Consequences                                                                                                                                                            |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(c)</b> Reduced viability of adjacent habitat due to noise, dust, or light spill | Construction activities may generate noise and dust, potentially affecting adjacent vegetation and roosting species. Post-construction, light spill may also reduce habitat quality. | None.                                                                                                                                                                                                                               | Localised impacts may occur but are unlikely to significantly affect bioregional persistence due to habitat connectivity allowing species movement to unaffected areas. |
| <b>(d)</b> Transport of weeds and pathogens from the site to adjacent vegetation    | Weed infiltration and pathogen introduction may occur due to construction activities. However, mitigation measures, including temporary fencing, will reduce these risks.            | None.                                                                                                                                                                                                                               | Localised impacts are expected to be minimal, with mitigation measures reducing the likelihood of significant effects on bioregional persistence.                       |
| <b>(e)</b> Increased risk of starvation, exposure, and loss of shade or shelter     | Habitat connectivity in the surrounding landscape reduces the likelihood of significant impacts on fauna due to habitat loss or disturbance.                                         | None                                                                                                                                                                                                                                | Not expected to affect bioregional persistence due to available alternative habitats in the broader area.                                                               |
| <b>(f)</b> Loss of breeding habitats                                                | Noise during and after construction may disturb breeding habitats in adjacent areas. However, significant impacts are unlikely due to extensive habitat connectivity.                | Potential habitat for threatened fauna species adjacent to the Subject Land. Localised impacts are expected but will not affect bioregional persistence due to large, connected habitat areas providing alternative breeding sites. | Localised impacts are expected to be minimal.                                                                                                                           |
| <b>(g)</b> Trampling of threatened flora species                                    | No threatened flora species were identified within or adjacent to the Subject Land.                                                                                                  | N/A                                                                                                                                                                                                                                 | N/A                                                                                                                                                                     |
| <b>(h)</b> Inhibition of nitrogen fixation                                          | It is unlikely that nitrogen fixation inhibition or increased salinity will                                                                                                          | N/A                                                                                                                                                                                                                                 | N/A                                                                                                                                                                     |

| Indirect Impact                                      | Nature, Extent and Duration                                                                                                                           | Threatened Entities Likely Affected                                                                                                                                                                     | Consequences                                                                                                           |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| and increased soil salinity                          | affect adjacent vegetation, as clearing is limited to the Subject Land.                                                                               |                                                                                                                                                                                                         |                                                                                                                        |
| <b>(i)</b> Fertiliser drift                          | Fertiliser use during occupation is not expected to result in drift impacting surrounding vegetation.                                                 | N/A                                                                                                                                                                                                     | N/A                                                                                                                    |
| <b>(j)</b> Rubbish dumping                           | Rubbish dumping during construction may attract invasive fauna species, impacting habitat quality. Proper disposal practices will mitigate this risk. | Potential habitat for threatened fauna species adjacent to the Subject Land. Localised impacts are expected but will not significantly affect bioregional persistence with proper management practices. |                                                                                                                        |
| <b>(k)</b> Wood collection                           | The proposed development is unlikely to increase wood collection in surrounding vegetation.                                                           | N/A                                                                                                                                                                                                     | N/A                                                                                                                    |
| <b>(l)</b> Bush rock removal and disturbance         | Bush rock within and adjacent to the Subject Land may be impacted, potentially affecting fauna relying on these features.                             | None.                                                                                                                                                                                                   | Localised impacts are not expected to significantly affect bioregional persistence.                                    |
| <b>(m)</b> Increase in predatory species populations | Predatory species such as foxes and cats may be attracted by rubbish, but the development will discourage dumping through controlled site management. | None.                                                                                                                                                                                                   | Localised impacts are expected but are unlikely to affect bioregional persistence due to available connected habitats. |
| <b>(n)</b> Increase in pest animal populations       | Pest animals may increase due to indirect impacts such as rubbish                                                                                     | None.                                                                                                                                                                                                   | Localised impacts are not expected to significantly affect bioregional persistence due to habitat connectivity.        |

| Indirect Impact                                                    | Nature, Extent and Duration                                                                                 | Threatened Entities Likely Affected | Consequences                                                                                                                                         |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    | dumping, but current habitat connectivity will allow their dispersal.                                       |                                     |                                                                                                                                                      |
| <b>(o)</b> Increased risk of fire                                  | Modification to the Subject Land is not expected to increase in risk of fire from the proposed development. | None.                               | Localised impacts are not expected to significantly affect bioregional persistence due to no increase in risk of fire from the proposed development. |
| <b>(p)</b> Disturbance to specialist breeding and foraging habitat | The proposed development is not expected to disturb specialist breeding and foraging habitats.              | N/A                                 | N/A                                                                                                                                                  |

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### 9.3 Mitigating Residual Impacts

There are no trees to be removed for the proposed development and a very low area of native groundcovers will be impacted.

**Weed Management and Native Vegetation Restoration:** To provide some habitat restoration to the highly disturbed areas, it is recommended that that locally indigenous understory and canopy species representative of the relevant PCT be replanted to increase species richness and habitat complexity within the Subject Land in areas where construction will not occur.

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## 10. SERIOUS AND IRREVERSIBLE IMPACTS (SAII)

An impact is considered serious and irreversible if it significantly increases the risk of a threatened species or ecological community becoming extinct. This occurs when:

- The species or community is experiencing a rapid decline, and the impact contributes to further declines.
- The population size is already very small, and the impact exacerbates its reduction.
- The habitat is geographically limited, and the impact further restricts its distribution.
- The species or community is unlikely to recover through habitat or vegetation integrity improvements, making it irreplaceable.

These principles are outlined in Clause 6.7 of the *Biodiversity Conservation Regulation 2017*. Species and ecological communities with a 'very high' biodiversity risk weighting are identified as potential Serious and Irreversible Impacts (SAIIs) in the BAM calculator.

The determination of SAIIs is the responsibility of the consent authority, guided by the principles in the BC Regulation. To assist, the guidance document *Guidance to assist a decision-maker to determine a serious and irreversible impact* provides criteria for applying the principles in Clause 6.7 to identify species and ecological communities likely subject to SAIIs.

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### 10.1 SAII Assessment Requirements

Cumberland Red Gum Riverflat Forest, listed as not Critically Endangered under the BC Act 2016 and EPBC Act 1999, and thus is not included as a threatened entity in the Threatened Biodiversity Data Collection. An additional Serious and Irreversible Impacts (SAIIs) assessment in accordance with Section 9.1 of the BAM was not required.

There were threatened species deemed to be a SAI auto-populated by the BAM-C. However, these species were eliminated from the assessment due to various constraint factors. Thus, a SAI assessment was not required for these species.

## 11. IMPACT SUMMARY

### 11.1 Offset Requirement for Impacts

#### 10.1.1 Ecosystem Credits

Table 18 below provides a summary of impacts to native vegetation and Threatened Ecological Communities (TECs) or Ecological Communities (ECs) that require an offset in the form of ecosystem credits.

**Table 18.** Summary of impacts that require an offset (ecosystem credits).

| Vegetation Zone      | PCT                                                                                                                                                                     | TEC | Area (ha) | Current VI Score | Future VI Score | Change in VI | Number of Ecosystem Credits Required |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|------------------|-----------------|--------------|--------------------------------------|
| Zone A               | 4025: Cumberland Red Gum Riverflat Forest                                                                                                                               | No  | 0.38      | 4.3              | 0               | -4.3         | 0                                    |
| Zone B               | 4025: Cumberland Red Gum Riverflat Forest                                                                                                                               | No  | 0.3       | 17.9             | 0               | -17.9        | 3                                    |
| <b>PCT Class</b>     | Coastal Floodplain Wetlands This includes PCT's: 4015, 4023, 4024, 4025, 4026, 4027, 4029, 4034, 4035, 4036, 4037, 4041, 4042, 4044, 4046, 4049, 4050, 4051, 4055, 4059 |     |           |                  |                 |              |                                      |
| <b>Trading Group</b> | Coastal Floodplain Wetlands - ≥ 70% - <90% cleared group (including Tier 2 or higher threat status).                                                                    |     |           |                  |                 |              |                                      |

#### 10.1.2 Impacts on threatened species and their habitat (species credits)

The ecological impact assessment has determined that no threatened species require the purchase and retirement of Biodiversity Offset Credits.

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## Appendix A: Development Application Site Plan

### Appendix A



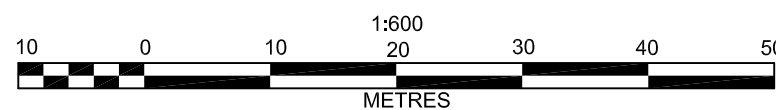
MGA 2020  
CO-ORDINATE ORIGIN E 282 800.897  
SSM 24966 (SCIMS) N 6 263 947.009

MGA 2020 ORIENTATION  
SSM 24966 TO SSM 1868  
359°29'38" (BY DP1273251)

(D) - RIGHT OF ACCESS 8 WIDE



● - POWER POLE  
6/0.3/10 - DENOTES TREE SPREAD/TRUNK DIAMETER/HEIGHT



- NOTES:
1. THIS DETAIL SURVEY IS NOT A 'SURVEY' AS DEFINED BY THE SURVEYING & SPATIAL INFORMATION ACT, 2002.
  2. DATUM OF LEVELS : AUSTRALIAN HEIGHT DATUM
  3. SIGNIFICANT TREES LOCATED ONLY (greater than 300mm trunk).
  4. NO SEARCH MADE OF LOCATION AND NATURE OF TELEPHONE, ELECTRICITY, SEWER, WATER, GAS AND DRAINAGE RECORDS AT THE RELEVANT AUTHORITY. PRIOR TO ANY CONSTRUCTION THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR LOCATION OF SERVICES.
  5. THE POSITION OF IMPROVEMENTS IN RELATION TO BOUNDARIES IS DIAGRAMMATIC ONLY.
  6. THIS TITLE BLOCK AND NOTES IS AN INTEGRAL PART OF THIS DRAWING WHICH IS NOT TO BE REMOVED.
  7. CONTOURS ARE INDICATIVE ONLY. SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

RUSSELL STREET

STREET

2  
DP 1273251

1 DP 1273251

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**RHCO** RICHARD HOGAN & CO.  
SURVEYING & DEVELOPMENT CONSULTANTS  
ABN 59 082 453 165  
P.O. BOX 4365, Penrith Plaza, NSW 2750.  
Phone: (02) 4732 6599  
Web: www.rhco.com.au Email: admin@hoganco.com.au

SURVEYOR: RR/WF  
DRAWN: CL/DG  
REDUCTION RATIO: 1:600 @ A1  
CONTOUR INTERVAL: 0.2  
SHEET 1 OF 1

ORIGIN OF LEVELS:  
SSM 24966  
R.L. = 24.660 (SCIMS)  
DATUM: AUSTRALIAN HEIGHT DATUM  
DATE: 22.10.2024  
VERSION No.: A

PLAN OF DETAIL AND LEVELS OVER  
EXISTING STOCKPILES ON LOT 2 IN D.P. 1273251,  
RUSSELL STREET, EMU PLAINS.

CLIENT: GLENSTONE

L.G.A.: PENRITH

JOB REF: 21744 SPILE

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## Appendix B: BMAT Report (Excerpt) for Subject Property

### Appendix B

## Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to your local council to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under [the Biodiversity Conservation Regulation 2017 \(Cl. 7.2 & 7.3\)](#).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

### Biodiversity Values Map and Threshold Report

| Date of Report Generation                                                                                                                                                                  |                                                                                                                                                         | 27/12/2024 2:15 PM |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)                                                                                       |                                                                                                                                                         |                    |
| 1.1                                                                                                                                                                                        | <b>Does the development Footprint intersect with BV mapping?</b>                                                                                        | yes                |
| 1.2                                                                                                                                                                                        | Was <u>ALL</u> BV Mapping within the development footprint added in the last 90 days? (dark purple mapping only, no light purple mapping present)       | no                 |
| 1.3                                                                                                                                                                                        | <b>Date of expiry of dark purple 90 day mapping</b>                                                                                                     | N/A                |
| 1.4                                                                                                                                                                                        | <b>Is the Biodiversity Values Map threshold exceeded?</b>                                                                                               | yes                |
| 2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)                                                                                            |                                                                                                                                                         |                    |
| 2.1                                                                                                                                                                                        | <b>Size of the development or clearing footprint</b>                                                                                                    | 18,640.1 sqm       |
| 2.2                                                                                                                                                                                        | <b>Native Vegetation Area Clearing Estimate (NVACE)</b><br>(within development/clearing footprint)                                                      | 16,603.0 sqm       |
| 2.3                                                                                                                                                                                        | <b>Method for determining Minimum Lot Size</b>                                                                                                          | Lot size           |
| 2.4                                                                                                                                                                                        | <b>Minimum Lot Size</b> (10,000sqm = 1ha)                                                                                                               | 213,621 sqm        |
| 2.5                                                                                                                                                                                        | <b>Area Clearing Threshold</b> (10,000sqm = 1ha)                                                                                                        | 5,000 sqm          |
| 2.6                                                                                                                                                                                        | <b>Does the estimate exceed the Area Clearing Threshold?</b><br>(NVACE results are an estimate and can be reviewed using the <a href="#">Guidance</a> ) | yes                |
| <b>REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area?</b><br>(Your local council will determine if a BDAR is required) |                                                                                                                                                         | <b>yes</b>         |

## What do I do with this report?

- If the result above indicates the BOS Threshold has been exceeded, your local council may require a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor>.
- If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is “likely to significantly affect threatened species” as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.
- If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.
- If all Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

For more detailed advice about actions required, refer to the Interpreting the evaluation report section of the [Biodiversity Values Map Threshold Tool User Guide](#) .

## Review Options:

- If you believe the Biodiversity Values mapping is incorrect please refer to our [BV Map Review webpage](#) for further information.
- If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the [Guide for reviewing area clearing threshold results from the BMAT Tool](#).

## Acknowledgement

I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: \_\_\_\_\_

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

Date: \_\_\_\_\_

27/12/2024 02:15 PM

## Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The BV map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Scheme applies to a clearing or development proposal. You have used the Threshold Tool in the map viewer to generate this BV Threshold Report for your nominated area. This report calculates results for your proposed development footprint and indicates whether Council may require you to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

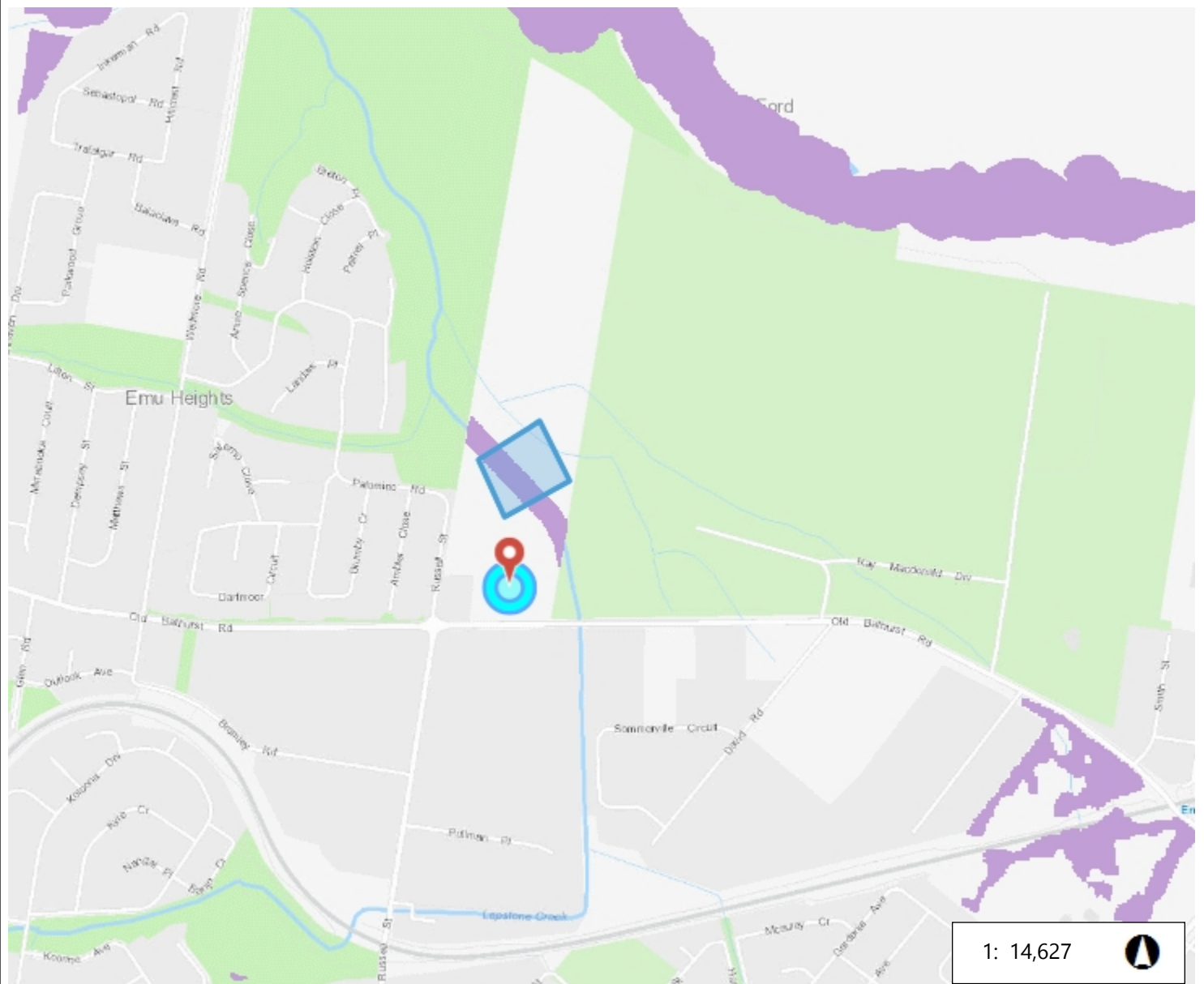
This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

What's new? For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the [Biodiversity Values Map webpage](#).

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the [Biodiversity Values Map Review webpage](#).

If you need help using this map tool see our [Biodiversity Values Map and Threshold Tool User Guide](#) or contact the Map Review Team at [map.review@environment.nsw.gov.au](mailto:map.review@environment.nsw.gov.au) or on 1800 001 490.

# Biodiversity Values Map



|       |   |        |       |        |
|-------|---|--------|-------|--------|
| 743.1 | 0 | 371.53 | 743.1 | Metres |
|-------|---|--------|-------|--------|

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere

### Legend

-  Biodiversity Values that have been mapped for more than 90 days
-  Biodiversity Values added within last 90 days
-  Native Vegetation Area Clearing Estimate (NVACE)
-  Development area selected by proponent

27/12/2024 02:15 PM

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Imagery © Airbus DS/Spot Image 2016

© NSW Department of Customer Service, Basemaps  
2019

© NSW Department of Planning and Environment

The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the [Biodiversity Values Map viewer](#) for mapping updates is recommended.

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## Appendix C: BAM Site – Field Survey Data

**Appendix C: Survey PDFs inserted below.**



# Field Data Sheet – Vegetation Survey (BAM)

|                                                                            |                          |                                                                       |                                      |                     |
|----------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------|--------------------------------------|---------------------|
| <b>Survey Name:</b> 172 Russell St, Emu Plains                             |                          | <b>Date:</b> 20/12/2025                                               | <b>Recorders:</b> J.McIvor / S.Hoft  |                     |
| <b>Zone:</b> GDA94                                                         | <b>Datum:</b> MGA56      | <b>Plot ID:</b> Veg. Zone B – South of drain                          | <b>Plot dimensions:</b> 50m x 20m    | <b>Photo #:</b>     |
| <b>Easting:</b> 282913                                                     | <b>Northing:</b> 6264259 | <b>IBRA region:</b> Sydney Basin<br><b>IBRA subregion:</b> Cumberland | <b>Midline bearing from 0 m:</b> 41° |                     |
| <b>Vegetation Class:</b> Coastal Floodplain Wetlands                       |                          |                                                                       |                                      | Confidence<br>H M L |
| <b>Plant Community Type:</b> PCT 4025: Cumberland Red Gum Riverflat Forest |                          |                                                                       | <b>EEC: No</b>                       | Confidence<br>H M L |

Record easting and northing at 0m on midline. Dimensions (Shape) of 0.04ha base plot.

| 400m <sup>2</sup> Plot (20m x 20m) |             |                           | 1000m <sup>2</sup> Plot (20m x 50m) |                                                          |           |
|------------------------------------|-------------|---------------------------|-------------------------------------|----------------------------------------------------------|-----------|
|                                    | Composition | Cover (%)<br>(may =>100%) | DBH                                 | Count (best practice for benchmarks/otherwise just tick) |           |
| Trees (TG)                         | 1           | 2                         | 80 + cm                             | 0                                                        |           |
| Shrubs (SG)                        | 0           | 0                         | 50 – 79 cm                          | 0                                                        |           |
| Grasses etc. (GG)                  | 1           | 21                        | 30 – 49 cm                          | 0                                                        |           |
| Forbs (FG)                         | 3           | 4                         | 20 – 29 cm                          | 0                                                        |           |
| Ferns (EG)                         | 0           | 0                         | 10 – 19 cm                          | 0                                                        |           |
| Other (OG)                         | 1           | 1                         | 5 – 9 cm                            | 0                                                        | Regen.? Y |
| <b>HTE Cover</b>                   |             | 50                        | <b>Length Fallen Log</b>            | 5                                                        |           |
|                                    |             |                           | <b>HBTs</b>                         | No                                                       |           |

| <b>BAM Attribute (1 x 1 m plots)</b> Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10cm in diameter) |                  |    |    |    |    |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------|----|----|----|----|-----------------------|----|----|----|----|---------------------|----|----|----|----|----------------|----|----|----|----|
|                                                                                                                                       | Litter cover (%) |    |    |    |    | Bare ground cover (%) |    |    |    |    | Cryptogam cover (%) |    |    |    |    | Rock cover (%) |    |    |    |    |
| Subplot score                                                                                                                         | 5                | 15 | 25 | 35 | 45 | 5                     | 15 | 25 | 35 | 45 | 5                   | 15 | 25 | 35 | 45 | 5              | 15 | 25 | 35 | 45 |
|                                                                                                                                       | 15               | 10 | 0  | 35 | 5  |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |
| <b>Mean (5 plots)</b>                                                                                                                 | 12               |    |    |    |    |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |

| <b>Physiography (Optional):</b> site features may help determine PCT and mgmt. zone or for BioNet systematic flora survey purposes) |  |                      |  |                  |  |                                |  |
|-------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|------------------|--|--------------------------------|--|
| Morphological Type                                                                                                                  |  | Landform Element     |  | Landform Pattern |  | Microrelief                    |  |
| Lithology                                                                                                                           |  | Soil Surface Texture |  | Soil Colour      |  | Soil Depth                     |  |
| Slope                                                                                                                               |  | Aspect               |  | Site Drainage    |  | Distance to nearest water type |  |

| <b>Site Description/Notes</b>                                                                         |
|-------------------------------------------------------------------------------------------------------|
| Southern side of drainage culvert – representative vegetation data for the southern stockpiles 1 – 5. |

Midline 1

## West Elevation

☉ 127°SE (T) ☉ -33.740191, 150.657381 ±3m ▲ 46m



Plot 3 Midline 2

17 Russel St, Emu Plains  
20 Dec 2024, 6:17:44 pm

Midline 2

## East Elevation

☉ 313°NW (T) ☉ -33.740427, 150.657701 ±3m ▲ 57m



Plot 3 Midline 1

17 Russel St, Emu Plains  
20 Dec 2024, 6:15:50 pm

# Field Data Sheet – Vegetation Survey (BAM)

|                                                                            |                          |                                                                       |                                      |                     |
|----------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------|--------------------------------------|---------------------|
| <b>Survey Name:</b> 172 Russell St, Emu Plains                             |                          | <b>Date:</b> 20/12/2025                                               | <b>Recorders:</b> J.McIvor / S.Hoft  |                     |
| <b>Zone:</b> GDA94                                                         | <b>Datum:</b> MGA56      | <b>Plot ID:</b> Veg. Zone B – South of drain                          | <b>Plot dimensions:</b> 50m x 20m    | <b>Photo #:</b>     |
| <b>Easting:</b> 282913                                                     | <b>Northing:</b> 6264259 | <b>IBRA region:</b> Sydney Basin<br><b>IBRA subregion:</b> Cumberland | <b>Midline bearing from 0 m:</b> 41° |                     |
| <b>Vegetation Class:</b> Coastal Floodplain Wetlands                       |                          |                                                                       |                                      | Confidence<br>H M L |
| <b>Plant Community Type:</b> PCT 4025: Cumberland Red Gum Riverflat Forest |                          |                                                                       | <b>EEC: No</b>                       | Confidence<br>H M L |

Record easting and northing at 0m on midline. Dimensions (Shape) of 0.04ha base plot.

| 400m <sup>2</sup> Plot (20m x 20m) |                    |                                  | 1000m <sup>2</sup> Plot (20m x 50m) |                                                                 |           |
|------------------------------------|--------------------|----------------------------------|-------------------------------------|-----------------------------------------------------------------|-----------|
|                                    | <b>Composition</b> | <b>Cover (%)</b><br>(may =>100%) | <b>DBH</b>                          | <b>Count (best practice for benchmarks/otherwise just tick)</b> |           |
| <b>Trees (TG)</b>                  | 1                  | 2                                | 80 + cm                             | 0                                                               |           |
| <b>Shrubs (SG)</b>                 | 0                  | 0                                | 50 – 79 cm                          | 0                                                               |           |
| <b>Grasses etc. (GG)</b>           | 1                  | 21                               | 30 – 49 cm                          | 0                                                               |           |
| <b>Forbs (FG)</b>                  | 3                  | 4                                | 20 – 29 cm                          | 0                                                               |           |
| <b>Ferns (EG)</b>                  | 0                  | 0                                | 10 – 19 cm                          | 0                                                               |           |
| <b>Other (OG)</b>                  | 1                  | 1                                | 5 – 9 cm                            | 0                                                               | Regen.? Y |
| <b>HTE Cover</b>                   |                    | 50                               | <b>Length Fallen Log</b>            | 5                                                               |           |
|                                    |                    |                                  | <b>HBTs</b>                         | No                                                              |           |

|                                                                                                                                              |                         |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----|----|----|----|------------------------------|----|----|----|----|----------------------------|------------------|----|----|----|-----------------------|----|--------------------------------|----|----|--|--|--|
| <b>BAM Attribute (1 x 1 m plots)</b> <i>Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10cm in diameter)</i> |                         |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
|                                                                                                                                              | <b>Litter cover (%)</b> |    |    |    |    | <b>Bare ground cover (%)</b> |    |    |    |    | <b>Cryptogam cover (%)</b> |                  |    |    |    | <b>Rock cover (%)</b> |    |                                |    |    |  |  |  |
| <b>Subplot score</b>                                                                                                                         | 5                       | 15 | 25 | 35 | 45 | 5                            | 15 | 25 | 35 | 45 | 5                          | 15               | 25 | 35 | 45 | 5                     | 15 | 25                             | 35 | 45 |  |  |  |
|                                                                                                                                              | 15                      | 10 | 0  | 35 | 5  |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
| <b>Mean (5 plots)</b>                                                                                                                        | 12                      |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
| <b>Physiography (Optional):</b> site features may help determine PCT and mgmt. zone or for BioNet systematic flora survey purposes)          |                         |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
| Morphological Type                                                                                                                           |                         |    |    |    |    | Landform Element             |    |    |    |    |                            | Landform Pattern |    |    |    |                       |    | Microrelief                    |    |    |  |  |  |
| Lithology                                                                                                                                    |                         |    |    |    |    | Soil Surface Texture         |    |    |    |    |                            | Soil Colour      |    |    |    |                       |    | Soil Depth                     |    |    |  |  |  |
| Slope                                                                                                                                        |                         |    |    |    |    | Aspect                       |    |    |    |    |                            | Site Drainage    |    |    |    |                       |    | Distance to nearest water type |    |    |  |  |  |
| <b>Site Description/Notes</b>                                                                                                                |                         |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |
| Southern side of drainage culvert – representative vegetation data for the southern stockpiles 1 – 5.                                        |                         |    |    |    |    |                              |    |    |    |    |                            |                  |    |    |    |                       |    |                                |    |    |  |  |  |

Midline 1

## West Elevation

☉ 127°SE (T) ☉ -33.740191, 150.657381 ±3m ▲ 46m



Plot 3 Midline 2

17 Russel St, Emu Plains  
20 Dec 2024, 6:17:44 pm

Midline 2

## East Elevation

☉ 313°NW (T) ☉ -33.740427, 150.657701 ±3m ▲ 57m



Plot 3 Midline 1

17 Russel St, Emu Plains  
20 Dec 2024, 6:15:50 pm

# Field Data Sheet – Vegetation Survey (BAM)

|                                                                            |                          |                                                                       |                                      |                     |
|----------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------|--------------------------------------|---------------------|
| <b>Survey Name:</b> 172 Russell St, Emu Plains                             |                          | <b>Date:</b> 20/12/2025                                               | <b>Recorders:</b> J.McIvor / S.Hoft  |                     |
| <b>Zone:</b> GDA94                                                         | <b>Datum:</b> MGA56      | <b>Plot ID:</b> Veg. Zone B – South of drain                          | <b>Plot dimensions:</b> 50m x 20m    | <b>Photo #:</b>     |
| <b>Easting:</b> 282913                                                     | <b>Northing:</b> 6264259 | <b>IBRA region:</b> Sydney Basin<br><b>IBRA subregion:</b> Cumberland | <b>Midline bearing from 0 m:</b> 41° |                     |
| <b>Vegetation Class:</b> Coastal Floodplain Wetlands                       |                          |                                                                       |                                      | Confidence<br>H M L |
| <b>Plant Community Type:</b> PCT 4025: Cumberland Red Gum Riverflat Forest |                          |                                                                       | <b>EEC: No</b>                       | Confidence<br>H M L |

Record easting and northing at 0m on midline. Dimensions (Shape) of 0.04ha base plot.

| 400m <sup>2</sup> Plot (20m x 20m) |             |                           | 1000m <sup>2</sup> Plot (20m x 50m) |                                                          |           |
|------------------------------------|-------------|---------------------------|-------------------------------------|----------------------------------------------------------|-----------|
|                                    | Composition | Cover (%)<br>(may =>100%) | DBH                                 | Count (best practice for benchmarks/otherwise just tick) |           |
| Trees (TG)                         | 1           | 2                         | 80 + cm                             | 0                                                        |           |
| Shrubs (SG)                        | 0           | 0                         | 50 – 79 cm                          | 0                                                        |           |
| Grasses etc. (GG)                  | 1           | 21                        | 30 – 49 cm                          | 0                                                        |           |
| Forbs (FG)                         | 3           | 4                         | 20 – 29 cm                          | 0                                                        |           |
| Ferns (EG)                         | 0           | 0                         | 10 – 19 cm                          | 0                                                        |           |
| Other (OG)                         | 1           | 1                         | 5 – 9 cm                            | 0                                                        | Regen.? Y |
| <b>HTE Cover</b>                   |             | 50                        | <b>Length Fallen Log</b>            | 5                                                        |           |
|                                    |             |                           | <b>HBTs</b>                         | No                                                       |           |

| <b>BAM Attribute (1 x 1 m plots)</b> Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10cm in diameter) |                  |    |    |    |    |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------|----|----|----|----|-----------------------|----|----|----|----|---------------------|----|----|----|----|----------------|----|----|----|----|
|                                                                                                                                       | Litter cover (%) |    |    |    |    | Bare ground cover (%) |    |    |    |    | Cryptogam cover (%) |    |    |    |    | Rock cover (%) |    |    |    |    |
| Subplot score                                                                                                                         | 5                | 15 | 25 | 35 | 45 | 5                     | 15 | 25 | 35 | 45 | 5                   | 15 | 25 | 35 | 45 | 5              | 15 | 25 | 35 | 45 |
|                                                                                                                                       | 15               | 10 | 0  | 35 | 5  |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |
| <b>Mean (5 plots)</b>                                                                                                                 | 12               |    |    |    |    |                       |    |    |    |    |                     |    |    |    |    |                |    |    |    |    |

| <b>Physiography (Optional):</b> site features may help determine PCT and mgmt. zone or for BioNet systematic flora survey purposes) |  |                      |  |                  |  |                                |  |
|-------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|------------------|--|--------------------------------|--|
| Morphological Type                                                                                                                  |  | Landform Element     |  | Landform Pattern |  | Microrelief                    |  |
| Lithology                                                                                                                           |  | Soil Surface Texture |  | Soil Colour      |  | Soil Depth                     |  |
| Slope                                                                                                                               |  | Aspect               |  | Site Drainage    |  | Distance to nearest water type |  |

| <b>Site Description/Notes</b>                                                                         |
|-------------------------------------------------------------------------------------------------------|
| Southern side of drainage culvert – representative vegetation data for the southern stockpiles 1 – 5. |

Midline 1

## West Elevation

☉ 127°SE (T) ☉ -33.740191, 150.657381 ±3m ▲ 46m



Plot 3 Midline 2

17 Russel St, Emu Plains  
20 Dec 2024, 6:17:44 pm

Midline 2

## East Elevation

☉ 313°NW (T) ☉ -33.740427, 150.657701 ±3m ▲ 57m



Plot 3 Midline 1

17 Russel St, Emu Plains  
20 Dec 2024, 6:15:50 pm

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## Appendix D: BAM-C Biodiversity Credit Report

### Appendix D

## Proposal Details

|                                |                                        |                                              |
|--------------------------------|----------------------------------------|----------------------------------------------|
| Assessment Id                  | Proposal Name                          | BAM data last updated *                      |
| 00054836/BAAS24051/25/00055051 | 172 RUSSEL ST EMU PLAINS               | 28/10/2024                                   |
| Assessor Name                  | Report Created                         | BAM Data version *                           |
| Jesse Samuel Mclvor            | 02/05/2025                             | Current classification (live - default) (80) |
| Assessor Number                | BAM Case Status                        | Date Finalised                               |
| BAAS24051                      | Open                                   | To be finalised                              |
| Assessment Revision            | BOS entry trigger                      | Assessment Type                              |
| 1                              | BOS Threshold: Biodiversity Values Map | Part 4 Developments (General)                |

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

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

| Zone                                       | Vegetation zone name | TEC name  | Current Vegetation integrity score | Change in Vegetation integrity (loss / gain) | Area (ha) | Sensitivity to loss (Justification) | Species sensitivity to gain class | BC Act Listing status | EPBC Act listing status | Biodiversity risk weighting | Potential SAI | Ecosystem credits |
|--------------------------------------------|----------------------|-----------|------------------------------------|----------------------------------------------|-----------|-------------------------------------|-----------------------------------|-----------------------|-------------------------|-----------------------------|---------------|-------------------|
| <b>Cumberland Red Gum Riverflat Forest</b> |                      |           |                                    |                                              |           |                                     |                                   |                       |                         |                             |               |                   |
| 1                                          | 4025_Poor_North      | Not a TEC | 4.3                                | 4.3                                          | 0.38      | PCT Cleared - 89%                   | High Sensitivity to Gain          |                       |                         | 2.00                        |               | 0                 |

## BAM Credit Summary Report

|   |                 |           |      |      |     |                   |                          |  |  |      |                 |          |
|---|-----------------|-----------|------|------|-----|-------------------|--------------------------|--|--|------|-----------------|----------|
| 2 | 4025_Poor_South | Not a TEC | 17.9 | 17.9 | 0.3 | PCT Cleared - 89% | High Sensitivity to Gain |  |  | 2.00 |                 | 3        |
|   |                 |           |      |      |     |                   |                          |  |  |      | <b>Subtotal</b> | <b>3</b> |
|   |                 |           |      |      |     |                   |                          |  |  |      | <b>Total</b>    | <b>3</b> |

### Species credits for threatened species

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

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## Appendix E: SAII Assessment

### Appendix E

N/A

## Appendix F: Qualifications and Experience

### Jesse Samuel Mclvor

Email: consulting@mcenviro.com.au

Phone: 0403 891 523

| EXPERIENCE / POSITION                                                      | ORGANISATION                  | DATE                     |
|----------------------------------------------------------------------------|-------------------------------|--------------------------|
| Senior Environmental Scientist                                             | Mclvor Environmental          | 2020 – present (ongoing) |
| Ecologist (sub-contractor)                                                 | Various ecology consultancies | 2019 - 2024              |
| Educator<br>( <i>Earth and Environmental Science, Biology, Chemistry</i> ) | NSW Department of Education   | 2014 -2020               |
| Ecology Technician and<br>Fisheries Research Assistant                     | Australian Antarctic Division | 2011 - 2013              |
| Aquatic Technician / Field Officer                                         | University of Sydney          | 2008 - 2010              |

| QUALIFICATION                                                                          | INSTITUTION               | DATE        |
|----------------------------------------------------------------------------------------|---------------------------|-------------|
| Biodiversity Assessment Method (BAM) Officer<br><u>Accreditation Number: BAAS24051</u> | NSW Government / Greencap | 2024        |
| Diploma of Education                                                                   | UTS Sydney                | 2014        |
| Bachelor of Antarctic Studies (Honours)                                                | University of Tasmania    | 2006 - 2007 |
| Bachelor of Science                                                                    | Macquarie University      | 2003 – 2005 |

| COURSE (Professional Development)                                     | INSTITUTION                       | DATE              |
|-----------------------------------------------------------------------|-----------------------------------|-------------------|
| Grass Identification Course<br>(AHPCPM303 - Identify Plant Specimens) | Total College                     | 2025 (Registered) |
| Eucalyptus Identification Workshop                                    | Dan Clarke (Arcane Botanica)      | 2024              |
| Certificate of On-site Wastewater Management                          | Centre for Environmental Training | 2020              |