



**FLORA AND FAUNA SURVEYS AND
BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT (BDAR)
FOR
PROPOSED STATE SIGNIFICANT DEVELOPMENT (SSD)
APPLICATION
FOR THE MASTERPLAN INCLUDING STAGES 1, 2 & 3
AT TELOPEA, NSW**

PREPARED FOR:

**FRASERS PROPERTY AUSTRALIA PTY LTD
FOR THE LAND & HOUSING CORPORATION (LAHC)
C/O NATURALLY TREES
PO BOX 5085 ELANORA HEIGHTS
NSW 2101**

11th NOVEMBER 2022

ACS Environmental Pty Ltd

Flora and Fauna Surveys, Biodiversity and Ecological Impact Assessment and Bushland Plans of Management Services

Australian Company Number (ACN) 154 491 120

Australian Business Number (ABN) 24 154 491 120

3/28 Tullimbar Road, Cronulla NSW. 2230

Tel: 9527 5262. Mob: 0403 081 902.

Email: acs@actinotus.com; Web: www.actinotus.com

Director

Peter Stricker BSc. (Hons) (Syd) [□] # * ^



[□] Member Ecological Consultants Association NSW Inc

Accredited Biodiversity Assessment Assessor (Biodiversity Conservation Act 2016) -
(Accreditation Number BAAS 18125)

*ACS Environmental is an accredited Animal Research Establishment certified by the NSW
Dept of Primary industries

^ Scientific Biodiversity Conservation Act Licence BSL100855 (DPE 2022 in progress)

The principal of 'ACS Environmental P/L has worked in the area of floristic and faunal impact assessment services for a period of greater than 20 years. He also has over 30 years of experience in scientific research (ecological) and teaching in biological science.

Declarations

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).

The relevant application is for a planning approval for the development of Stage 1A of the Telopea Concept Plan Area (CPA)

Signature: 

Date: 16/11/2022

BAM Assessor Accreditation no: BAAS 18125

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

Contents

| | |
|---|---------------|
| 1. Introduction | 1 |
| 1.1. Proposed development..... | 1 |
| 1.2. Purpose of report..... | 2 |
| 1.3. Background | 3 |
| 1.4. Site description | 3 |
| 1.5. History of subject area | 4 |
| 1.6. Arboricultural assessment of subject area | 4 |
| 1.7. Location of subject area..... | 4 |
| 1.8. Sampling vegetation attributes | 12 |
| 1.9. Extent of land proposed to be impacted by development..... | 16 |
| 1.10. Topography, geology and soils | 20 |
| 1.11. Current database and mapping searches | 20 |
| 1.12. Literature Review | 20 |
| 2. Landscape Features | 22 |
| 2.1. IBRA Regions and Subregions | 22 |
| 2.2. Mitchell Landscapes (NSW Landscape Regions) | 22 |
| 2.3. Extent of native vegetation..... | 23 |
| 2.4. Wetlands, Rivers, Streams and Estuaries..... | 23 |
| 2.5. Connectivity | 23 |
| 2.6. Areas of Geological significance and soil hazard features..... | 24 |
| 2.7. Areas of Outstanding Biodiversity Value (AOBV) | 24 |
| 2.8. Site Context..... | 24 |
| 2.8.1. Native Vegetation Cover | 24 |
| 2.8.2. Patch Size | 24 |
| 3. Native Vegetation | 26 |
| 3.1. Native vegetation extent within the site | 26 |
| 3.2. Plant Community Types (PCTs) | 27 |
| 3.2.1. Plant Community Type mapped and PCT assessed as occurring at the site..... | 27 |

| | |
|--|-----------|
| 3.2.2. Plot data used in BAM Calculator | 33 |
| 3.2.3. Flora species occurring in the plot | 34 |
| 3.2.4. Fauna species and potential fauna habitat | 34 |
| 3.3. Vegetation Integrity Assessment | 41 |
| 3.3.1. Vegetation zone | 41 |
| 3.3.2. Patch size | 41 |
| 3.3.3. Vegetation Integrity Score | 41 |
| 4. Threatened Species | 45 |
| 4.1. Ecosystem Credit Species..... | 45 |
| 4.2. Species Credit Species (Candidate Species)..... | 45 |
| 4.3. Description of Impacts | 73 |
| 4.3.1. Direct impacts to the subject site..... | 73 |
| 4.3.2. Potential for runoff, erosion and sedimentation during construction | 73 |
| 4.3.3. Biodiversity credits for PCT1281(Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion) | 73 |
| 4.3.4. Serious and Irreversible Impacts (SAIL)..... | 74 |
| 4.3.5. Potential Direct Impacts..... | 75 |
| 4.3.5.1. Removal of vegetation and potential habitat..... | 75 |
| 4.3.5.2. Potential for runoff, sedimentation and erosion during construction | 75 |
| 4.3.5.3. Potential temporary noise, dust, excessive lighting and vibration disturbance during construction | 76 |
| 4.3.6. Indirect Impacts | 76 |
| 4.3.7. Prescribed and uncertain impacts..... | 77 |
| 4.3.8. Avoidance/minimisation of impacts | 78 |
| 5. Impact Summary | 79 |
| 5.1. Serious and Irreversible Impacts (SAIL) | 79 |
| 5.2. Impacts that require an offset | 80 |
| 6. Biodiversity Credit Report (Like for Like) | 81 |
| 7. References and Literature Reviewed | 82 |

Figures

| | | |
|-----------|---|----|
| Figure 1 | Aerial image taken in 1943 indicating the mostly cleared landscapes and cropped fields of the current subject area of the Telopea CPA Urban Release Plan (from SIXmaps 2022) | 5 |
| Figure 2 | Location of the CPA development area at Telopea within the Sydney region (blue marker) (imagery from Nearmap, 2022) | 6 |
| Figure 3 | Locality image of CPA development area at Telopea (blue marker), and surrounds in relation to surrounding landscape and residential development (Nearmap, 2022) | 7 |
| Figure 4 | Locality aerial image of part of Telopea showing approximate property boundaries within the blue shaded areas in relation to the proposed Staged precinct development sections of the Telopea CPA, an area of approximately 18.85ha (Nearmap, 2022) | 8 |
| Figure 5A | Schematic representation of the Envelope Control Plan of the proposed Core and East Precincts of the Telopea Urban Release Plan (Bates Smart 2020) | 9 |
| Figure 5B | Schematic representation of the Envelope Control Plan of the proposed North Precinct of the Telopea Urban Release Plan (Bates Smart 2020) | 10 |
| Figure 5C | Schematic representation of the Envelope Control Plan of the proposed South Precincts of the Telopea Urban Release Plan (Bates Smart 2020) | 11 |
| Figure 6 | Locations of numbered sampled quadrats for floristic and structural attributes (at locations indicated by blue markers: 20 x 20m; 20 x 50m quadrats) across 3 different areas where the occurrence of native species may likely represent highly modified STIF assemblages within the proposed CPA development area at Telopea (Nearmap September 2022). | 15 |
| Figure 7 | Vegetation mapping by DPE (2022) showing subject Masterplan development (central location indicated by purple dot) in relation to nearest area of STIF some 275m to the south-east (shaded green with aqua boundary) | 18 |
| Figure 8 | Biodiversity Values map showing subject of Telopea Masterplan development (relative location indicated by blue dot) in relation to nearest areas of biodiversity value (shaded purple in relation to retained STIF bushland at lower section of image). Drainage channel which flows southward through Elizabeth MacArthur Park to the west of the railway line is also evident (DPE 2022). | 19 |

Figures

| | | |
|-----------|--|----|
| Figure 9 | Map of Mitchell landscapes surrounding the subject area. Orange shaded area indicates the more elevated Pennant Hills Ridges Mitchell Landscape. Dark pink shaded areas indicate the less elevated Port Jackson Mitchell Landscape. The Subject area is indicated adjacent to the pink dot (Land and Property Information 2015). | 23 |
| Figure 10 | Image of landscape features within a 1500m radius centred around the subject site at Telopea (blue circular outline) showing extent of vegetated areas along creek lines and associated reserves within the buffer zone (Nearmap July 2022; GIS 2022) (Blue pointers indicate location of BAM quadrats). | 25 |
| Figure 11 | Lower section of Quadrat 1 (see Figure 6) in the North Precinct of the Telopea redevelopment proposal indicating planted individuals of Sydney Blue Gum, <i>Melaleuca armillaris</i> , Broad-leaved Paperbark and Sweet Pittosporum in a landscaped area along Shortland Street connecting downslope with Wade Street | 28 |
| Figure 12 | Section of Quadrat 2 (see Figure 6) in the North Precinct of the Telopea redevelopment proposal indicating planted individuals of Mugga Ironbark (<i>Eucalyptus sideroxylon</i>) occurring in relatively poor condition in a landscaped area within private residential areas along the upper section of The Parade, Telopea | 29 |
| Figure 13 | Upper section of Quadrat 3 (see Figure 6) in the East Precinct of the Telopea redevelopment proposal indicating a possible mature remnant individual of Sydney Blue Gum with younger individuals of Blue Gum within the quadrat potentially having naturalised from seedlings derived from the remnant individual. The quadrat occurs within areas surrounding and including a carpark off Moffat's Drive, near Evans Road, Telopea. Note the large hollows developed in the mature individual | 30 |
| Figure 14 | Individuals of Broad-leaved Paperbark occurring along the upper section of Sturt Street in the Core Precinct are not representative of STIF, this species occurring naturally in coastal swamps and along the edges of brackish lagoons | 31 |
| Figure 15 | Individuals of Box Elder (<i>Acer negundo</i>), an exotic deciduous ornamental species planted in a landscaped area along the front section of Evans Road in the East Precinct are not representative of STIF | 31 |

Figures

| | | |
|------------|--|----|
| Figure 16 | Bat surveys undertaken over three evenings within the inclusive Stages of the Telopea CPA Masterplan subject site, results are provided in Legend for Bat Detections and Habitat Types (Courtesy of Arcadis Pty Ltd 2022). | 37 |
| Figure 17A | The specific multi-storey building and individual of Blackbutt containing hollows that occurs in the south-west section of the Core Precinct of the Telopea CPA subject area shown in Figure 16 (Courtesy of Arcadis Pty Ltd 2022) | 38 |
| Figure 17B | The specific multi-storey building that occurs in the south-west section of the Core Precinct of the Telopea CPA subject area shown in Figure 16 (Courtesy of Arcadis Pty Ltd 2022). | 38 |

Tables

| | | |
|---------|--|----|
| Table 1 | Summarises the abiotic environmental and biotic attributes recorded at the subject land | 14 |
| Table 2 | Dates, timing of bat surveys and weather conditions recorded for bat surveys throughout the various Stages of the Telopea CPA | 36 |
| Table 3 | Condition attributes for composition, structure and function at plots (Table 1; Figure 9) which were sampled for BAM analysis (from Table 2 in BAM 2020) | 42 |
| Table 4 | Condition attributes for composition, structure and function in Plots 1, 2 & 3 (Figure 6) | 44 |
| Table 5 | Condition attribute scores for composition, structure, function and VIS at Plots 1 2 & 3 for PCT1281 | 44 |
| Table 6 | Ecosystem species and Candidate species assessment table for PCT 1281 occurring within the Masterplan of the CPA area at Telopea | 47 |
| Table 7 | List of potential prescribed impacts which may occur as a result of proposed development | 77 |
| Table 8 | Summarises the impact to areas of PCT1281 that require an offset | 80 |

Appendices

| | | |
|---|---------------------------------|----|
| 1 | BAAS Profile for Peter Stricker | 85 |
| 2 | BAM Attributes and VIS Score | 86 |
| 3 | BAM Ecosystem Credit Classes | 87 |
| 4 | BAM Ecosystem Credit Scores | 88 |
| 5 | BAM Ecosystem Pricing Offsets | 89 |

Glossary and Acronyms

| | |
|-------------------------------|---|
| APZ | asset protection zone |
| BAM | Biodiversity Assessment Method (2020) – supports the BC Act (2016) |
| BAM-C | Biodiversity Assessment Method Calculator |
| BC Act | <i>Biodiversity Conservation Act 2016</i> (NSW) |
| 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 |
| DCCEEW | Commonwealth Department of Climate Change, Environment, Energy and Water |
| DAWE | Commonwealth Department of Agriculture, Water and Environment |
| DBH | diameter at breast height over bark |
| DPI | Department of Primary Industries |
| DPE | Department of Planning and Environment |
| EC | ecological community listed under the EPBC Act |
| E (threatened species status) | Endangered species |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth). Enacted to protect and manage nationally and internationally (migratory) flora, fauna and ecological communities, defined in the Act as matters of national environmental significance (NES) |
| EP&A Act | <i>Environmental Planning and Assessment Act 1979</i> (NSW) |
| EEC | endangered ecological community |
| Habitat | areas occupied, either territorially, periodically or occasionally, by a species, population or ecological community |
| HTW | high threat weed |
| IBRA | Interim Biogeographic Regionalisation for Australia |
| KTP | Key threatening process, a process that threatens the survival, life cycle, abundance or potential evolutionary development of native species, populations or ecological communities (Dept of Environment and Conservation 2004). KTP's are listed under the BC Act and the EPBC Act. |
| LLS Act | <i>Local Land Services Act 2013</i> (NSW) |
| IPA | Inner Protection Zone |
| Migratory species | listed under the EPBC Act and relating to international agreements to which Australia is a signatory. Includes the Japan-Australia Migratory Bird Agreement (JAMBA), Chine-Australia Migratory Bird Agreement (CAMBA) Republic of Korea Migratory Bird Agreement (ROKAMBA) |

| | |
|---|--|
| MNES | matters of national environmental significance |
| NPW Act | <i>National Parks and Wildlife Act 1974 (NSW)</i> |
| NSW | New South Wales |
| OEH | Office of Environment and Heritage |
| OPA | Outer protection zone |
| PCT | plant community type as such using the Bionet Vegetation Classification system (OEH 2018) |
| RoTAP | Rare or Threatened Australian Plants |
| SAII | serious and irreversible impact |
| SEARs | Secretary's Environmental Assessment Requirements |
| TBDC | Threatened Biodiversity Data Collection |
| TEC | threatened ecological community |
| Threatened species, populations or ecological communities | - Entities listed by the BC Act and EPBC Act as 'Vulnerable to decreasing population growth in time', Endangered as population growth decreasing rapidly leading to eventual extinction' or 'Critically Endangered, a more extreme rate of population decrease than the former'. |
| TPZ | Tree protection zone |
| V (threatened species status) | Vulnerable |
| VEC | vulnerable ecological community |
| Vegetation SEPP | <i>State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)</i> |

1. Introduction

1.1. Proposed development

This report has been prepared by ACS Environmental Pty Ltd for Naturally Trees on behalf of *Frasers Property Australia Pty Ltd* (Frasers) and accompanies a State Significant Development application (SSDA) submitted to the NSW Department of Planning and Environment (DPE). The SSDA seeks Concept approval, in accordance with Division 4.4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the staged redevelopment of the **Telopea 'Concept Plan Area'** (CPA).

The SSDA seeks Concept approval for the staged redevelopment of the Telopea CPA, as well as a detailed proposal for the first stage of development. The Concept proposal sets out the maximum building envelopes and GFA that can be accommodated across the CPA, and identifies the land uses and public infrastructure upgrades to be provided. The Concept proposal will establish the planning and development framework from which any future development application will be assessed against.

The Telopea CPA proposal comprises:

- A mixed-use development including:
 - Approximately 4700 dwellings, including a mix of social, affordable and market dwellings
 - Inclusion of a new retail precinct with a new supermarket, food and beverage, and speciality retail
 - Proposed childcare facility
 - Proposed combined library and community centre
 - Proposed combined Church, Residential Aged Care Facility and Independent living unit's facility
- Delivery of new public open space, including:
 - A new light rail plaza
 - Hill top park
 - Eyles pedestrian link
 - Open space associated with the proposed library
- Retention of existing significant trees

- Road and intersection upgrades
- Cycle way upgrades
- Upgrade of utility services

The Telopea CPA is divided into four precincts known as Core, North, South and East incorporating a total of 29 lots. The Concept proposal is further detailed in the Urban Design Report prepared by Bates Smart and Hassell.

1.2. Purpose of report

The purpose of this report is to provide *Frasers Property Australia Pty Ltd* (Frasers) with detailed flora and fauna surveys on the subject land and to prepare a biodiversity development assessment report (BDAR) to accompany the SSDA.

The report investigates the impact of the proposed development on the biodiversity values of the existing natural or derived biota occurring on the land and provides the following guidelines for appropriate conservation of existing biodiversity and recommended mitigation measures in relation to the proposed impacts:

- describe the ecological value of the existing populations of landscaped street trees and trees planted to provide amenity amongst building structures;
- to evaluate the potential for the current populations of trees to represent threatened ecological communities and/or to provide habitat for threatened species of flora and/or fauna, and to assess the requirement to provide biodiversity offsets for potential impacts in relation to the BC Act (2016). This evaluation will provide guidance on appropriate management and protective measures in support of the planning submission of the Concept proposal and for the Staged works;
- to ensure all necessary safeguards are described and complied with in relation to the Staged works and to the proposal as required by Parramatta LEP 2011 and Parramatta DCP 2011; and
- to prepare a comprehensive report addressing current legislation, qualifying potential impacts and describing mitigation measures in relation to the above assessments.

1.3. Background

The Telopea CPA forms part of the **Telopea Precinct Master Plan** (February 2017), which was prepared by NSW Land and Housing Corporation (LAHC) and Parramatta City Council to facilitate the rezoning of the precinct in August 2018. The Master Plan seeks to revitalise the Telopea Precinct through the redevelopment of LAHC's social housing assets, as well as sites under private ownership, to deliver an integrated community with upgraded public domain and community facilities – and to capitalise on access to the new Parramatta Light Rail network.

The Telopea CPA is land currently owned by LAHC. The proposed redevelopment of the CPA is part of the NSW Government *Communities Plus* program, which seeks to deliver new communities where social housing blends with private and affordable housing with good access to transport, employment, improved community facilities and open space. The program seeks to leverage the expertise and capacity of the private and non-government sectors.

In December 2019, the NSW Government announced that the Frasers lease consortium, were awarded the contract to redevelop the Telopea CPA. The SSDA represents the first step in the delivery of the planned redevelopment of the Telopea CPA and the Stage 1A works will provide the first integrated social and market housing development on the site, as well as a new arrival plaza for the Parramatta Light Rail.

1.4. Site description

Telopea is located in the Parramatta Local Government Area (LGA). It is approximately 4km north-east of the Parramatta Central Business District (CBD), 6km south-west of Macquarie Park Strategic Centre, and 17km from Sydney CBD.

The Telopea CPA site is approximately 13.4 (ha) and comprises 99 individual allotments. It currently accommodates 486 social housing dwellings, across a mix of single dwelling, townhouse, and 3-9 storey residential flat buildings. The Estate also currently accommodates a range of existing community facilities including the Dundas Community Centre, Dundas Branch Library, Community Health Centre, Hope Connect church, and Telopea Christian Centre.

The immediate surrounds comprise predominantly residential properties within an established landscape setting. The broader Precinct contains the Telopea Public School, a neighbourhood centre known as the Waratah Shops, and two large Council parks known as Sturt Park and Acacia Park.

1.5. History of subject area

Historically the land has been cleared since before 1943 for farming including crop farming and grazing.

Figure 1 is an aerial of the subject area as it appeared in 1943, indicating the cleared rural landscape that was present at that time.

1.6. Arboricultural assessment of subject area

Scales (2020; revised 2022) has completed Arboricultural Impact Assessment and Method Statements for the subject area and documented a total of 393 individual trees that occur within the Stage 1 (Core and East Precinct); 268 individual trees that occur within Stage 2 (North Precinct) and a total of 255 individual trees that occur within Stage 3 (South Precinct).

As such, the tree numbers and species referred to in this report are as for those documented in the various Stages of Development in the reports by Naturally Trees Arboricultural Consulting by Scales (2020; revised 2022).

1.7. Location of subject area

Figure 2 is a diagram indicating the location of the subject site in the Sydney region.

Figure 3 is a locality aerial image of the subject Masterplan area at Telopea (blue marker), and surrounds in relation to landscapes and current residential development (Nearmap 2022).

Figure 4 is a locality aerial image of Telopea showing approximate property boundaries in relation to the subject Staged areas (Precincts) at Telopea (blue marker) (Nearmap 2022).

Figures 5A, 5B and 5C are schematic plans of the proposed envelopes in the Core and East Precinct, North Precinct and South Precincts respectively, of the various proposed developmental stages at the Telopea CPA.



Figure 1 - Aerial image taken in 1943 indicating the mostly cleared landscapes and cropped fields of the current subject area of the Telopea CPA Urban Release Plan (from SIXmaps 2022)

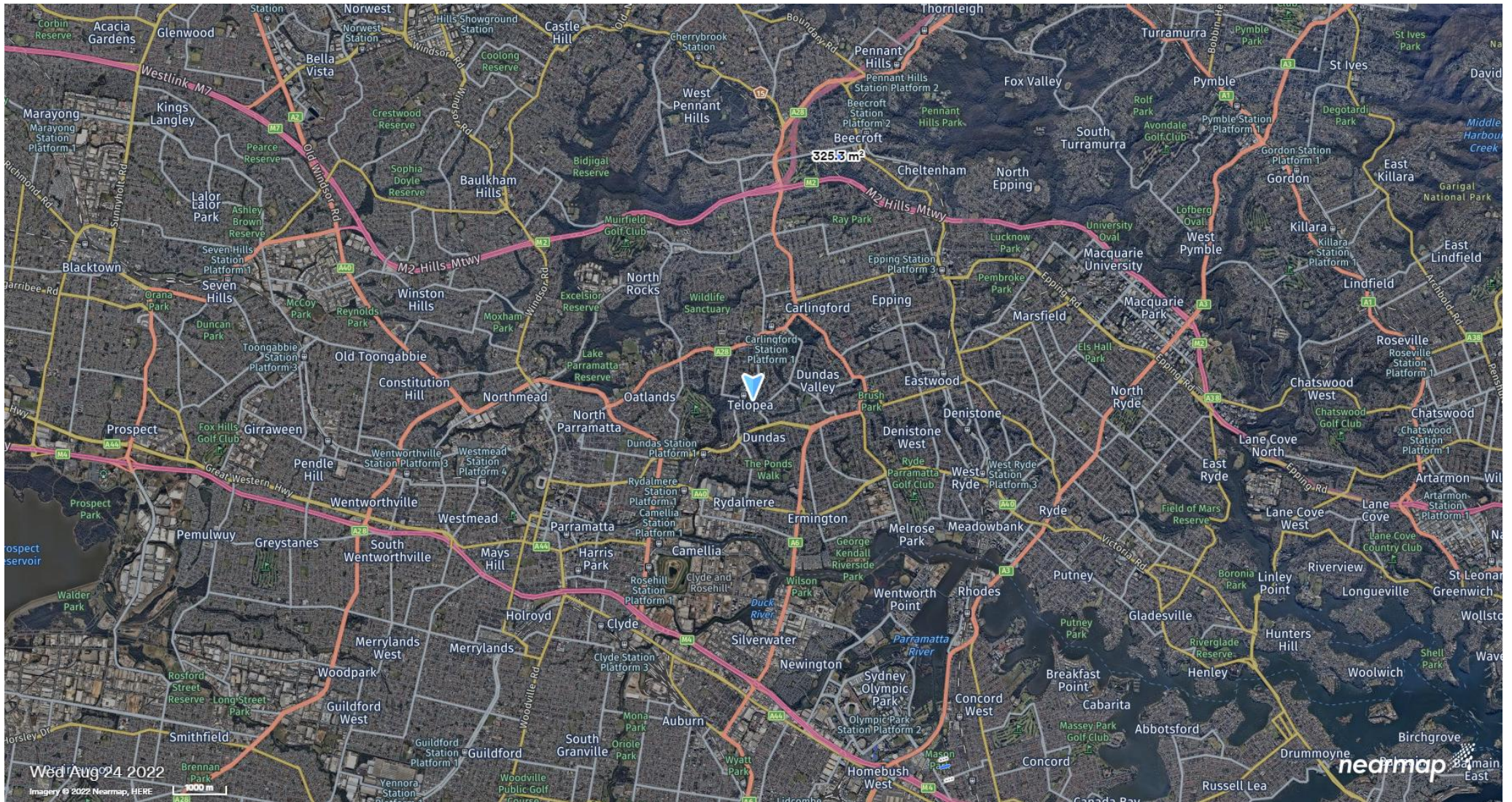


Figure 2 – Location of the CPA development area at Telopea within the Sydney region (blue marker) (imagery from Nearmap, 2022)

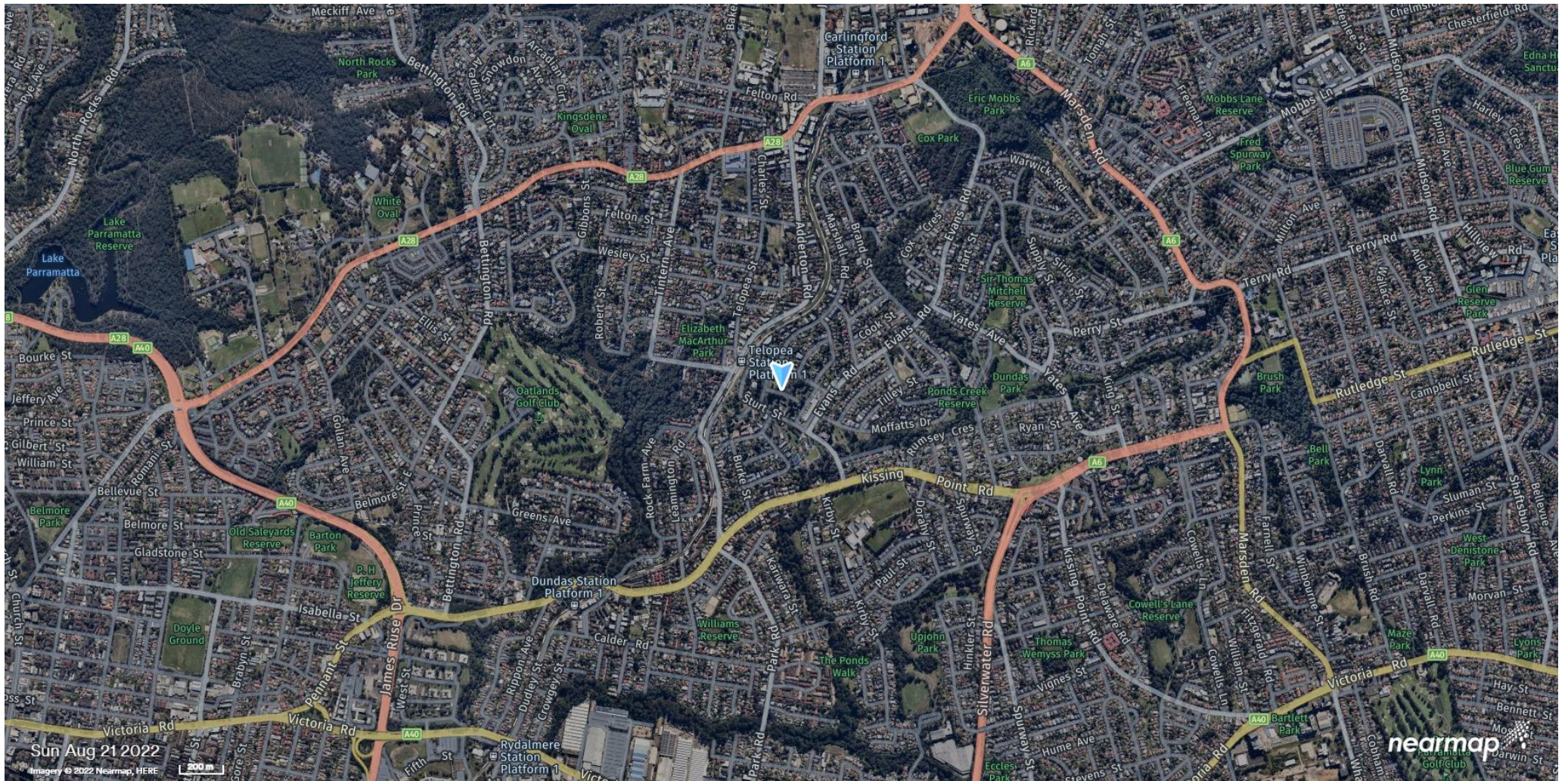


Figure 3 – Locality image of CPA development area at Telopea (blue marker), and surrounds in relation to surrounding landscape and residential development (Nearmap, 2022)



Figure 4 – Locality aerial image of part of Telopea showing approximate property boundaries within the blue shaded areas in relation to the proposed Staged precinct development sections of the Telopea CPA, an area of approximately 18.85ha (Nearmap, 2022)



Figure 5A - Schematic representation of the Envelope Control Plan of the proposed Core and East Precincts of the Telopea Urban Release Plan (Bates Smart 2022)



Figure 5B - Schematic representation of the Envelope Control Plan of the proposed North Precinct of the Telopea Urban Release Plan (Bates Smart 2022)

1.8. Sampling vegetation attributes

Strategy for sampling planted vegetation

The definition of native vegetation means that all plants that are native to NSW must be assessed in accordance with the Biodiversity Assessment Method (BAM), even if they are not indigenous to the local area. This includes planted native vegetation, such as windbreaks, street trees and planted native gardens.

BAM 2020 Appendix D: 'Streamlined assessment module - Planted native vegetation' provides a framework for the assessment of planted native vegetation using the BAM.

The planted native vegetation, where possible, is allocated to a best-fit PCT in the same IBRA subregion as the proposal. Appendix D: asks 'Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?' If the answer is yes, the BAM is then applied. Some planted native vegetation may meet the definition of a TEC.

If the planted native vegetation occurs in an isolated patch and/or cannot be reasonably assigned to a PCT known to naturally occur in the IBRA subregion, the assessor must include justification for this in the BAR and then apply Q2 of the Module (BAM 2020).

Planted native vegetation meeting specific requirements in the decision-making key only need to assess the planted native vegetation area for threatened species habitat (i.e. the use of Chapters 4 and 5 of the BAM are not required to be applied). Evidence demonstrating the application of the decision-making key to the areas of planted native vegetation must be provided in the BDAR.

The total area of the Telopea CPA development plan as depicted in Figure 4, equates to about 18.85ha. As such, 3 BAM plots are required to sample the vegetation attributes at the proposed development site (BAM 2020). Accordingly, three plots were sampled in each of the precincts and the plots with the greatest number of floristic, structural and functional attributes were selected to use in the BAM calculator.

The three most likely areas containing likely representative tree species of former Sydney Turpentine Ironbark Forest (STIF) within the proposed construction footprints were sampled for vegetation composition attributes in quadrat sizes of 20m x 20m to derive species composition and structural attributes. The 400m² areas and adjacent areas extending for another 600m² from the sampled quadrats was further sampled for functional attributes.

The compositional, structural and functional attributes of the sampled vegetation were combined by the BAM algorithm process to derive a Vegetation Integrity Score (VIS).

The BAM attributes for floristic composition, structural variation and functional attributes were sampled on the 20th and 27th of September 2022.

Figure 6 indicates the location of the sampling areas at the subject site. These plots provided the attributes that were used to derive any potential offsets.

Table 1 summarises environmental and biotic attributes recorded in the floristic plot (s) (PLOTS 1 (Stage 1), 2 (Stage 2) & 3 (Stage 3)) (Figure 6).

| QUADRAT NUMBER | Q1 | Q2 | Q3 |
|---|--|--|--|
| PRECINCT | CORE | NORTH | EAST |
| DESCRIPTION | PLANTED STREET AND INTERNAL TREES | PLANTED STREET AND INTERNAL TREES | PLANTED AND NATURALISED LANDSCAPE TREES |
| Plot coordinates | -33.794107, 151.042116 | -33.792411, 151.04543 | -33.796691, 151.045709 |
| Location of Coordinate | (NW corner of quadrat) | (NW corner of quadrat) | (SE corner of quadrat) |
| Bearing | 100° E | 150° S | 25° N |
| Approx. canopy tree cover | ~ 75% | ~ 15% | ~ 30% |
| Total number potentially locally occurring native spp. | 4 | 3 | 2 |

| QUADRAT NUMBER | Q1 | Q2 | Q3 |
|---|---|--|---|
| PRECINCT | CORE | NORTH | EAST |
| DESCRIPTION | PLANTED STREET AND INTERNAL TREES | PLANTED STREET AND INTERNAL TREES | PLANTED AND NATURALISED LANDSCAPE TREES |
| Total number potentially NON-locally occurring native spp. | 2 | 2 | - |
| Locally occurring native canopy spp. occurring in 20 x 50m plot | <i>Eucalyptus saligna</i> ; <i>Eucalyptus botryoides</i> ; <i>Ceratopetalum gummiferum</i> ; <i>Melaleuca armillaris</i> | <i>Eucalyptus sideroxylon</i> ; <i>Corymbia maculata</i> ; <i>Ceratopetalum gummiferum</i> ; | <i>Eucalyptus saligna</i> ; <i>Elaeocarpus reticulatus</i> |
| NON-locally occurring native spp. occurring in 20 x 50m plot | <i>Lophostemon conferta</i> ; <i>Callistemon viminalis</i> | <i>Melaleuca quinquinervia</i> ; <i>Callistemon viminalis</i> | |

Table 1 - Summarises abiotic environmental and biotic attributes recorded at sampled plots across the subject land

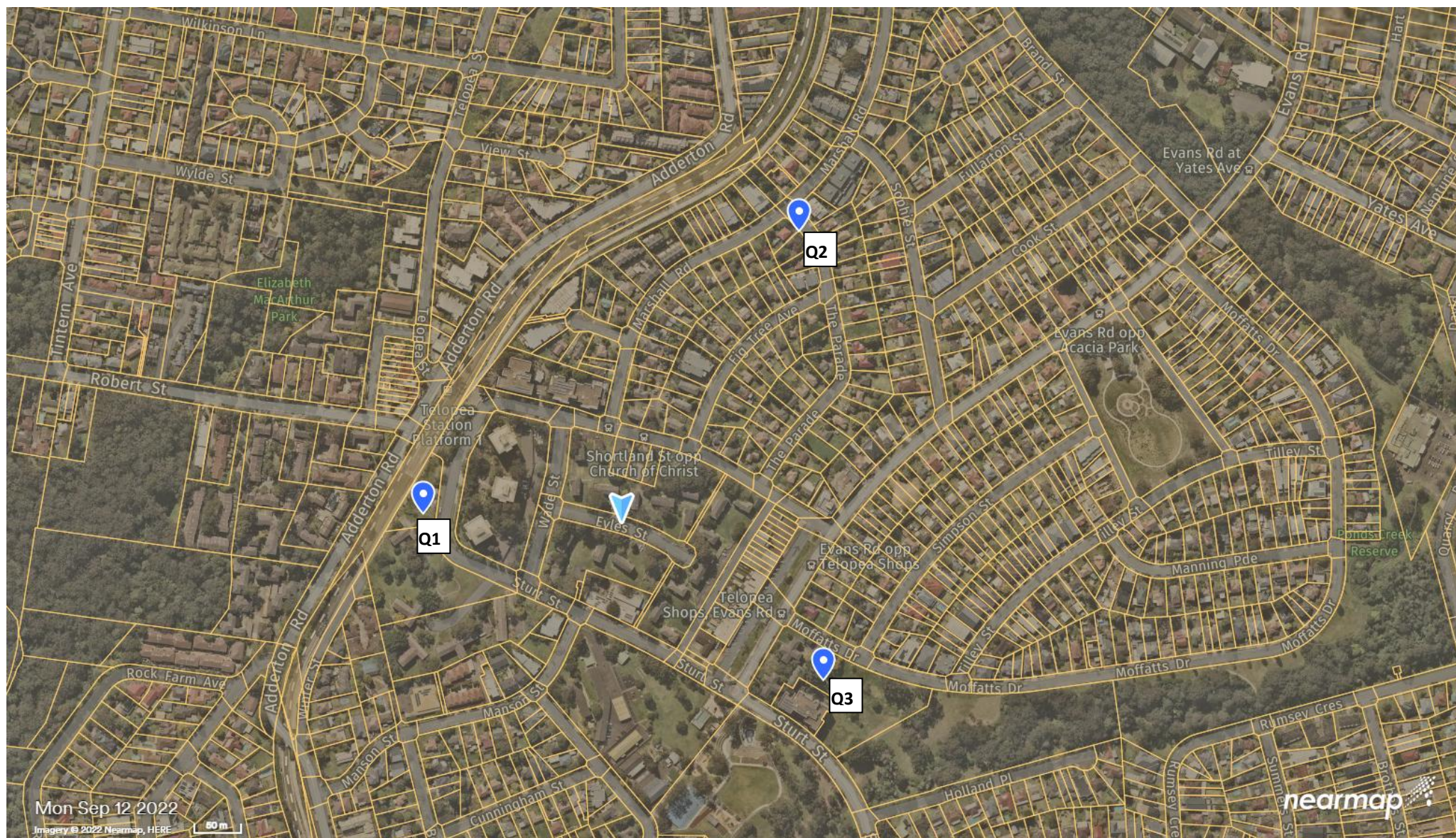


Figure 6 - Locations of numbered sampled quadrats for floristic and structural attributes (at locations indicated by blue markers: 20 x 20m; 20 x 50m quadrats) across 3 different areas where the occurrence of native species may likely represent highly modified STIF assemblages within the proposed CPA development area at Telopea (Nearmap September 2022).

1.9. Extent of land proposed to be impacted by development

Figure 4 includes the extent of development and potential STIF habitat that would be lost as a result of the construction proposal.

It appears that about 33% of the total area of the development contains tree canopies with the remaining 67% of the area containing built structures and exotic managed lawns and curtilage (Figure 4)

As such, from a total extent of 18.85ha, about 6.2ha cover is present as tree canopies.

The plant community type that most likely would have occurred at the site before historical clearing, and that still occurs about 275m to the south-east of the subject site at Telopea is likely to have been PCT 1281 - Sydney Turpentine Ironbark Forest (STIF) in the Sydney Basin Bioregion (Figure 7).

This plant community type is considered to have also occurred at the upper sections of the hillslope before clearing, as the local geology of the subject area appears to occur on sediments of the Ashfield Shale Series of the Wianamatta Group of Shales (Herbert 1983).

Former STIF habitat is likely to have included such species that have been planted as Sydney Blue Gum, Coast Mahogany or Bangalay, Spotted Gum, Blackbutt, Grey Gum, Thin-leaved Stringybark and Port Jackson Fig (other non-locally occurring native species that do not contribute to STIF habitat include Brush Box, Broad-leaved Paperbark, Swamp Oak, Weeping Bottlebrush and many other species, and also including exotic, non-native species such as Jacaranda, *Prunus*, *Cupressus sp*, Camphor Laurel, etc).

The total cover area calculated from canopy spread of these species that potentially contribute to STIF habitat in the three precinct areas (Figures 5A - 5C) equates to 1.501ha.

This area was then used for potential STIF habitat that is impacted and included in offset evaluation by the BAM calculator. As the area of this land exceeds 0.5ha, the threshold for which the BAM and offsets scheme applies for an area size of 18.85ha (<40ha), the Biodiversity Offsets Scheme is triggered (BAM 2020).

The mapping of Biodiversity Value indicates that there is no Biodiversity Value associated with the subject property (Figure 8).

PCT 1281 (STIF) is listed as a threatened ecological community (TEC) on registers of the BC Act (2016) and as a Critically Endangered Ecological Community on registers of the EPBC Act (1999)(OEH 2016).

This report will determine the number of Biodiversity Credits that may be required to offset the potential loss of 1.5 hectares of potential STIF habitat (PCT 1281) in highly modified condition, the offset to be paid under the NSW Biodiversity Offsets Agreement Management Scheme (BOAMS).

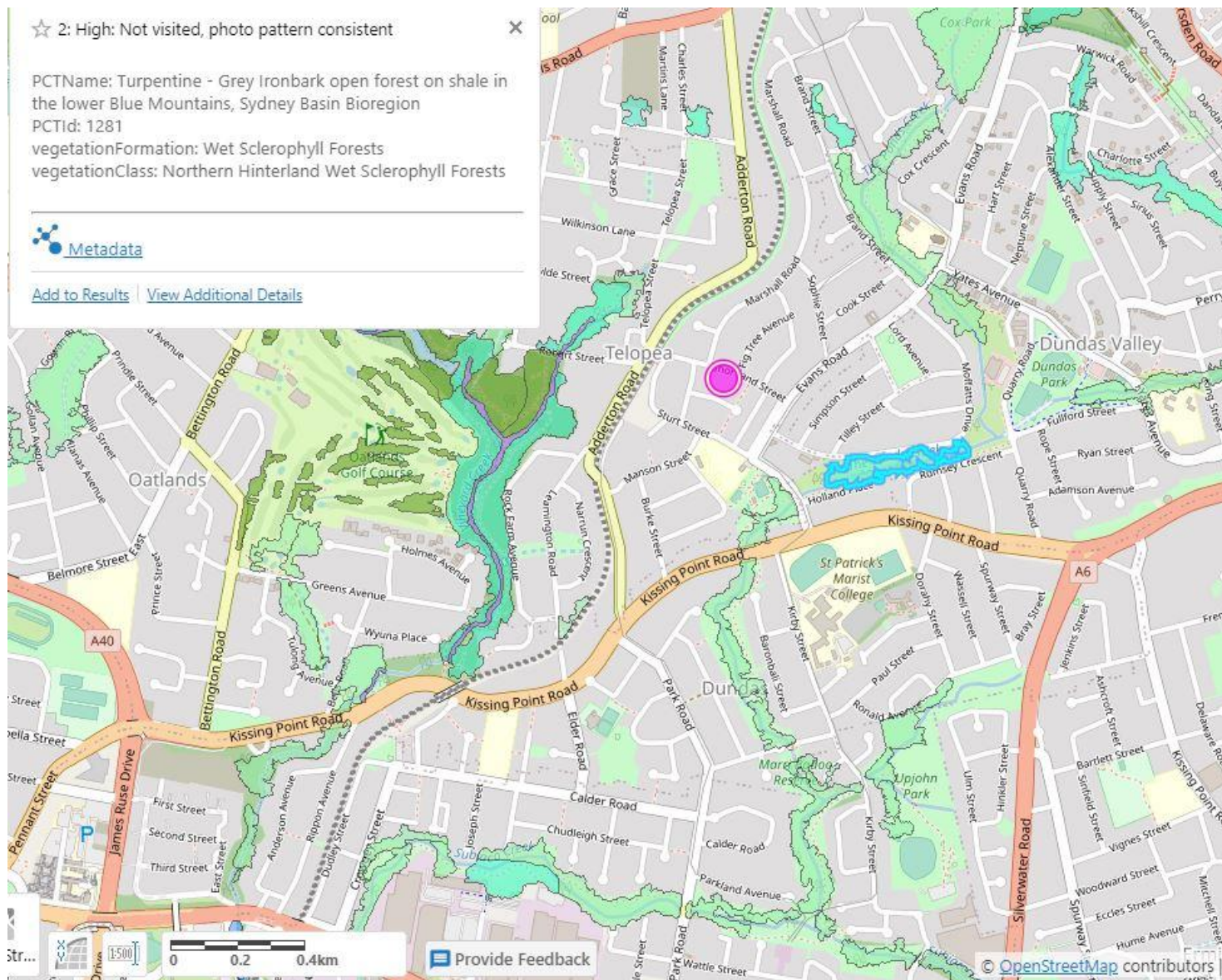


Figure 7 – Vegetation mapping by DPE (2022) showing subject Masterplan development (central location indicated by purple dot) in relation to nearest area of STIF some 275m to the south-east (shaded green with aqua boundary)

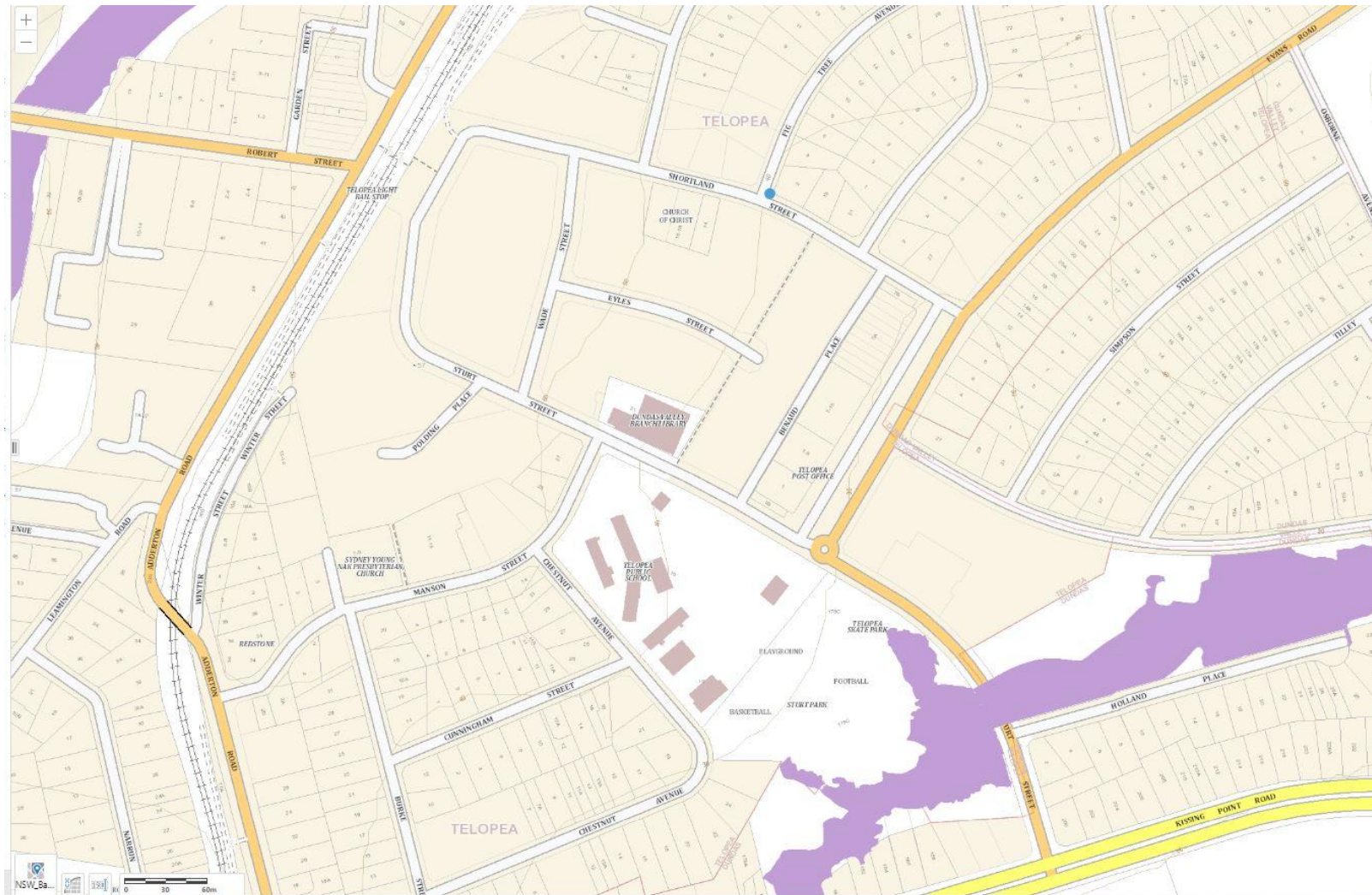


Figure 8 – Biodiversity Values map showing subject of Telopea Masterplan development (relative location indicated by blue dot) in relation to nearest areas of biodiversity value (shaded purple in relation to retained STIF bushland at lower section of image). Drainage channel which flows southward through Elizabeth MacArthur Park to the west of the railway line is also evident (DPE 2022).

1.10. Topography, geology and soils

The subject site has a gently sloping topography with shallow gradients sloping to the south and south-east.

The local substrate geology of the subject area at Telopea appears to occur on sediments of the Ashfield Shale Series of the Wianamatta Group of Shales (Herbert 1983). The Ashfield Shale is comprised of fine-grained black to dark grey shale and laminite (Herbert 1983).

The predominant soil landscape series of the landscape appears to be the erosional Glenorie Soil Landscape Series (Chapman & Murphy 1989). This soil landscape is characterised by undulating to rolling hills on Wianamatta Group shales, with narrow ridges, hillcrests and valleys (Hazelton *et al* 1990).

Soils include shallow to moderately deep red podzolic soils on crests, moderately deep red and brown podzolic soils on upper slopes and deep yellow podzolics on lower slopes and in areas of poor drainage (Chapman & Murphy 1989).

1.11. Current database and mapping searches

Existing information on 'Threatened Flora of the Locality', defined as an area of 5km radius around the site, was accessed from the DPE Bionet Atlas of NSW Wildlife (online BioNet 2022), Review of Commonwealth DCCEEW Environmental Protected Matters Search Tool for MNES records within an area of 5km radius around the site (October 2022) and RoTAP (Briggs and Leigh 1996) databases.

Other literature detailing regionally and locally threatened and significant flora and fauna, as well as plant communities of the study area, included NSW Scientific Committee Final Determinations (1996-2022), Benson and Howell (1994) and 'The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area' (OEH 2016).

1.12. Literature Review

Information sources reviewed included the following:

- Aerial Photograph Interpretation (API)
- Relevant guidelines, including:
 - DPE Biodiversity Assessment Method (BAM) (2020);

- NSW Guide to Surveying Threatened Plants (OEH 2016);
- 'Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method (OEH 2018);
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Department of Environment and Conservation 2004);
- DPE Threatened Species, Populations and Ecological Communities website (2022);
- Commonwealth DCCEEW Species, Profile and Threats Database (2022);
- Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians (DEC 2009);
- NSW Guideline to Surveying Threatened Plants (OEH 2016b);
- Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010a);
- Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010c);
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2011);
- Survey guidelines for Australia's threatened orchids (2017);
- Guidelines for detecting bats listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2013).

2. Landscape Features

2.1. IBRA Regions and Subregions

The subject site occurs within the Sydney Basin IBRA region and the Cumberland IBRA Subregion.

2.2. Mitchell Landscapes (NSW Landscape Regions)

The landscape features of the greater section of subject site to the north and east include the Pennant Hills Ridges Mitchell Landscape in the Cumberland IBRA subregion of the Sydney Basin IBRA Region, whereas the south-western section of the development site is synonymous with the Port Jackson Mitchell Landscape features (Figure 9).

The Pennant Hills Ridges landscape is characterised by rolling to moderately steep hills on horizontal Triassic shales and siltstones. General elevation 10 to 90m, local relief 60m.

Deep red texture-contrast soils on narrow hillcrests, red and brown to yellow texture-contrast soils on slopes becoming slightly harsher in drainage lines. Supports a tall open forest of Sydney Blue Gum (*Eucalyptus saligna*), Turpentine (*Syncarpia glomulifera*), Blackbutt (*Eucalyptus pilularis*), White Stringybark (*Eucalyptus globoidea*), Grey Ironbark (*Eucalyptus paniculata*), Forest Oak (*Allocasuarina torulosa*) and Rough-barked apple (*Angophora floribunda*).

Rainforest elements in protected moist gully heads with Sweet Pittosporum (*Pittosporum undulatum*), Cheese tree (*Glochidion ferdinandi*), Sandpaper Fig (*Ficus coronata*) and Black Wattle (*Callicoma serratifolia*).

The Port Jackson landscape is characterised by steep cliffed margins on horizontal Triassic quartz sandstone. General elevation 0 to 80m, local relief 10 to 50m.

Sandstone slopes and cliffs have patches of uniform or gradational sandy soil on narrow benches and within joint crevices that support forest and woodland of Sydney Peppermint (*Eucalyptus piperita*), Smooth-barked Apple (*Angophora costata*), Red Bloodwood (*Corymbia gummifera*) and Blackbutt (*Eucalyptus pilularis*).

Sheltered gullies contain some Turpentine (*Syncarpia glomulifera*), Coachwood (*Ceratopetalum apetalum*) and Water Gum (*Tristaniopsis laurina*).

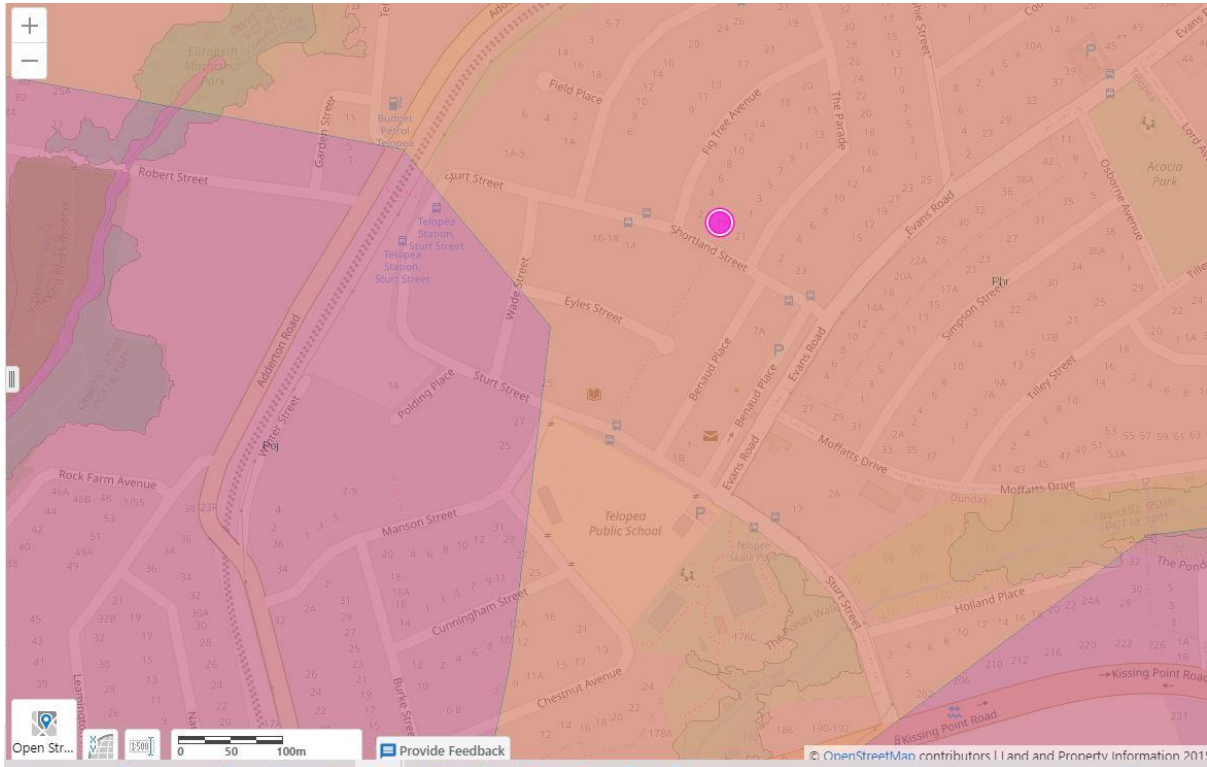


Figure 9 – Map of Mitchell landscapes surrounding the subject area. Orange shaded area indicates the more elevated Pennant Hills Ridges Mitchell Landscape. Dark pink shaded areas indicate the less elevated Port Jackson Mitchell Landscape. The Subject area is indicated adjacent to the pink dot (Land and Property Information 2015).

2.3. Extent of native vegetation

The area of native vegetation cover within a 1,500 m buffer area surrounding the site is shown in Figure 10. It is estimated that the native vegetation cover within the 1500m buffer area to the subject site is 11% and this was used in the BAM Offsets calculations.

2.4. Wetlands, Rivers, Streams and Estuaries

No significant wetlands, rivers, streams and estuaries are present within the developmental section of the subject land or that would affect the assessment.

2.5. Connectivity

Landscapes that retain connections between patches of otherwise isolated areas of vegetation are more likely to maintain more numerous and more diverse populations of plant and animal species (Lindenmayer and Fischer 2006).

The proposed development will remove some of the cover of canopy trees in the subject locality although many individuals of the significant taller locally-occurring native tree species are proposed to be retained.

Landscape planning will eventually restore the canopy connectivity maintaining a fragmented cover throughout the locality with bushland areas to the south-east of the site and drainage creeks that occur in the immediate area (Figure 2).

2.6. Areas of Geological significance and soil hazard features

These features are not present on the subject land. The managed curtilage on the slopes of the subject land are currently stabilised by vegetative cover including managed exotic grassland and no soil creep or landslip features are apparent.

2.7. Areas of Outstanding Biodiversity Value (AOBV)

AOBV are special areas that contain irreplaceable biodiversity values that are considered important to NSW, Australia or globally. No listed AOBV occur within the site or within a 1,500m area buffer around the subject site.

2.8. Site Context

2.8.1. Native Vegetation Cover

Native vegetation cover is calculated as a percentage cover occurring on the subject land and within the surrounding 1,500m buffer area.

Cover estimates are based on the cover of native woody and non-woody vegetation relative to the approximate benchmarks for the PCT considering the extent and condition of the vegetation.

The native vegetation cover within the 1500m buffer area is estimated at 11% (Figures 2 and 13) (L. Edgeworth GIS 2022).

2.8.2. Patch Size

Patch size is used to describe areas that include native vegetation with a gap of less than 100m from adjacent or surrounding areas of native vegetation that occur in moderate to good condition. The patch size for the vegetation onsite is assessed as 20.1ha (Figure 13).

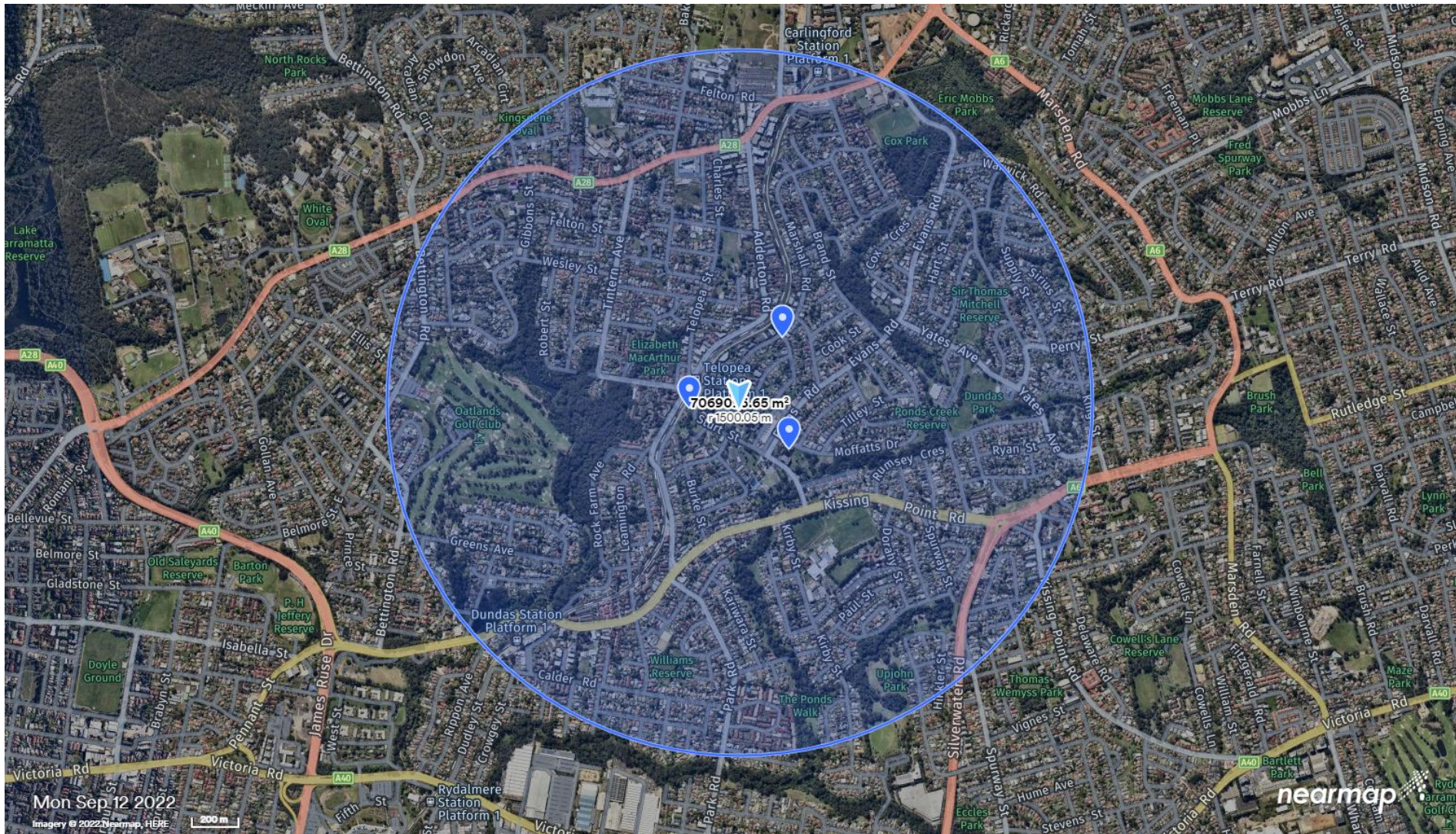


Figure 10 - Image of landscape features within a 1500m radius centred around the subject site at Telopea (blue circular outline) showing extent of vegetated areas along creek lines and associated reserves within the buffer zone (Nearmap July 2022; GIS 2022) (Blue pointers indicate location of BAM quadrats).

3. Native Vegetation

3.1. Native vegetation extent within the site

The subject land is comprised of a managed landscape with planted street trees and groups of trees within housing complexes, small trees and shrubs in garden areas and extensive maintained exotic grassy lawns including mostly exotic herbaceous ground cover species.

For the Masterplan for the Telopea CPA, Scales (2020; revised 2022) documents a total of 916 individuals of various tree species, including some such as stands of planted Sydney Blue Gum, and likely remnant individuals of Blackbutt, Sydney Blue Gum and Thin-leaved Stringybark which may represent former natural species assemblages, many of which include non-locally occurring planted native species, and some exotic ornamental species.

Figure 1 indicates that most of the natural vegetation, which may have included Sydney Turpentine Ironbark Forest and possibly Blue Gum High Forest (Benson & Howell 1990), had been almost totally cleared for farming land use before 1943.

The total area of locally-occurring planted native vegetation cover within the subject site was estimated at about 36% of the total planted vegetated cover.

Locally-occurring planted native tree and shrub species such as Sydney Blue Gum, Blackbutt, Thin-leaved Stringybark, Sweet Pittosporum, Christmas Bush etc are scattered among non-locally occurring planted native species such as Brush Box, Broad-leaved Paperbark, Swamp Oak, Weeping Bottlebrush etc.

The planted and possibly few remnant elements of the vegetation that potentially contribute to STIF vegetation habitat in the various precincts at Telopea is calculated (from the spread of canopy trees of STIF component species), as 1.5ha (Scales 2022)

As such, a total of 1.5ha was included in the potential impacted area of STIF vegetation on the BAM Calculator.

3.2. Plant Community Types (PCTs)

3.2.1. Plant Community Type mapped and PCT assessed as potentially occurring at the site

The plant community type that most likely would have occurred at the site before historical clearing, and that still occurs about 275m to the south-east of the subject site at Telopea is PCT 1281 - Sydney Turpentine Ironbark Forest (STIF) in the Sydney Basin Bioregion (Figure 8).

This plant community type is considered to have also occurred at the upper sections of the hillslope before clearing, as the local geology of the locality appears to occur on sediments of the Ashfield Shale Series of the Wianamatta Group of Shales (Herbert 1983). The Ashfield Shale is comprised of fine-grained black to dark grey shale and laminite (Herbert 1983).

Former STIF habitat is likely to have included such species that have been planted as Sydney Blue Gum, Coast Mahogany or Bangalay, Spotted Gum, Blackbutt, Grey Gum, Thin-leaved Stringybark and Port Jackson Fig.

Figures 11, 12 and 13 indicate landscaped areas that contain native species that may be representative of a highly modified STIF assemblage and that may potentially resemble STIF habitat.

Other non-locally occurring native species that have been planted over an area of about 4ha and that do not contribute to STIF habitat include Brush Box, Broad-leaved Paperbark, Swamp Oak, Weeping Bottlebrush etc and also including exotic, non-native species such as Jacaranda, *Prunus*, *Cupressus sp*, Camphor Laurel, etc (Scales 2022).

Figures 14 and 15 indicate landscaped areas that do not resemble STIF habitat.



Figure 11- Lower section of Quadrat 1 (see Figure 6) in the North Precinct of the Telopea redevelopment proposal indicating planted individuals of Sydney Blue Gum, *Melaleuca armillaris*, Broad-leaved Paperbark and Sweet Pittosporum in a landscaped area along Shortland Street connecting downslope with Wade Street.



Figure 12 –Section of Quadrat 2 (see Figure 6) in the North Precinct of the Telopea redevelopment proposal indicating planted individuals of Mugga Ironbark (*Eucalyptus sideroxylon*) occurring in relatively poor condition in a landscaped area within private residential areas along the upper section of The Parade, Telopea



Figure 13 - Upper section of Quadrat 3 (see Figure 6) in the East Precinct of the Telopea redevelopment proposal indicating a possible mature remnant individual of Sydney Blue Gum with younger individuals of Blue Gum within the quadrat potentially having naturalised from seedlings derived from the remnant individual. The quadrat occurs within areas surrounding and including a carpark off Moffat's Drive, near Evans Road, Telopea. Note the large hollows developed in the mature individual.



Figure 14 - Individuals of Broad-leaved Paperbark occurring along the upper section of Sturt Street in the Core Precinct are not representative of STIF, this species occurring naturally in coastal swamps and along the edges of brackish lagoons



Figure 15 - Individuals of Box Elder (*Acer negundo*), an exotic deciduous ornamental species planted in a landscaped area along the front section of Evans Road in the East Precinct are not representative of STIF

Description of Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion (from DPE 2022)

BioNet Vegetation Classification – Community Profile Report (DPE 2022)

Plant Community Type ID (PCT ID): 1281

PCT Name: Sydney Turpentine - Ironbark forest

Classification Confidence Level: 2-High

Vegetation Description: Sydney Turpentine-Ironbark Forest (Benson and Howell 1990) is a tall open forest found on shale and shale-enriched sandstone soils on the coast and hinterland of Sydney. It has been extensively cleared but was once widely distributed between Sutherland and the Hornsby plateau with outlying examples found on shale-rich deposits at Campbelltown, Menai, Kurrajong and Heathcote. The primary distribution of this forest is in areas receiving between 900 and 1250 millimetres of mean annual rainfall at elevations between 10 and 180 metres above sea level. The forest is characterised by open midstrata of mesic and sclerophyllous shrubs and small trees with a grassy ground cover.

The composition of the canopy is variable depending on location and substrate. Typically it is recognised by a canopy dominated by Turpentine (*Syncarpia glomulifera*), Red Mahogany (*Eucalyptus resinifera*) and various ironbarks of which *Eucalyptus paniculata* is most often recorded.

On the north shore these forests are found on shale-enriched sheltered sandstone slopes where ironbarks are less common and Blackbutt (*Eucalyptus pilularis*) is prevalent.

In the western suburbs drier forms of this forest are found at Concord, Bankstown and Auburn although remnants are small and highly disturbed. This map unit is referable to a community of the same name in Tozer et al. 2010 and includes some sites previously identified as Sydney Turpentine Ironbark Margin Forest in NPWS (2002b) and Tozer (2003).

Vegetation Formation: Wet Sclerophyll Forests (Grassy sub-formation);

Vegetation Class: Northern Hinterland Wet Sclerophyll Forests;

IBRA Bioregion(s): Sydney Basin;

IBRA Sub-region(s): Wollemi; Yengo; Pittwater; Cumberland; Burragorang; Sydney Cataract;

LGA: SUTHERLAND; BANKSTOWN; FAIRFIELD; RYDE; KU-RING-GAI; HORNSBY; HAWKESBURY; BLUE MOUNTAINS; WOLLONDILLY; LITHGOW;

Emergent species: None

Upper Stratum Species: *Syncarpia glomulifera*; *Eucalyptus punctata*; *Eucalyptus pilularis*; *Eucalyptus paniculata* subsp. *paniculata*; *Angophora costata*;

Mid Stratum Species: *Pittosporum undulatum*; *Polyscias sambucifolia* subsp. *A*; *Acacia parramattensis*; *Breynia oblongifolia*; *Ozothamnus diosmifolius*; *Pittosporum revolutum*; *Allocasuarina torulosa*; *Leucopogon juniperinus*; *Notelaea longifolia*;

Ground Stratum Species: *Dianella caerulea*; *Lomandra longifolia*; *Microlaena stipoides* var. *stipoides*; *Pratia purpurascens*; *Entolasia marginata*; *Dichondra repens*; *Entolasia stricta*; *Pseuderanthemum variabile*; *Imperata cylindrica* var. *major*; *Oplismenus imbecillis*;

TEC Assessed: Has associated TEC

TEC List: Listed BC Act, E: Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion (Part); Listed BC Act, CE: Shale Sandstone Transition Forest in the Sydney Basin Bioregion (Part); Listed BC Act, CE: Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (Equivalent); Listed EPBC Act, CE: Shale Sandstone Transition Forest of the Sydney Basin Bioregion (Part); Listed EPBC Act, CE: Turpentine-Ironbark Forest of the Sydney Basin Bioregion (Part);

Associated TEC Comments: PCT Percent Cleared: 90.00

PCT Definition Status: Decommissioned

[3.2.2. Plot data used in BAM Calculator](#)

The area containing Plots 1, 2 and 3 (Figure 6) was subject to BAM analysis for a Vegetation Integrity Score that may require biodiversity offsets.

The data for Plots 1, 2 & 3 is presented in Table 3.

The native species occurring in the plots are indicated in Table 1.

3.2.3. Flora species occurring in the plot

The flora species complement and respective cover values are listed in Tables 1 and 3.

3.2.4. Fauna species and potential fauna habitat

The area subject to offsets (Figure 4) is largely landscaped with some small areas of locally-occurring native tree and shrub species, but largely consisting of exotic managed grassland and non-locally occurring native and exotic tree and shrub species (Table 1). There is currently a low potential habitat for ground-dwelling fauna in the managed curtilage areas of the surveyed site, with little structural habitat for sheltering and few plant species available for foraging.

The locally-occurring and non-locally occurring tree canopy cover is relatively continuous along streetscapes and open parkland areas, where the habitat may be deemed suitable for common arboreal species such as possums and common species of avifauna.

The habitats of the subject land include:

1. Cleared, managed lawnscape areas with extensive exotic grassland and patches of bare ground (Figures 12, 13 & 15), and
2. Large tall mature canopy trees occurring in rows or clumped within managed lawnsapes (Figures 12, 13, 14 & 15).
3. Multi-storey buildings vacated by residents where bats may roost under eaves, cornices or other roofing structures (Figures 13 & 14).

Avian and arboreal species

The extensive areas of managed exotic grassland provides poor habitat but may provide some food resources for common seed foraging avifauna such as the Magpie and Magpie Lark.

Canopy trees may provide sheltering and seasonal food resources for avifauna, arboreal species and occasionally, the Grey-headed Flying Fox. A few small and medium sized hollows for species of parrots and other birds or microbats were recorded in two trees within the study area. Some large stick nests were recorded during this survey.

Microchiropteran species

A dedicated microchiropteran survey (1 diurnal and 3 evening sampling surveys) was undertaken from 10 - 12/10/2022 to record presence of microbats across the Telopea CPA Masterplan Precincts.

A search of the NSW BioNet database revealed several microbat species listed as threatened under the *Biodiversity Conservation Act 2016* (BC Act) and/or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) with records within 5km of the study area.

These species include:

- Eastern Coastal Free-tailed Bat, *Micronomus norfolkensis* (BC Act: Vulnerable)
- Eastern False Pipistrelle, *Falsistrellus tasmaniensis* (BC Act: Vulnerable)
- Greater Broad-nosed Bat, *Scoteanax rueppellii* (BC Act: Vulnerable)
- Large Bent-winged Bat, *Miniopterus orianae oceanensis* (BC Act: Vulnerable)
- Large-eared Pied Bat, *Chalinolobus dwyeri* (BC Act: Vulnerable, EPBC Act: Vulnerable)
- Little Bent-winged Bat, *Miniopterus australis* (BC Act: Vulnerable)
- Yellow-bellied Sheathtail Bat, *Saccolaimus flaviventris*. (BC Act: Vulnerable)
- Southern Myotis, *Myotis macropus* (BC Act: Vulnerable)

Some of these species are known to roost in buildings and/or hollow-bearing trees.

Methodology

The initial diurnal habitat assessment of the investigation area included a site walkover to identify areas with habitat appropriate for threatened microbat species, including hollow-bearing trees, culverts, and buildings with suitable roosting habitat. Areas with potential habitat were photographed and geographic coordinates were recorded on a GIS-enabled iPad.

To maximise likelihood of detection, surveys were conducted only on days with mild weather conditions when bats were likely to be most active. Active detector surveys were conducted at dusk for a minimum of 1 hour in areas of suitable habitat on the 10, 11 and 12 October 2022. Surveys involved the use of an ultrasonic recording device (Echo Meter Touch Bat Detector) connected to an iPad, commencing at sunset and continuing until complete darkness. Surveys were conducted at dusk to ensure any bats roosting within the site could be detected and potentially observed.

Survey transects were tracked using a GIS-enabled iPad, and location and time of ultrasonic detections were recorded. Three surveys were conducted from foot in the areas where habitat was identified during the initial site assessment, with the ultrasonic recorder aimed at potential roosting locations and ecologists concurrently observing these locations for departing microbats. On the final evening, an additional survey was conducted from a slow-moving vehicle covering the entire site.

Date and timing of surveys and weather conditions are outlined in Table 2. Survey transects and results are shown in Figure 16.

| Date | Time of survey | Weather |
|------------|---|---|
| 10/10/2022 | 19:00-20:05 | Daily temperature range: 10.0°C - 17.0°C Precipitation: 0mm, max wind speed: SE 4 km/h Sunset: 19:04 |
| 11/10/2022 | 19:05-20:05 | Daily temperature range: 11.6°C - 19.5°C Precipitation: 0mm, max wind speed: calm Sunset: 19:05 |
| 12/10/2022 | 19:00-19:40 19:40-20:20 (Vehicle) | Daily temperature range: 10.8°C – 20.0°C Precipitation: 0.2mm, Max wind speed: SW 2km/h Sunset: 19:05 |

Table 2 - Dates, timing of bat surveys and weather conditions recorded for bat surveys throughout the various Stages of the Telopea CPA

Limitations of surveys

As bats can use multiple roost sites, and it was not possible to survey year-round for microbats, there is a chance some microbat species may use the study area even if not detected during the current survey period. Furthermore, much of the study area is comprised of private residences where close inspection of buildings was not possible



Figure 16 - Bat surveys undertaken over three evenings within the inclusive Stages of the Telopea CPA Masterplan subject site, results are provided in Legend for Bat Detections and Habitat Types (Courtesy of Arcadis Pty Ltd 2022).

Results

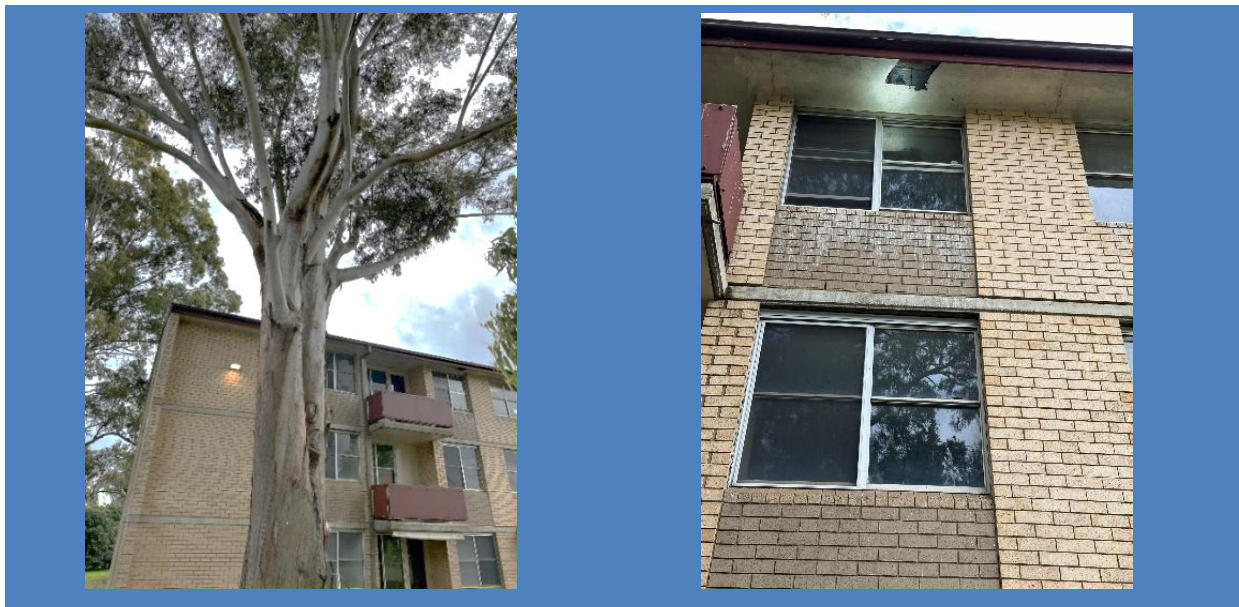
The site assessment found that the study area contained suitable bat roosts.

Potential habitat consisted of hollows and fissures in the limbs of three large remnant trees, as well as a vacated building found to have gaps in the roofing that would allow microbats to enter (Figure 16).

This habitat was identified in two locations within the study area. Two hollow-bearing trees and the vacated building are proximal to one another in the south-west extent of the site near Polding Place and Sturt Street (Figures 17A & 17B).

The third large remnant hollow-bearing tree occurs in the south-east section of the study area on Moffatts Drive (Figure 13). Location of these habitat features are shown in Figure 16.

Furthermore, extensive street and exterior building lighting recorded over the site could increase insect activity to offer some species of bats with potential foraging opportunities (Newport, et al., 2014).



Figures 17A & 17B - The specific multi-storey building and individual of Blackbutt containing hollows; and close-up of side of building that occurs in the south-west section of the Core Precinct of the Telopea CPA subject area shown in Figure 16 (Courtesy of Arcadis Pty Ltd 2022).

A total of 50 passes were detected using ultrasonic recorders during targeted surveys, of which three species of microbat were recorded: Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Gould's Wattled Bat (*Chalinolobus gouldii*), and an unidentified *Vespadelus* species.

The Eastern Coastal Free-tailed Bat is listed as Vulnerable under the BC Act and is an ecosystem credit species.

One pass of the Eastern Coastal Free-tailed Bat was recorded at approximately 19:50 on 11 October near the hollow-bearing tree on Moffatts Drive (Figure 13). A second survey was conducted at the same location on 12 October, however the species was not detected again. No fauna was observed exiting any of the hollows in the tree during survey.

A total of 44 passes of Gould's Wattled Bat were recorded across all three nights of survey. Gould's Wattled Bat was found in both sites with identified habitat in the study area, as well as in several additional locations shown in Figure 16. The earliest passes of Gould's Wattled Bat were recorded at approximately 19:30, near the vacated building and hollow-bearing trees in the south-western section extent of the study area (Figures 16, 17A & 17B).

No bats were observed departing either of the hollow-bearing trees or building during survey.

Four passes of a *Vespadelus sp.* were recorded during the survey on 10 October at the south-western extent of the site, between the two hollow-bearing trees between the times of 19:39 and 20:00.

Discussion and recommendations

While it is possible the detected species of microbats may be roosting in the study area, no fauna was observed exiting roosting habitat during targeted surveys. Furthermore, for all species except the Gould's Wattled Bat, the time of passes were between approximately 40 minutes to 1 hour following sunset. The earliest pass of Gould's Wattled Bat detected was close to 30 minutes after sunset.

Timing of detection and lack of observations of fauna departing roosting locations may indicate these species were foraging in the area rather than roosting.

Artificial lighting and prevalence of flowering trees (such as eucalypt plantings) in the study area may offer improved foraging conditions for microbats (Lumsden, 2004; Newport, et al., 2014). For some species, such as the Gould's Wattled Bat, it has been shown they will travel several kilometres from roost sites to reach preferred foraging habitat (Lumsden, 2004).

Although no threatened microbat species were identified to be roosting within the study area, microbats are known to frequently switch roosting sites and it is possible that the site does contain roosting habitat for threatened species, including for the Eastern Coastal Free-tailed Bat.

Note that Impacts to Eastern Coastal Free-tailed Bat do not require species-specific offsets under the NSW Biodiversity Assessment Method (BAM), where a Biodiversity Development Assessment Report (BDAR) is required, as this species is an ecosystem credit species and its potential presence in the habitat of the study area is indicated as 'predictable'.

Therefore, it is recommended:

- Identified habitat within the study area be treated as potential roosting habitat and retained where practicable to minimise potential impacts to microbats, including threatened species.
- During demolition of buildings, specifically that shown in Figures 17A & 17B, with suitable crevices or felling of hollow-bearing trees, an experienced fauna ecologist should be present to oversee removal of the roof of that building. Hollow-bearing trees should be preserved as a priority as these provide valuable roosting and breeding habitat for common avian species, arboreal mammals and microbats.
- A qualified ecologist undertake a pre-clearance survey prior to building demolition and any hollow-bearing tree removal.

'Supervised clearing' is a standard procedure for habitat removal, not necessarily targeting species of microbats but to minimise impacts to all fauna, including common fauna, that may be present. The guidelines RMS biodiversity guidelines for removal of habitat recommends ecologist supervision for similar situations and is standard practice for pre-clearance of vegetation and man-made habitat structures including culverts, buildings etc.

In terms of a pre-clearance assessment, this is recommended for areas with residential buildings that were occupied at time of survey and were unable to be closely inspected for habitat during initial assessment. An ecologist would closely inspect such buildings for habitat not previously identified.

This pre-clearance assessment may be completed for each stage of the project, as buildings are vacated, but should take no more than a few hours for each stage. An ecologist would only be required to be onsite during demolition of buildings containing habitat identified during the pre-clearance survey. If no additional habitat is found during the pre-clearing surveys, then an ecologist would only be required to be present for the removal of the hollow-bearing trees (if any) and roof of the building shown in Figures 17A & 17B.

The majority of microbat species forage over wide areas and the loss of individuals of mostly non-locally indigenous and exotic tree species is not expected to significantly affect their foraging behaviours.

The developed managed curtilage areas have no habitat features such as hollow logs, dense leaf litter, rock shelves and crevices etc that may provide safe foraging and potential shelter for small terrestrial fauna species such as skinks or small mammals, though existing rubbish container structures may provide shelter for some small feral mammalian species such as mice and the Black Rat.

3.3. Vegetation Integrity Assessment

3.3.1. Vegetation zone

A vegetation zone is defined as an area of vegetation having the same PCT and occurring in a similar condition state. In some areas of landscaped vegetation (Figures 11, 12 & 13), the vegetation appears structurally and somewhat floristically similar. The presence of species such as Sydney Blue Gum (*Eucalyptus saligna*), Coast Mahogany or Bangalay (*Eucalyptus botryoides*), Blackbutt (*Eucalyptus pilularis*), Spotted Gum (*Corymbia maculata*), Mugga Ironbark (*Eucalyptus sideroxylon*), Christmas Bush (*Ceratopetalum gummiferum*), Sweet Pittosporum (*Pittosporum undulatum*), Blueberry Ash (*Elaeocarpus reticulatus*) and *Melaleuca armillaris* indicate that the patches of landscaped vegetation may represent elements of Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion (DPE 2022).

A total of only 6 locally-occurring native species were recorded in Plot 1, only 2 locally-occurring native species were recorded in Plot 2 and only 2 locally-occurring native species were recorded in Plot 3 (Table 1, Figures 11, 12 & 13).

The general condition of the vegetation in regard to BAM analysis was regarded as 'poor' since the natural vegetation has long been cleared, species poor, landscaped and maintained as managed curtilage (Figures 11, 12, 13, 14 & 15).

3.3.2. Patch size

The patch size for relatively continuous patches of native vegetation within the buffer area (within 100m of any adjacent patch) and aligned with the vegetation of the subject land is estimated at 20.2ha. This area was used for patch size in the BAM calculation.

3.3.3. Vegetation Integrity Score

Quantitative measures for species composition, structure and function attributes were derived from the intact landscaped vegetation within the plots as listed in Table 2 of BAM (2020) as indicated in Table 3.

The 20m x 20m plots were located within mostly landscaped exotic grassland vegetation with planted locally-native occurring tree and shrub species as well as non-locally occurring native and exotic tree and shrub species (Figure 6) and scores derived from the 20m x 50m plots were used for functional attributes.

| Condition attributes use to assess composition of vegetation | Condition attributes use to assess structure within vegetation | Condition attributes use to assess functionality within vegetation |
|--|--|--|
| Tree richness | Tree cover | Number large trees |
| Shrub richness | Shrub cover | Tree regeneration potential |
| Grass and grass-like richness | Grass and grass-like cover | Tree stem size classes Tree hollows |
| Forb richness | Forb cover | Total length of fallen logs |
| Fern richness | Fern cover | Litter cover |
| Other richness (Twining, Palms etc) | Other cover (Twining etc) | High Threat Weed cover |

Table 3 - Condition attributes for composition, structure and function at plots (Table 1; Figure 6) which were sampled for BAM analysis (from Table 2 in BAM 2020).

Table 4 tabulates the plot scores for the attributes listed in Table 2 for the plots.

PLOT 1 (Figures 6 & 11)

| Life-form | Tree | Shrub | Grass & Grass-like | Forb | Fern | Other |
|------------------------|------|-------|-----------------------|------|------|-------|
| Counts for composition | 2 | 2 | 1 | 0 | 0 | 0 |
| Counts for cover (%) | 75 | 8 | 5 | 0 | 0 | 0 |

| Number large trees (>80cm DBH) | Tree regeneration | Tree stem size classes (cm) | | | | | Length fallen logs | litter cover (%) | Tree Hollows | HTW (%) |
|--------------------------------|-------------------|-----------------------------|-------|-------|-------|-------|--------------------|------------------|--------------|---------|
| | | 5-9 | 10-19 | 20-29 | 30-49 | 50-79 | | | | |
| 0 | present | 2 | 0 | 3 | 5 | 1 | none | 23 | 0 | 0 |

PLOT 2 (Figures 6 & 12)

| Life-form | Tree | Shrub | Grass & Grass-like | Forb | Fern | Other |
|------------------------|------|-------|-----------------------|------|------|-------|
| Counts for composition | 2 | 0 | 0 | 0 | 0 | 0 |
| Counts for cover (%) | 15 | 0 | 0 | 0 | 0 | 0 |

| Number large trees (>80cm DBH) | Tree regeneration | Tree stem size classes (cm) | | | | | Length fallen logs | litter cover (%) | Tree Hollows | HTW (%) |
|--------------------------------|-------------------|-----------------------------|-------|-------|-------|-------|--------------------|------------------|--------------|---------|
| | | 5-9 | 10-19 | 20-29 | 30-49 | 50-79 | | | | |
| 0 | present | 0 | 2 | 0 | 3 | 1 | none | 7 | 0 | 0 |

| PLOT 3 (Figures 6 & 13) | | | | | | |
|-------------------------|------|-------|--------------------|------|------|-------|
| Life-form | Tree | Shrub | Grass & Grass-like | Forb | Fern | Other |
| Counts for composition | 1 | 1 | 0 | 0 | 0 | 0 |
| Counts for cover (%) | 30 | 2 | 0 | 0 | 0 | 0 |

| Number large trees (>80cm DBH) | Tree regeneration | Tree stem size classes (cm) | | | | | Length fallen logs | litter cover (%) | Tree Hollows | HTW (%) |
|--------------------------------|-------------------|-----------------------------|-------|-------|-------|-------|--------------------|------------------|--------------|---------|
| | | 5-9 | 10-19 | 20-29 | 30-49 | 50-79 | | | | |
| 1 | absent | 1 | 1 | 0 | 2 | 0 | none | 27 | 1 | 0 |

Table 4 - Condition attributes for composition, structure and function in Plots 1, 2 & 3 (Figure 6)

Table 5 summarises the condition attributes for composition, structure and functionality of the biota in the plots which were sampled for BAM analysis, with the resultant Vegetation Integrity Score (VIS) based on the potential area of 1.5ha impacted (from Table 2 in BAM 2020). The VIS is used to calculate the offset credits required and the costs incurred for clearing native vegetation at the subject land.

| PLOTS 1, 2 & 3 (Figures 6, 11, 12 & 13) | | | | |
|---|-------------------|-----------------|----------------|----------------------------------|
| ATTRIBUTE | COMPOSITION SCORE | STRUCTURE SCORE | FUNCTION SCORE | VEGETATION INTEGRITY SCORE (VIS) |
| | 1.7 | 34.3 | 38.4 | 13 |

Table 5 - Condition attribute scores for composition, structure, function and VIS at Plots 1, 2 & 3 for PCT 1281.

The VIS Score of 13 is less than that for the threshold score of 15 which is the lowest score for an EEC to generate any offsets (BAM 2022).

4 Threatened Species

4.1 Ecosystem Credit Species

These species are those where the likelihood of occurrence of the species potential elements of the species habitat can reasonably be predicted by vegetation surrogates and features of the landscape, or for which targeted species surveys have a low probability of detection.

The Threatened Biodiversity Data Collection (TBDC) has identified 28 potential ecosystem credit species as predicted by vegetation surrogates and landscape features (even though the site is managed curtilage with landscaped tree and garden plantings in a busy and long established residential setting!). These are listed and addressed in the following Table 6.

4.2 Species Credit Species (Candidate Species)

These species are those where the likelihood of occurrence of the species, or potential suitable elements of the species habitat, cannot be reliably predicted by vegetation surrogates and landscape features and can more reliably be detected by species surveys.

The TBDC has identified a total of 47 potential candidate species that cannot be reliably predicted to occur at the long-established residential precinct, and these are listed and addressed in the following Table 6.

In accordance with Section 5.3 of BAM (2020) a targeted species survey must be undertaken for a threatened candidate species that is likely to occur at the site based on the application of Steps 1 - 3 in Sub-sections 5.2.1 - 5.2.3 (BAM 2020).

The habitat features for breeding (such as caves, rocky overhangs and escarpments) are not present in the managed curtilage of the residential areas of the subject land that is proposed to be impacted.

The landscaped assemblage is highly modified and lacks any natural ground cover, lacks any understorey structure and is maintained as managed curtilage (Figures 11, 12, 13, 14, and 15). Most, if not all, of these species would not be expected to occur at the subject site where habitat is otherwise highly modified and unsuitable. It is considered that targeted surveys in this case would not achieve any purpose, except possibly for threatened microbat species that may have sought shelter and roost sites after tenants had vacated some

buildings in the Stage 1A (Core Precinct); and these species have been targeted in current relevant surveys (See Section 3.2.4 of this report).

Table 6 lists all Ecosystem Credit and Species Credit Species (Candidate Species) listed in the TBDC and addresses their suitability to the habitat and likelihood of occurrence.

Table 6 - Ecosystem species and Candidate species assessment table for PCT 1281 occurring within the Masterplan CPA area at Telopea

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|--|---|--|---|
| PLANTS | | | | |
| <i>Acacia bynoeana</i> Bynoe's Wattle | Decumbent shrub to 0.5m tall. Dry sclerophyll woodland/forest on sandy clay soils, often containing ironstone gravels in Castlereagh Woodlands. Also occurs in heath and woodland on sandy soils in the central and upper Blue Mountains | Potential habitat onsite does not occur, site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Acacia prominens</i> Gosford Wattle | An erect or spreading tree, 4 - 18 m high. Grows in open situations on clayey or sandy soils | Potential habitat onsite does not occur, site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Acacia pubescens</i> Downy Wattle | Spreading shrub to 5m tall. Dry sclerophyll woodland/forest on clay soils, from Bilpin to the Georges River. | Potential habitat onsite does not occur, site is managed curtilage, no structural integrity, planted street trees, no native ground cover | Record about 2.9km to the south. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|---|---|---|---|--|
| PLANTS | | | | |
| <i>Caladenia tessellata</i> Thick-lip Spider Orchid | <p>Terrestrial herb. Clay or sandy soils in moist forests or scrubs on coastal ridgetops.</p> <p>Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.</p> <p>The single leaf regrows each year.</p> <p>Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).</p> | <p>Potential habitat onsite does not occur, site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>No records within locality.</p> <p>This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted.</p> | <p>A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species.</p> <p>No further surveys required</p> |
| <i>Rhodamnia rubescens</i> Scrub Turpentine | <p>Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.</p> | <p>Potential habitat onsite does not occur.</p> <p>Site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>Record about 700m to the NE.</p> <p>This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted.</p> | <p>A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species.</p> <p>No further surveys required</p> |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|---|---|--|--|---|
| PLANTS | | | | |
| <i>Persoonia hirsuta</i> subsp <i>hirsuta</i> Hairy Geebung | Spreading to decumbent shrub found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Epacris purpurascens</i> var. <i>purpurascens</i> | Erect shrub to 150cm tall, in dry sclerophyll forest. Occurs on damp soils in woodland and forest on sandstone, shale or rocky sites, confined to coastal plateaus in the Sydney region from Gosford to Sydney district. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | Records about 2.2km to the NW. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Grevillea parviflora</i> var. <i>parviflora</i> Small-flower Grevillea | Erect shrub to 150cm tall. Occurs in light clayey soils over shale on ridges or rocky sandstone slopes in dry shrubby sclerophyll forest, from Gosford to Sydney district. Known to occur or have occurred from Prospect to Camden and Appin. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|--|--|---|---|
| PLANTS | | | | |
| <i>Grevillea parviflora</i> var. supplicans <i>Grevillea parviflora</i> var. supplicans | Semi-prostrate shrub to 1m tall. Occurs in heathy woodlands on skeletal soils over massive sandstones. Associated with clay-capped ridges of the Lucas Heights & Faulconbridge soil landscapes, preference for yellow clays and periodically impeded drainage | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Gyrostemon thesioides</i> Gyrostemon thesioides | Within NSW, has only ever been recorded at three sites, to the west of Sydney, near the Colo, Georges and Nepean Rivers. The most recent sighting was of a single male plant near the Colo River within Wollemi National Park. The species has not been recorded from the Nepean and Georges Rivers for 90 and 30 years respectively, despite searches. Also occurs in Western Australia, South Australia, Victoria and Tasmania. Grows on hillsides and riverbanks and may be restricted to fine sandy soils | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Hibbertia purebula</i> Hibbertia purebula | Sparsely branched shrublet to 30cm tall with weak stems. Occurs in sandy soils or clay in woodland and shrubland from Wollemi National Park to south coast near Nowra. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|---|--|--|---|
| PLANTS | | | | |
| <i>Hibbertia superans</i> Hibbertia superans | Low spreading shrub to 30cm tall with weak stems. Occurs in sandy soils in woodland and shrubland in north-west Sydney from Annangrove, Kellyville and Maroota. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Pimelea curviflora</i> var. <i>curviflora</i> Pimelea curviflora var. <i>curviflora</i> | Much-branched subshrub or shrub 20 to 100cm. Occurs in woodlands of the northern area of Sydney on shale-sandstone transition areas and laterite soils. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Pomaderris prunifolia</i> Pomaderris prunifolia | Shrub to 3m tall. At Rydalmere it occurs along a road reserve near a creek, among grass species on sandstone. At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soils. | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | Records about 1.26km to the south. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|--|--|--|---|
| PLANTS | | | | |
| <i>Syzygium paniculatum</i> Magenta Lilly Pilly | Shrub or small tree to 8m tall, occurs in or near rainforest from littoral sands to sheltered gullies, especially near watercourses on sandy soils | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | Record 2km to SW (probably landscaped individual). This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Wahlenbergia multicaulis</i> Tadgells Bluebell | A perennial, tufted herb, typically few-stemmed, 10 - 75 cm high. In Western Sydney most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite). | Potential habitat onsite does not occur. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | Record about 5.5km to the SE at Liberty Grove. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| FUNGI | | | | |
| <i>Hygrocybe aurantipes</i> | A small brightly coloured gilled fungus that occurs in warm temperate gallery | Potential habitat onsite does not occur. No | No records within locality. This species was not | A candidate species credit species but habitat is |

| | | | | |
|--|--|--|---|---|
| Hygrocybe aurantipes | forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | creeks, swamps or waterbodies within 50m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| FUNGI | | | | |
| Hygrocybe aurantipes Hygrocybe aurantipes | A small brightly coloured gilled fungus that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| Hygrocybe anomola var. ianthinomarginata Hygrocybe anomola var. ianthinomarginata | A small brightly coloured gilled fungus. Cap 8 - 18 mm variable, convex to expanded convex to convex with a hollow at the centre; orange brown to buff with a darkish reddish centre dot that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), | Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| | Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | | | |
|---|--|---|--|--|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| FUNGI | | | | |
| <p><i>Hygrocybe austropratensis</i></p> <p>Hygrocybe austropratensis</p> | A small brightly coloured fungus. Cap 14 - 30 mm orange to light orange brown, convex or irregularly convex expanding to convex on one side and flat on the other to irregular that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | <p>Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site.</p> <p>Site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>No records within locality.</p> <p>This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted.</p> | <p>A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species.</p> <p>No further surveys required</p> |
| <p><i>Hygrocybe collucera</i></p> <p>Hygrocybe collucera</p> | A small brightly coloured red gilled fungus. Cap 8 - 20 mm scarlet red, cone shaped to broadly convex that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum</i> | <p>Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site.</p> <p>Site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>No records within locality.</p> <p>This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted.</p> | <p>A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species.</p> <p>No further surveys required</p> |

| | <i>undulatum</i>) | | | |
|--|--|--|---|---|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| FUNGI | | | | |
| <i>Hygrocybe griseoramosa</i> Hygrocybe griseoramosa | A small buff to brown gilled fungus. Cap 20 -30 mm, sepia brown to chocolate brown at the centre but becoming light pinkish buff that occurs in warm temperate forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Hygrocybe lanecovensii</i> Hygrocybe lanecovensii | A small brightly coloured gilled fungus. Cap 10 - 23 mm, brilliant scarlet, convex, very sticky but soon becoming almost dry and only faintly sticky at maturity that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| <i>Hygrocybe reesiaae</i> | A small, lilac coloured gilled fungus that occurs in warm temperate gallery | Potential habitat onsite does not occur. No | No records within locality. This species was not | A candidate species credit species but habitat is |

| | | | | |
|----------------------------------|--|--|---|---|
| Hygrocybe reesia | forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| FUNGI | | | | |
| Hygrocybe rubronivea | Small, brightly-coloured gilled fungus. Cap 7 - 30 mm, convex then becoming rather flattened and occasionally centrally depressed, dry, smooth or sometimes mealy, brilliant crimson that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>) | Potential habitat onsite does not occur. No creeks, swamps or waterbodies occur within 500m of site. Site is managed curtilage, no structural integrity, planted street trees, no native ground cover | No records within locality. This species was not observed during targeted searches within the managed curtilage of the subject site and can be deemed to not occur and not impacted. | A candidate species credit species but habitat is managed curtilage and targeted searches did not locate individuals of this species. No further surveys required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|---|---|--|---|
| ANIMALS | | | | |
| <i>Burhinus grallarius</i> Bush Stone-curlew | <p>The Bush Stone Curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range.</p> <p>Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.</p> <p>Largely nocturnal, being especially active on moonlit nights.</p> <p>Feed on insects and small vertebrates, such as frogs, lizards and snakes.</p> <p>Nest on the ground in a scrape or small bare patch.</p> | <p>Site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>No recent sightings at site.</p> | <p>Ecosystem species credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further surveys or assessment required</p> |
| <i>Chthonicola sagittata</i> Speckled Warbler | <p>The Speckled Warbler lives in a wide range of <i>Eucalyptus</i> dominated communities that have a grassy understorey, often on rocky ridges or in gullies.</p> <p>Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.</p> <p>Large, relatively undisturbed remnants</p> | <p>Site is managed curtilage, no structural integrity, planted street trees, no native ground cover</p> | <p>No recent sightings at site.</p> | <p>Ecosystem species credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further surveys or</p> |

| | | | | |
|--|---|---|--|--|
| | are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. | | | assessment required |
| Eastern Pygmy Possum <i>Cercartetus nanus</i> | In most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable | Managed curtilage. | | Candidate species credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further surveys or assessment required |
| <i>Chalinolobus dwyeri</i> Large-eared Pied Bat | A small to medium-sized bat with long, prominent ears and glossy black fur. It is generally rare with a very patchy distribution in NSW. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. Found in well-timbered areas containing gullies. | Managed curtilage. No roosting or breeding habitat at site. No sandstone cliffs or rocky cave habitat features. | | Candidate species credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No roosting or breeding habitat occurs at subject site, no caves, rocky areas or cliff structures at subject site. No further surveys or assessment required |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|---|--|--|---|--|
| ANIMALS | | | | |
| <p><i>Lathamus discolor</i></p> <p>Swift Parrot (foraging)</p> | <p>The Swift Parrot is small parrot about 25 cm long distinguishable by its long thin dark red tail. Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i>, Spotted Gum <i>Corymbia maculata</i>, Red Bloodwood <i>C. gummifera</i>, Forest Red Gum <i>E. tereticornis</i>, Mugga Ironbark <i>E. sideroxylon</i>, and White Box <i>E. albens</i>. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum <i>Eucalyptus globulus</i>.</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Dual Ecosystem Credit Species and Candidate Species Credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |
| <i>Miniopterus australis</i> | Small, dark chocolate brown insectivorous bats with a body length of | No suitable habitat. No roosting or breeding | | Dual ecosystem credit species and candidate species credit |

| | | | | |
|---|--|--|---|---|
| Little Bent-winged Bat | about 45 mm. Lives in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. | habitat at site. No sandstone cliffs or rocky cave habitat features. | | <p>species.</p> <p>No roosting or breeding habitat occurs at subject site, no caves, rocky areas or cliff structures at subject site.</p> <p>Heavily vegetated habitat suitable for foraging not present at site.</p> <p>No further surveys required.</p> |
| <p><i>Miniopterus orianae oceanensis</i></p> <p>Large Bentwing Bat</p> <p>(Foraging and Breeding)</p> | This sub species of Bentwing Bat occurs from Cape York to central Vic. Occurs in wet and dry sclerophyll forests and rainforests. Roost within man-made structures. Known roost sites include caves, disused mines, storm-water drains, culverts and buildings. However maternity roosts occur in sandstone or limestone cave systems. Will form scattered smaller colonies, mostly within 300km of the larger maternity cave (Churchill 1998). Active all year round, foraging mostly on moths above the tree canopy. Feeds over large areas of land and has been reported to travel up to 70 km in one night (Dwyer 1995). No breeding habitat onsite. | No suitable foraging, breeding habitat onsite, no caves, tunnels, few tree hollows or other roosting or breeding habitat features. | A total of 25 records across the landscape but none in the near vicinity. | <p>Dual ecosystem credit species and candidate species credit species.</p> <p>No roosting or breeding habitat occurs at subject site, no caves, rocky areas or cliff structures at subject site.</p> <p>Heavily vegetated habitat suitable for foraging not present at site.</p> <p>No further surveys required.</p> |
| <p><i>Artamus cyanopterus cyanopterus</i></p> <p>Dusky woodswallow</p> | The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses. The Dusky Woodswallow nests colonially in 'neighbourhoods'. The nest is a loose bowl of twigs, grass and roots, lined with fine grass, and is placed in a tree fork, behind bark, in a stump hollow or in a fence post, about 1 m - 10 | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | <p>Ecosystem Credit Species</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment</p> |

| | m above the ground. | | | required |
|---|--|---|---|--|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| ANIMALS | | | | |
| <i>Grantiella picta</i> Painted Honeyeater | Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed curtilage. | | Ecosystem Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| Green and Golden Bellfrog <i>Litoria aurea</i> | Occurs along the coast and eastern slopes of the Great Dividing Range south from Wollemi National Park. Breeds in ephemeral to intermittent streams with persistent pools. Only infrequently moves to breeding sites, most commonly found on ridges away from creeks, several hundred metres from water. | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed curtilage. No waterbodies at site | | Candidate Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| Cumberland Plain Land Snail <i>Meridolum corneovirens</i> | This large native land snail occurs over a very restricted area within Cumberland Plain vegetation between Prospect and Liverpool to the east and the Hawkesbury-Nepean River to the west. To the south it extends as far as Picton and to the north to the Windsor-Richmond area. Its habitat has been | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed | | Candidate Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. |

| | | | | |
|--|---|--|--|---|
| | <p>largely destroyed by urbanisation and it now is reported as surviving only as isolated populations in some remnant areas of bushland. Large Land Snails (<i>Meridolum corneovirens</i>) burrow into the soft soil around the base of trees and during dry period can appear to be lost from an area. However following prolonged wet periods they will re-emerge into the litter to feed on decaying wood and fungi.</p> <p>No suitable habitat.</p> | curtilage. | | No further assessment required |
| <p><i>Melithreptis gularis gularis</i></p> <p>Black-chinned Honeyeater (Eastern subspecies)</p> | <p>In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter.</p> <p>Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>) and Forest Red Gum (<i>E. tereticornis</i>).</p> <p>Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.</p> <p>A gregarious species usually seen in</p> | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed curtilage. | | <p>Ecosystem Credit Species</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |

| | | | | |
|--|--|---|--|---|
| | <p>pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.</p> <p>Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage</p> | | | |
| <p><i>Myotis macrocarpus</i></p> <p>Southern Myotis</p> | <p>Prefers permanent and/or flowing water. The Southern Myotis is commonly a cave dwelling microchiropteran, but will utilise tree hollows, mines, stormwater drains, bridges and dense vegetation (Churchill 1998). Roosting sites can be located within a wide variety of habitats, usually located in close proximity to permanent, slow flowing water. Breeding occurs between November and December, with young being weaned after three to four weeks (Churchill 1998).</p> <p>The Southern Myotis commonly forages over water bodies for insects and small fish (Churchill 1998).</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed curtilage.</p> | | <p>Ecosystem Credit Species</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |
| <p><i>Neophema pulchella</i></p> <p>Turquoise Parrot</p> | <p>The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range.</p> <p>Lives on the edges of eucalypt woodland</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Managed</p> | | <p>Ecosystem Credit Species</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this</p> |

| | | | | |
|--|--|---|--|---|
| | <p>adjoining clearings, timbered ridges and creeks in farmland.</p> <p>Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals.</p> <p>Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter.</p> <p>Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed.</p> <p>Nests in tree hollows, logs or posts, from August to December</p> | curtilage. | | <p>species.</p> <p>No further assessment required</p> |
| <p><i>Callocephalon fimbriatum</i></p> <p>Gang-gang Cockatoo</p> | <p>Has a preference for wetter forests and woodlands from sea level to > 2,000m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9m above the ground in eucalypts.</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> <p>Hollows in only a few trees and not greater than 9cm diameter</p> | | <p>Dual Ecosystem species and Candidate credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |
| <p><i>Calyptorhynchus lathamii</i></p> <p>Glossy Black Cockatoo (foraging and breeding)</p> | <p>Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur. Forest She-oak is the preferred foraging resource. Roosts in the canopy of tall trees, occasionally in tree hollows. Nests in deep hollows in eucalypts.</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. Swamp Oak occurs throughout but not preferred food source. Hollows in only a few trees and not</p> | | <p>Dual Ecosystem species and Candidate credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment</p> |

| | | greater than 15cm diam. | | required |
|--|---|---|---|--|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| ANIMALS | | | | |
| <i>Daphoenositta chrysoptera</i> Varied Sittella | Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and <i>Acacia</i> woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Ecosystem Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| <i>Dasyurus maculata</i> Spotted-tail Quoll | Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites (Edgar & Belcher 1995). | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Ecosystem Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| <i>Petaurus norfolcensis</i> Squirrel Glider | The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Ecosystem Credit Species Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. |

| | | | | |
|--|--|--|--|--|
| | <p>Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.</p> <p>Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of <i>Acacia</i> gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.</p> | | | No further assessment required |
| <p><i>Phascolarctus cinereus</i></p> <p>Koala</p> | <p>Occurs in natural eucalypt forests and woodlands. Koala feed trees listed under Schedule 2 of SEPP 44 legislation include: Forest red gum <i>Eucalyptus tereticornis</i>; Tallowwood, <i>Eucalyptus microcorys</i>; Grey Gum, <i>Eucalyptus punctata</i>; Manna Gum, <i>Eucalyptus viminalis</i>; River Red Gum, <i>Eucalyptus camaldulensis</i>; Broad leaved scribbly gum, <i>Eucalyptus haemastoma</i>; Scribbly gum and Swamp mahogany, <i>Eucalyptus robusta</i>.</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Candidate species credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |
| <p><i>Glossopsitta pusilla</i></p> <p>Little Lorikeet</p> | <p>Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Little lorikeets are considered to be nomadic,</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Ecosystem Credit Species</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> |

| | | | | |
|--|---|--|--|--|
| | likely in a response to food availability. These lorikeets usually forage in small flocks, feeding mainly on nectar and pollen, but also fruit of eucalypts, melaleucas and mistletoes. The little lorikeet breeds from May to September, nesting in tree hollows, with small diameter entrance holes. Most breeding records are located on the western slopes. | | | No further assessment required |
| <i>Hieraaetus morphnoides</i> Little Eagle (Foraging and breeding) | The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest. The Little Eagle searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy. Prey includes rabbits, other live mammals and insects. | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Dual Ecosystem species and Candidate credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| <i>Hirundapus caudacutus</i> White-throated Needle-tail | Summer migrant to coastal and sub-coastal eastern Australia. Occurs over a range of habitats in summer months where it forages in the airspace over forests, woodlands, urban areas, grasslands and water. May occasionally roost in trees | May forage over subject land but development not expected to impact on this species as there will remain surrounding areas of foraging habitat. Sub-optimal habitat as it is highly managed | | Ecosystem species credit species. May overfly area. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| <i>Lophoictinia isura</i> Square-tailed Kite | Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to | Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Dual Ecosystem species and Candidate credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |

| | occupy large hunting ranges of more than 100 square km. | | | required |
|--|---|---|---|---|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| ANIMALS | | | | |
| <p><i>Melanodryas cucullata cucullata</i></p> <p>Hooded Robin</p> | <p>The Hooded Robin is a large Australian robin reaching 17 cm in length. Rarely found on the coast. The south-eastern form (subspecies <i>cucullata</i>) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i>. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.</p> | <p>Habitat unsuitable as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Ecosystem species credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |
| <p><i>Ninox connivens</i></p> <p>Barking Owl</p> <p>(Breeding an foraging)</p> | <p>Occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use,</p> | <p>Habitat unsuitable for breeding or foraging as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Dual Ecosystem species and Candidate credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |

| | and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as <i>Acacia</i> and <i>Casuarina</i> species. | | | |
|--|---|--|---|---|
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| ANIMALS | | | | |
| <p><i>Ninox strenua</i></p> <p>Powerful Owl (foraging and breeding)</p> | <p>Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i>, Black She-oak <i>Allocasuarina littoralis</i>, Blackwood <i>Acacia melanoxylon</i>, Rough-barked Apple <i>Angophora floribunda</i>, Cherry Ballart <i>Exocarpus cupressiformis</i> and a number of other eucalypt species.</p> | <p>Habitat unsuitable for breeding as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> <p>No large hollows for breeding for this owl.</p> <p>The Powerful Owl may occasionally forage within the area if prey species are in abundance. However during the survey, prey for this large owl did not appear sufficient in number to attract it to the area.</p> | | <p>Dual Ecosystem species and Candidate credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required</p> |

| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
|--|---|---|---|---|
| ANIMALS | | | | |
| <p><i>Petroica boodang</i></p> <p>Scarlet Robin</p> | <p>In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding.</p> | <p>Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.</p> <p>Habitat unsuitable for this species as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Ecosystem credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required.</p> |
| <p><i>Petroica phoenecia</i></p> <p>Flame Robin</p> | <p>In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields,</p> | <p>Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.</p> <p>Habitat unsuitable for this species as land has been historically cleared for farming and more recently as a dense established housing</p> | | <p>Ecosystem credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required.</p> |

| | | | | |
|---|---|---|--|---|
| | <p>heathlands, shrublands and sedgelands at high altitudes.</p> <p>In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains).</p> <p>Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration.</p> | precinct. | | |
| <p><i>Pseudomys novaehollandiae</i></p> <p>New Holland Mouse</p> | <p>Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. It is a social animal, living predominantly in burrows shared with other individuals</p> | <p>Habitat unsuitable for this species as land has been historically cleared for farming and more recently as a dense established housing precinct.</p> | | <p>Ecosystem credit species.</p> <p>Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species.</p> <p>No further assessment required.</p> |
| <p><i>Pteropus poliocephalus</i></p> <p>Grey-headed Flying-fox</p> <p>(Breeding and foraging)</p> | <p>Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.</p> <p>Feed on the nectar and pollen of native trees, in particular <i>Eucalyptus</i>, <i>Melaleuca</i> and <i>Banksia</i>, and fruits of rainforest trees and vines.</p> | <p>Some suitable foraging trees located on subject site. Potential seasonal foraging at the site. May be attracted to flowering Eucalyptus and paperbark trees on occasion during the warmer months</p> <p>No evidence of roosting camps found at subject site.</p> | | <p>Dual Ecosystem species and Candidate credit species.</p> <p>It is considered that due to the greater extent of foraging area in the region, this species will not be compromised by the proposed development for the subject site.</p> <p>No further assessment required</p> |
| <p><i>Saccolaimus flaviventris</i></p> <p>Yellow-bellied Sheathtail-bat</p> | <p>A very distinctive, large, insectivorous bat up to 87 mm long. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.</p> | <p>Habitat unsuitable for this species as land has been historically cleared for farming and more recently as a dense</p> | | <p>Ecosystem credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development</p> |

| | | | | |
|--|---|---|--|--|
| | Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. | established housing precinct. | | proposal is not likely to impact on this species. No further assessment required. |
| SPECIES & COMMON NAME | DESCRIPTION/HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPE 2022) | HABITAT SUITABILITY FROM DPE PROFILES; TDBC AND CALCULATOR TICK BOXES | HISTORICAL RECORDS (TO 20 YEARS PREVIOUS) | ECOSYSTEM SPECIES/CANDIDATE SPECIES ASSESSMENT |
| ANIMALS | | | | |
| Masked Owl <i>Tyto novaehollandiae</i> (breeding and foraging) | Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. | Habitat unsuitable for breeding as land has been historically cleared for farming and more recently as a dense established housing precinct. No large hollows for breeding for this owl. | | Dual Ecosystem species and Candidate credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required |
| Rosenberg's Goanna <i>Varanus rosenbergi</i> | Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens. | Habitat unsuitable for this species as land has been historically cleared for farming and more recently as a dense established housing precinct. | | Ecosystem credit species. Subject site is highly managed curtilage and unlikely to provide suitable habitat. Development proposal is not likely to impact on this species. No further assessment required. |

4.3. Description of Impacts

4.3.1. Direct impacts to the subject site

The proposal is to remove all the buildings and most of the landscaped street and garden trees and redevelop the entire subject site in Stage 1A of the Telopea 'Concept Plan Area (CPA).

It is recommended to retain mature individuals of Blackbutt (in the Core Precinct - number 283 in Scales 2020 for Stage 1A) and the remnant individual of Sydney Blue Gum (in the East Precinct - number 300 in Scales 2020; 2022 for Stage 3). These individuals all contain suitable large hollows which may provide sheltering and roosting habitat for local fauna, as well as many individuals of mature Sydney Blue Gum that have been landscaped along the north-western side of Shortland Street and the northern side of Wade Street within established garden areas and along the street verges (although not all individuals established in current landscaped garden areas are able to be retained) (Figures 11 & 13).

Tree No. 315, an individual of Thin-leaved Stringybark (*Eucalyptus eugenioides*) (Tree No. 315 in Scales 2020) that occurs in the Core Precinct, also contains some small hollows but is designated to be removed for the development. It is recommended to offset this loss of potential fauna habitat by installing two bat boxes and two small bird boxes on existing trees in the locality that are to be retained. These artificial fauna habitat structures should be affixed at least 5m from the ground on the trunks or in the forks of existing tall trees.

4.3.2. Potential for runoff, erosion and sedimentation during construction

Sediment fences or hay bales installed along downslope contours from construction activities would serve to reduce potential erosion of land surfaces and decrease any sediment wash downslope.

An approved Construction Environment Management Plan (CEMP) must be prepared for the proposal and be provided with the relevant application prior to issue of the Construction Certificate to address these potential issues.

4.3.3. Biodiversity credits for PCT 1281

The vegetation community that is likely to have occurred at the subject site before historical clearing and eventual landscaping is assessed as having represented Sydney Turpentine Ironbark Forest (STIF) in the Sydney Basin Bioregion, an ecological community that is listed

as Endangered by the NSW Biodiversity Conservation Act (2016) and as Critically Endangered by the EPBC Act (1999). This ecological community may be considered to be represented by small patches of landscaped individuals of such species as Sydney Blue Gum, Bangalay, Blackbutt, Thin-leaved Stringybark and Spotted Gum within the construction envelopes at the subject site (Figures 11, 12 & 13).

This assessment (prepared using the BAM-C Offsets Calculator) has determined that there are no ecosystem credits required to offset the impact for the clearing of 1.5ha (or even 18.85ha which includes the entire construction footprint) of patches of landscaped vegetation representing elements of STIF in a highly floristically, structurally and functionally modified condition.

The floristic, structural and functional components of the BAM result in a low vegetation integrity score of 13 for the proposed Masterplan development site. The VIS Score of 13 is less than the threshold score of 15 which is the lowest score for an EEC to generate any offsets (BAM 2020).

According to section 9.2 of the BAM (2020) the vegetation integrity score is less than the vegetation integrity threshold required to generate an offset requirement.

4.3.4. Serious and Irreversible Impacts (SAIL)

Species and ecological communities with a 'very high' biodiversity risk weighting are considered to be a potential serious and irreversible impact (SAIL). These 'potential SAIL entities' are identified by the BAM calculator (BAM 2020).

The determination of serious and irreversible impacts on biodiversity values is to be made by the consent authority in accordance with the principles set out in the BC Regulation. To assist the consent authority, the guidance document 'Guidance to Assist a Decision Maker to determine a serious and irreversible impact' includes criteria that enable the application of the four principles set out in clause 6.7 of the BC Regulation. These criteria provide a guide to identify the species and ecological communities that are likely to be the subject of serious and irreversible impacts.

These four principles include the following (BC Regulation 2018):

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

- a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or

- b) it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or
- c) it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or
- d) the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

For the purpose of this clause, a decline of a species or ecological community is a continuing or projected decline in:

- a) an index of abundance appropriate to the taxon, or
- b) the geographic distribution and habitat quality of the species or ecological community.

As the subject land proposed for development occurs in a highly floristically, structurally and functionally modified condition with no opportunity for natural recovery, it is considered that no biodiversity offset is needed to compensate for the clearing of 1.5ha of a highly modified area of representative elements of PCT 1281 on the subject site and there are no serious and irreversible impacts associated with the clearing of this land.

4.3.5. Potential Direct Impacts

4.3.5.1 Removal of vegetation and potential habitat

The impact would include the removal of 1.5ha of highly modified areas of representative elements of PCT 1281 on the subject site that have been largely been landscaped as street plantings and as amenity for garden areas (Figures 11, 12, 13, 14 & 15).

4.3.5.2 Potential for runoff, sedimentation and erosion during construction

Due to the contoured surface of the subject land, construction activities could potentially lead to some soil erosion and some increase in sediment load downslope.

The potential for accidental leaks/spills of oil, fuel, cement or other substances could potentially pollute ground water and downslope drainage lines.

The installation of sediment fences or hay bales installed along downslope contours from construction activities would serve to reduce potential erosion of land surfaces and decrease the sediment wash downslope.

An approved Construction Environment Management Plan (CEMP) must be prepared for the proposal and be provided with the approved application prior to issue of the Construction Certificate to address these potential issues.

4.3.5.3. Potential temporary noise, dust, excessive lighting and vibration disturbance during construction

The potential effects of temporary but excessive noise, dust, bright lighting and vibration disturbance during construction activities upon potential fauna are difficult to predict.

Potential impacts may include negative effects on predator-prey interactions and changes to roosting and breeding behaviours in the short term.

An approved Construction Environment Management Plan (CEMP) must be prepared for the proposal and be provided with the approved application prior to issue of the Construction Certificate to address these potential issues.

4.3.6. Indirect Impacts

Indirect impacts occur when the proposal or activities relating to the construction or operation of the proposal may affect adjacent or proximal areas of native vegetation, threatened ecological communities or threatened species habitat beyond the subject site.

Potential indirect impacts to flora and fauna would include hydrological changes to the surface water-runoff flow. Additional hard surface areas created as a result of the proposed construction would be expected to potentially result in some changes to the current hydrological regime, however, it is proposed that all water run-off would be directed to the current urban stormwater management system.

4.3.7. Prescribed and uncertain impacts

Prescribed impacts on biodiversity values includes any potential impacts that are not a result of direct vegetation clearing or construction development that have been prescribed by the Biodiversity Conservation Regulation (2017), these listed in Table 7 as follows:

| Attributes or features of the habitat | Potential impacts | Actions to alleviate or ameliorate potential impacts |
|--|--|---|
| Species using caves, cliffs, karsts or crevices. Includes potential roosting sites for cave-dwelling microchiropterans | None, as these natural features do not occur at or in the vicinity of the subject site | Not applicable |
| Habitat of threatened species associated with rocks | Not applicable | Not applicable |
| Habitat of threatened species associated with man-made structures such as drainage pipes | Not applicable | Not applicable |
| Habitat of threatened species associated with non-native vegetation | Not applicable | Not applicable |
| Connectivity of habitats within and between allotments facilitating movement of species across their range | The removal of some canopy trees is not expected to reduce habitat connectivity for any threatened species. | Connectivity is retained via remaining trees located on the eastern, northern and southern side of the development, though threatened species are highly unlikely to occur anywhere within the Telopea precinct |
| Movement of threatened species required to maintain life cycles | Highly unlikely that any threatened species would occur within the developed and highly modified areas at the Telopea CPA site | Connectivity is retained via remaining trees located on the eastern, northern and southern side of the development, though threatened species are highly unlikely to occur anywhere within the Telopea precinct |
| Hydrological regimes required to sustain threatened species | Not applicable | Not applicable |

Table 7 - List of potential prescribed impacts which may occur as a result of proposed development

4.3.8. Avoidance/minimisation of impacts

Minimisation of impacts can be achieved through the potential retention of a high number of mature individuals of Sydney Blue Gum (*Eucalyptus saligna*), Bangalay (*Eucalyptus botryoides*), Spotted Gum (*Corymbia maculata*) and the mature single individuals of Blackbutt (*Eucalyptus pilularis*) and Thin-leaved Stringybark (*Eucalyptus eugenioides*) (Scales 2020; 2022).

5. Impact Summary

5.1 Serious and Irreversible Impacts (SII)

OEH (2017) 'Guidance to Assist a Decision-maker to Determine a Serious and Irreversible Impact' lists the ecological communities and species that are 'potential serious and irreversible impact (SII) entities'.

Criteria to identify which ecological communities and threatened species are at the greatest risk of serious and irreversible impacts allowing the identification of ecological communities and threatened species that:

- are in a rapid rate of decline
- have a very small population size
- are severely degraded or disrupted
- have a very limited geographic distribution
- are unlikely to respond to measures to improve habitat

PCT 1281 in the Sydney Basin Bioregion is **currently listed as an endangered or threatened entity on the BC Act** (NSW Bionet Vegetation Classification 2022, OEH 2016) but the scattered and often isolated, highly modified floristically, structurally and in functionality, landscaped elements of such community are such that impacts over the entire area of the Telopea CPA Masterplan derive a low VIS Score of 13, indicating that these elements cannot be regarded as viable components of this PCT.

As such, the community at the subject development site has been historically cleared and the elements of the PCT highly modified with a low VI Score of just 13 (Table 5), a qualification critical to its assessment as to whether the removal of a small area of cleared and landscaped vegetation would constitute a SII. The clearing of about 1.5ha of this area of highly modified floristically, structurally and functionally landscaped elements of such community is not considered to constitute a serious and irreversible impact (SII).

5.2 Impacts that require an offset

Table 8 summarises the impact to areas of PCT 1281 that require an offset.

| Vegetation Zone (Description) | PCT | Extent of area impacted | Current Vegetation Integrity Score (VIS) | Future Vegetation Integrity Score | Number of Ecosystem credits required |
|--|------|-------------------------------|---|--|--|
| Elements of highly modified, landscaped areas of PCT 1281 (Figures 11, 12 & 13) | 1281 | 1.5ha | 13 | 0 | 0 |

6. Biodiversity Credit Report (Like for Like)

For the proposed development of the Masterplan at Telopea (Figures 4 & 5A, 5B and 5C), no credits are assessed as having been generated with the loss of a potential area of 1.5ha of elements of highly modified floristically, structurally and functionally landscaped areas of Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion, occurring as street and garden amenity plantings, with potentially only three remnant individuals retained within the subject area (Figure 13).

Section 9.2 of the BAM (2020) qualifies that low scores for vegetation integrity (lower than 15) do not generate the requirement for biodiversity offset costs. As the vegetation integrity score for the subject area at Telopea is 13, it falls below the threshold of a vegetation integrity score of 15 for PCTs that represent a TEC and are not associated with habitat for threatened species.

The vegetation is assessed as having a very low floristic, structural and functional integrity in the canopy tree, shrub and ground strata. There is very low composition of natural species in the assemblage, a low spread of tree DBH sizes with no regeneration occurring and little functional aspects to the vegetation to provide foraging, sheltering or breeding habitat opportunity for any threatened fauna.

7. References and Literature Reviewed

- Arcadis Australia Pacific Pty Ltd (2022) Telopea Development Bat survey
- Bates, Smart (2022) and Hassell (2022) Urban Design Report for Telopea Masterplan
- Benson, D. and Howell, J. (1994) The natural vegetation of the Sydney 1: 100,000 map sheet. *Cunninghamia* **3**:677 – 787.
- Briggs, J.D. and Leigh, J.H.C. (1996) Rare or Threatened Australian Plants: CSIRO Division of Plant Industry/Australian National Parks and Wildlife Service. CSIRO Publishing, Melb.
- Chapman, G.A. and Murphy, C.L. (1989) *Soil landscapes of the Sydney 1:100 000 sheet*. (Soil Conservation Service of N.S.W.: Sydney).
- Churchill, S., (1998). *Australian Bats*. Reed New Holland Publishers.
- Cogger, H. G. (2000). Reptiles and Amphibians of Australia. 6th ed. Reed New Holland, Sydney.
- Commonwealth DCCEW Protected Matters Environmental Search Tool (2022)
- Cropper, S (1993) *Management of Endangered Plants* CSIRO Pub. East Melbourne
- DEC (2004) Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities
- DPE (2020) Biodiversity Assessment Method (BAM)
- DPE Bionet Atlas of NSW Wildlife (2022). NPWS Geographic Information Systems Division, Hurstville NSW, 2220.
- DPIE (2019), 'Guidance to assist a decision-maker to determine a serious and irreversible impact', Environment, Energy and Science.
- Eco Logical (2017) Flora and fauna assessment for the Telopea Master Plan *prepared for the Land and Housing Corporation*
- Fairley, A. & Moore, P. (2010) Native Plants of the Sydney District – An Identification Guide. Kangaroo Press, Kenthurst, Sydney.

- Fairley, A. (2004) *Seldom Seen – Rare Plants of Greater Sydney*. New Holland Publ Sydney, Aust.
- Gibbons P, Lindenmayer D (2000) 'Tree Hollows and Wildlife Conservation in Australia'. (CSIRO Publishing: Canberra)
- Harden, G. J. (ed.) (1990 – 2002; 2022 online) *Flora of New South Wales*, Royal Botanic Gardens, Sydney NSW.
- Hassall (2020) *Landscape Report for Telopea Masterplan*
- Herbert, C. (1983) '*Geology of the 1:100 000 Sheet 9130*'. Geological Survey of NSW, Sydney.
- Menkhorst, P & F Knight (2001). *A field guide to the Mammals of Australia*. Victoria: Oxford University Press.
- National Parks and Wildlife Service (NPWS) (2003), *Bioregions of New South Wales: Sydney Basin*, Chapter 15, p.185-196
- NSW Scientific Committee. Final Determinations (1996 – 2022) Determinations relating to listings of threatened species, ecological communities and key threatening processes in the Schedules of the *Biodiversity Conservation Act 1995*.
- OEH (2016) 'The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area'.
- Pizzey, G. and Knight, F. (2003). *The Field Guide to the Birds of Australia*. Angus and Robinson Publs.
- Plus Architecture (2020) *Urban Design Report for Telopea Masterplan Stage 1A*
- Scales (2019) *Arboricultural Impact Appraisal and Method Statement for Telopea Stage 1, Shortland Street and Sturt Street prepared for Frasers Telopea Property Developer Pty Ltd for the Land and Housing Corporation*
- Scales (2020; 2022) *Arboricultural Impact Appraisal and Method Statement for Telopea Stage 1 & 1A, 2 & 3 prepared for Frasers Telopea Property Developer Pty Ltd for the Land and Housing Corporation*
- Specht, R. L., Specht, A., Whelan, M.B., Hegarty, E. E. (1995) *Conservation Atlas of Plant Communities in Australia*. Southern Cross Univ Press Lismore

Strahan, R. 1995 *Complete Book of Australian Mammals*, Second Edition.
Sydney: Reed Books.

Appendix 1 – BAAS Profile for P Stricker



Planning,
Industry &
Environment

CERTIFICATE OF ACCREDITATION AS A BIODIVERSITY ASSESSMENT METHOD ASSESSOR under the *Biodiversity Conservation Act 2016* (NSW)

| BAM Assessor | | |
|----------------------|---------------------------------------|----------------|
| Peter Stricker | | |
| Accreditation number | Accreditation date (Date of issue) | Expiry Date of |
| BAAS18125 | 17 July 2021 | 17 July 2024 |

The person named above is accredited under section 6.10 of the *Biodiversity Conservation Act 2016* (NSW) (**BC Act**) as a Biodiversity Assessment Method Assessor to apply the Biodiversity Assessment Method in connection with the preparation of biodiversity stewardship site assessment reports, biodiversity development assessment reports and biodiversity certification assessment reports pursuant to Part 6 of the BC Act.

The accreditation is in force until and including the Expiry Date. The accreditation is subject to the conditions set out in the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*, under the BC Act, and the conditions specified on the reverse of this certificate.

A handwritten signature in black ink, appearing to read 'Lucian McElwain'.


LUCIAN MCELWAIN

Manager Ecosystem Programs
Department of Planning, Industry & Environment

NOTES

- DPIE maintains a register of Accredited Biodiversity Assessment Method (BAM) Assessors accessible from the DPIE website.
- The BAM Assessor's accreditation expires on the Expiry Date unless renewed in accordance with the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*. It is the BAM Assessor's responsibility to monitor the Expiry Date of their accreditation, and apply for any renewal with sufficient time for the application to be processed prior to the Expiry Date.
- Words and expressions used in this accreditation instrument and which are also used in the Act have the same meaning.

Appendix 2 – BAM Attribute and VIS Scores



BAM Calculator

App last updated: 09/12/2021 11:00 (Version: 1.4.0.00)

BAM data last updated *: 14/10/2022 (Version: 55) * Disclaimer

1. Assessment details
2. Site context
3. Vegetation
4. Habitat suitability: Predicted
5. Habitat suitability: Candidate
6. Habitat survey

7. Credits
8. Credit classes
9. Price

All fields marked with an asterisk (*) are mandatory

Plant community types (PCT) & ecological communities

| Formation * | Class * | Plant community type * | PCT % cleared | Associated TEC * | BC Act listing status | EPBC Act listing status | Action | Delete |
|--|---|--|---------------|---|--|-------------------------|---|--|
| Wet Sclerophyll Forests (Grassy sub-formation) | Northern Hinterland Wet Sclerophyll Forests | 1281 - Sydney Turpentine - Ironbark forest | 90 | Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion | Critically Endangered Ecological Community | Not Listed | <div style="border: 1px solid #ccc; padding: 2px; display: inline-block;">ADD VEG ZONE</div> <div style="border: 1px solid #ccc; padding: 2px; display: inline-block; margin-top: 2px;">Modify default benchmarks</div> | ✕ |




ADD ANOTHER PCT

SEARCH PCT OUTSIDE IBRA

Vegetation zones (Current vegetation integrity score)

IMPORT SITE


Vegetation zones (Current vegetation integrity score)

| # | Import | PCT code | Condition class * | Vegetation zone name | Patch Size* | Area (ha)* | Location * | Composition condition score | Structure condition score | Function condition score | Current vegetation integrity score | Management zones | Delete |
|---|---|----------|-------------------|----------------------|-------------|------------|---|-----------------------------|---------------------------|--------------------------|------------------------------------|---|--|
| 1 |  | 1281 | MANAGEI | 1281_MANAGED | 20 | 1.5 |  | 1.7 | 34.3 | 38.4 | 13 |  | ✕ |

Vegetation zones (Future vegetation integrity score)

| # | PCT code | Condition class | Vegetation zone name | Patch Size | Management zone | Area (ha) | Composition condition score | Structure condition score | Function condition score | Vegetation integrity (VI) score | Change in VI score | Total VI loss |
|---|----------|-----------------|----------------------|------------|-----------------|-----------|-----------------------------|---------------------------|--------------------------|---------------------------------|--------------------|---------------|
| 1 | 1281 | MANAGED | 1281_MANAGED | 20 | | 1.5 | 0 | 0 | 0 | 0 | -13 | -13 |

Appendix 3 – BAM Ecosystem Credit Classes



BAM Calculator

App last updated: 09/12/2021 11:00 (Version: 1.4.0.00)

BAM data last updated *: 14/10/2022 (Version: 55) * Disclaimer

1. Assessment details [↗](#)
2. Site context [↗](#)
3. Vegetation [↗](#)
4. Habitat suitability: Predicted [↗](#)
5. Habitat suitability: Candidate [↗](#)
6. Habitat survey [↗](#)

7. Credits [↗](#)
8. Credit classes [↗](#)
9. Price [↗](#)

Note: Despite the biodiversity credit output displayed for any EPBC Act only listed entity, biodiversity credits cannot be created or traded under the NSW biodiversity offsets scheme and payments cannot be made into the Biodiversity Conservation Fund for any EPBC Act only listed entity.

You should contact the Commonwealth Department of Agriculture, Water and Environment as the relevant agency for meeting any requirements of an EPBC Act approval.

* EPBC Act only listed entity means a 'threatened species' or 'threatened ecological community' that is listed under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) but not listed under the Biodiversity Conservation Act 2016 (NSW) (BC Act).

Ecosystem credit classes

Ecosystem credit summary

| PCT | TEC | Area | HBT Cr | No HBT Cr | Credits |
|--|---|------|--------|-----------|---------|
| 1281-Sydney Turpentine - Ironbark forest | Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion | 1.5 | 0 | 0 | 0 |

Credit classes for 1281

Like-for-like options

| TEC | HBT | Credits | IBRA region |
|---|-----|---------|--|
| Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion <small>This includes PCT's: 1183, 1281, 1284</small> | Yes | 0 | Cumberland , Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site. |

Species credit classes

Species credit summary

| Species | Vegetation Zone/s names | Area / Count | Credits |
|---------|-------------------------|--------------|---------|
|---------|-------------------------|--------------|---------|

Appendix 4 – BAM Ecosystem Credit Scores



BAM Calculator

App last updated: 09/12/2021 11:00 (Version: 1.4.0.00)
BAM data last updated *: 14/10/2022 (Version: 55) * Disclaimer

1. Assessment details
2. Site context
3. Vegetation
4. Habitat suitability: Predicted
5. Habitat suitability: Candidate
6. Habitat survey
7. Credits
8. Credit classes
9. Price

Note: Despite the biodiversity credit output displayed for any EPBC Act only listed entity, biodiversity credits cannot be created or traded under the NSW biodiversity offsets scheme and payments cannot be made into the Biodiversity Conservation Fund for any EPBC Act only listed entity.

You should contact the Commonwealth Department of Agriculture, Water and Environment as the relevant agency for meeting any requirements of an EPBC Act approval.

* EPBC Act only listed entity means a 'threatened species' or 'threatened ecological community' that is listed under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) but not listed under the Biodiversity Conservation Act 2016 (NSW) (BC Act).


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

| Zone | Vegetation zone name | Vegetation integrity loss | Area | Sensitivity to loss | Sensitivity to loss(Justification) | Species sensitivity to gain class | Biodiversity risk weighting | Potential SAIL | Ecosystem credits |
|-------------------------------------|----------------------|---------------------------|--------------|-------------------------------|------------------------------------|-----------------------------------|-----------------------------|----------------|-------------------|
| Sydney Turpentine - Ironbark forest | | | | | | | | | |
| 1 | 1281_MANAGED | 13 | 1.5 hectares | Very High Sensitivity to Loss | Population size | High Sensitivity to Gain | 2.5 | True | 0 |
| | | | | | | | | | Subtotal: 0 |
| | | | | | | | | | Total: 0 |

Species credits for threatened species


| Vegetation zone name | Habitat condition (vegetation integrity) loss | Area / Count | Sensitivity to loss | Sensitivity to loss(Justification) | Sensitivity to gain | Sensitivity to gain(Justification) | Biodiversity risk weighting | Potential SAIL | Species credits |
|----------------------|---|--------------|---------------------|------------------------------------|---------------------|------------------------------------|-----------------------------|----------------|-----------------|
|----------------------|---|--------------|---------------------|------------------------------------|---------------------|------------------------------------|-----------------------------|----------------|-----------------|


Appendix 5 – BAM Ecosystem Pricing Offsets





BAM Calculator


App last updated: 09/12/2021 11:00 (Version: 1.4.0.00)
BAM data last updated *: 14/10/2022 (Version: 55) * Disclaimer





1. Assessment details 


2. Site context 


3. Vegetation 


4. Habitat suitability: Predicted 

5. Habitat suitability: Candidate 

6. Habitat survey 

7. Credits 

8. Credit classes 

9. Price 

IMPORTANT UPDATE:

The Biodiversity Offsets Payment Calculator (BOPC) was replaced by the BCF Charge System on 17 October 2022. The new BCF Charge System will now be used to determine the amount a proponent may pay into the BCF to meet a biodiversity offset obligation.

The Biodiversity Conservation Trust (BCT) is responsible for administering the new charge system.

More information about the new charge system, including how to request a quote from the BCT, is available on the [BCT website](#).

Disclaimer

Although the Offsets Payment Calculator has been removed from this page, some users may still have access to the tool due to their browser settings. Any quotes that were generated **after 11:59pm on 16 October 2022** will not be valid for the purposes of determining the amount to be paid into the BCF. The date and time of calculation found on the bottom left corner of the Offsets Payment Calculator will be used for verification.