Water Cycle Management for Greater Parramatta and Olympic Peninsula

Biodiversity Development Assessment Report

Certified by Elijah Elias, Principal Ecologist (BAAS21012)

16/01/2026



Document Control

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Acronyms and Abbreviations

Acronym	Definition
AEC	Animal Ethics Committee
AOBV	Area of Outstanding Biodiversity Value
AOO	Area of occupancy
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
CFFMP	Construction Flora and Fauna Management Plan
CoA	Commonwealth of Australia
DBH	diameter at breast height
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEC	NSW Department of Environment and Conservation
DECC	NSW Department of Environment and Climate Change
DEWHA	Commonwealth Department of Environment, Water, Heritage and the Arts
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
DPI	NSW Department of Primary Industries
DPIE	NSW Department of Planning, Industry and the Environment
EC	ecological community listed under the EPBC Act
EIS	Environmental Impact Statement
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EEC	Endangered Ecological Community
EPL	Environment Protection Licence
Extent of occurrence	EOO
FM Act	Fisheries Management Act 1994
GDE	Groundwater Dependent Ecosystem
GPOP	Greater Parramatta and Olympic Peninsula
HAVAE	NSW High Ecological Value Aquatic Ecosystems mapping
HDD	Horizontal directional drilling
HTW	High Threat Weed

Acronym	Definition
IBRA	Interim Biogeographic Regionalisation for Australia
IHM	Important Habitat Mapping
KFH	Key Fish Habitat
KTP	Key Threatening Process
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013* (NSW)
MNES	Matters of National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSOOS	Northern Suburbs Ocean Outfall Sewer
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
PMST	EPBC Protected Matters Search Tool
RBGDT	NSW Royal Botanical Gardens and Domain Trust
RGRF	Red Gum Riverflat Forest
RAPs	Rapid Assessment Points
SAII	Serious And Irreversible Impact
SEARs	Secretary's Environmental Assessment Requirements
SEED	Sharing and Enabling Environmental Data in NSW
SSI	State Significant Infrastructure
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VEC	Vulnerable Ecological Community
VI	Vegetation Integrity
VIS	Vegetation Information Systems
WRRF	Water Resource Recovery Facility
WSU	Western Sydney University

Declarations

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

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

Signature: 

Date: 16/01/2026

BAM Assessor Accreditation no: BAAS 21012

This BDAR has been prepared to meet the requirements of the BAM 2020. Section 1.6 provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

The table below lists the personnel and their roles in the preparation of this BDAR

Name	BAM Assessor Accreditation no.	Position/ Role	Tasks performed	Relevant qualification
Elijah Elias	BAAS 21012	Principal Ecologist	Technical Oversight, Document review and BDAR Certification BAM plots surveys and Fauna surveys	B Biodiversity Conservation
Brendan Fletcher	BAAS 25005	Senior Ecologist	Report preparation, BAM plot surveys, Flora and Fauna surveys	M Env Man, M Law, Juris Doctor, BA (History and Political Science)
Nathan Banks	BAAS 23023	Senior Ecologist	Bat surveys	B Zoology
Taylor Bliss-Henaghan	n/a	Ecologist	Bat surveys	M Con Biol, B Sc (Zoology, Ecology)
Acacia Jennings	n/a	Ecologist	BAM plot surveys, Fauna surveys	M Con Biol, B Animal BioSc (Hons) (Wildlife Conservation Management)
Emma Teusner	n/a	Graduate Ecologist	Report preparation, BAM plot surveys, Fauna surveys	B Adv Sci Hons (Ecology, Biology)

iii. Conflict of interest

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

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

Full disclosure has also been provided to the client.

Signature: 

Date: 16/01/2026

BAM Assessor Accreditation no: BAAS 21012

Executive Summary

Sydney Water is proposing to build and operate a water resource recovery facility (WRRF) at Camelia-Rosehill to support growth across the northern suburbs of Sydney, and in the Greater Parramatta and Olympic Peninsula (GPOP) growth corridor. Sydney Water has engaged Arcadis to prepare a Biodiversity Development Assessment Report (BDAR) for the area potentially impacted by the project. This BDAR is based on desktop research and detailed field surveys undertaken between October 2024 and August 2025.

The biodiversity impacts and offset requirements for the project were calculated using the Biodiversity Assessment Method Calculator (BAM-C) in accordance with the Biodiversity Assessment Method (BAM) (DPIE, 2020a).

Two NSW Plant Community Types (PCTs) (PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest) and three PCT vegetation zones were identified within the subject land. Three planted native vegetation zones (non-PCT) were identified. The remainder of the subject land is made up of roads, buildings, urban infrastructure and exotic vegetation.

An additional three PCTs were identified within the study area outside the subject land, within land avoided by the project in order to minimise the project's overall impact on biodiversity values.

Vegetation zones and their associated PCTs within the subject land, the study area, avoided land, and their calculated vegetation integrity (VI) scores are in the table below. Some PCTs do not have VI scores calculated or vegetation zones designated because they occur only within avoided land and not within the subject land, and therefore, plots are not required under the BAM to calculate vegetation integrity.

Table 0-1-1 Vegetation zones within the study area and the subject land

PCT ID	PCT name	Vegetation zone	Vegetation integrity score	Extent in the study area (ha)	Extent in avoided land (ha)	Extent in the subject land (ha)
3176	Sydney Enriched Sandstone Moist Forest	Avoided land	60.6	0.08	0.08	0.00
3320	Cumberland Shale Plains Woodland	Avoided land	n/a	0.27	0.27	0.00
4028	Estuarine Swamp Oak Twig-rush Forest	Low-Camellia Park (avoided land)	23.8	0.70	0.70	0.00
		Low-Sydney Olympic Park	13.3	0.20	0.14	0.06
4058	Sydney Hinterland Red Gum Riverflat Forest	Moderate	46.2	0.02	0.00	0.02
		Low	32.4	0.10	0.00	0.10
		Avoided land	33.2	0.18	0.18	0.00
4091	Grey Mangrove-River Mangrove Forest	Avoided land	n/a	0.78	0.78	0.00
		Subtotal – PCT native vegetation communities	n/a	**2.33**	**2.15**	**0.18**
Planted native vegetation		Street trees	n/a	2.44	0.23	2.20
		Suburban parks	n/a	3.60	2.26	1.34
		Sydney Olympic Park	n/a	1.55	0.31	1.23

	Subtotal – Planted native vegetation	n/a	**7.59**	**2.80**	**4.78**
	Total area native vegetation	n/a	**9.92**	**4.95**	**4.97**

* Some totals do not equal the sum of subtotals by 0.01 ha due to rounding.

Portions of the two PCTs identified within the subject land are associated with Threatened Ecological Communities (TECs) as follows:

- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions Endangered Ecological Community (EEC) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) (associated with PCT 4028)
- NSW River-Flat Eucalypt Forest on Coastal Floodplains EEC (BC Act) (associated with PCT 4058)
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria Critically Endangered Ecological Community (CEEC) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (associated with PCT 4058).

No threatened flora were recorded within the subject land during targeted surveys.

Five threatened fauna species were recorded during surveys:

- *Miniopterus australis* (Little Bent-winged Bat) (Vulnerable, BC Act)
- *Miniopterus orianae oceanensis*), (Large Bent-winged Bat) (Vulnerable, BC Act)
- *Myotis macropus* (Southern Myotis) (Vulnerable, BC Act)
- *Ninox strenua* (Powerful Owl) (Vulnerable, BC Act)
- *Pteropus poliocephalus* (Grey-headed Flying Fox) (Vulnerable, BC Act; Vulnerable, EPBC Act).

Presence was assumed for one threatened fauna species, *Litoria aurea* (Green and Golden Bell Frog) (Endangered, BC Act; Vulnerable, EPBC Act), where suitable habitat occurred.

Impacts were assumed where the indicative Parramatta River construction area overlaps with the Important Habitat Map (IHM) for the following two species:

- *Calidris ferruginea* (Curlew Sandpiper) (Critically Endangered, BC Act; Critically Endangered, EPBC Act)
- *Limosa lapponica baueri* (Bar-tailed Godwit) (Vulnerable, BC Act; Endangered, EPBC Act).

There will be (IHM) impacts to one species at risk of Serious and Irreversible Impacts (SAII), *Calidris ferruginea* (Curlew Sandpiper).

Extensive measures were undertaken to avoid and minimise impacts to native vegetation, threatened species and overall biodiversity values. These measures included using trenchless technology horizontally directionally drilling pipeline beneath river crossings and wetlands, repurposing existing infrastructure, moving alignments to avoid native vegetation, and adjusting alignments to minimise impacts to native vegetation.

Where impacts could not be avoided, mitigation measures are proposed that would reduce adverse impacts on ecological values. These include preparation of a Construction Flora and Fauna Management Plan, appropriate sediment and erosion controls, avoiding and minimising removal of vegetation where practicable, site inductions, exclusion fencing, pre-clearance surveys and appropriate weed and hygiene protocols.

Residual impacts to native vegetation and threatened species within PCTs will be offset in accordance with the NSW BAM. A total of three (3) ecosystem credits are required to offset impacts to native vegetation and ecosystem credit species, and a total of eight (8) species credits are required to offset impacts to species credit species. It is intended to meet the credit obligation by purchasing and retiring biodiversity credits according to the offset rules or payment to the Biodiversity Conservation Fund.

Significant impact criteria assessments under the Commonwealth EPBC Act concluded that the project is unlikely to have a significant impact on any Matter of National Environmental Significance (MNES) including listed threatened species. No referral to the Commonwealth for assessment is required.

BAM (Stage 1): Biodiversity Assessment



1 Introduction

1.1 Proposed development

Arcadis has been engaged by Sydney Water Corporation (Sydney Water) to prepare this BDAR to meet the requirements of Section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act).

This BDAR has been prepared by Brendan Fletcher, an Accredited Person (BAAS 25005) to apply the Biodiversity Assessment Method (BAM) under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act). Its surveys and preparation were conducted with the oversight of Elijah Elias, Principal Ecologist/Accredited Assessor (BAAS 21012), reviewer and certifier. All credit calculations have been undertaken using the BAM Calculator in case number 00052103/BAAS21012/24/00052122 Revision 3. The BDAR has been prepared with consideration of the minimum requirements outlined in Table 25 of the BAM (DPIE, 2020a). The levels of survey and assessment conducted for this BDAR are considered sufficient for the project.

1.1.1 Development overview

Sydney Water is proposing to build and operate a new water resource recovery facility (WRRF) at Camellia-Rosehill. The new WRRF is needed to provide additional wastewater capacity to support growth across the northern suburbs of Sydney, and in the Greater Parramatta and Olympic Peninsula (GPOP) growth corridor. The WRRF and associated infrastructure together form the GPOP Water Cycle Management project (the project).

The additional growth would place pressure on the existing northern suburbs wastewater network, which includes the Northern Suburbs Ocean Outfall Sewer (NSOOS) and the North Head WRRF. These critical assets provide wastewater services to around 1.7 million people, and with current growth projections would reach capacity by 2031.

The GPOP WCM project has been designed to be efficient, sustainable, and cost effective for the community, as well as resilient and adaptable for future water uses.

The main elements of the project include:

- a new WRRF at Camellia-Rosehill to treat wastewater to produce advanced treated water
- upgrades to the existing pumping station at Camellia
- a new wastewater transfer pipeline from Camellia pumping station to the WRRF
- a new and repurposed brine pipeline to transfer brine from the WRRF to the NSOOS
- a new river release pipeline to transfer advanced treated water from the WRRF to a release structure in Parramatta River at Meadowbank.

1.1.2 Approvals pathway

The project is development that requires approval under Part 5, Division 5.2 (State Significant Infrastructure) of the *Environmental Planning & Assessment Act 1979* (EP&A Act). Under this State Significant Infrastructure (SSI) approval pathway, Sydney Water is required to lodge an Environmental Impact Statement (EIS), which must be accompanied by a BDAR. The requirement for a BDAR is prescribed in Section 7.9 of the BC Act and has also been specified by the Secretary's Environmental Assessment Requirements (SEARs) issued for this project.

The SEARs were issued on 24 September 2024 for the Greater Parramatta, Olympic Peninsula Water Cycle project (SSI 74258485). SEARs relating to biodiversity, and where they are addressed within this report, are listed in Table 1-1.

Table 1-1: SEARs for the project

Key issue	Requirement	Where addressed in this report
Biodiversity **The project design considers measures to avoid and minimise impacts on terrestrial and aquatic biodiversity.** **Offsets and / or supplementary measures are assured which are equivalent to residual impacts of project construction and operation**.	1) Prepare a Biodiversity Development Assessment Report (BDAR) that assesses biodiversity impacts in accordance with section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method 2020 (BAM).	All sections
	2) The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM.	Section 8 (Avoid and minimise impacts), Section 9 (Impact assessment), Section 10 (Mitigation of), Section 11 (Serious and Irreversible Impacts), Section 12 (Impact summary),Section 13
	3) The BDAR must include information in the form detailed in s6.12 of the BC Act, section 6.8 of the *Biodiversity Conservation Regulation 2017* (BC Regulation) and the BAM including details of the measures proposed to address the offset obligation as follows: a) the total number and classes of biodiversity credits required to be retired for the project b) the number of classes of like-for-like biodiversity credits proposed to be retired c) the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules d) any proposal to fund a biodiversity conservation action e) any proposal to make a payment to the Biodiversity Conservation Fund f) any staged retirement of credits based on when a development /activity that would impact on biodiversity values is carried out.	Section 12, (Impact summary), Section 13
	4) The BDAR must be submitted with all digital spatial data associated with the survey and assessment.	To be submitted with BAM case 00052103/BAAS21012/24/00052122.
	5) The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of Biodiversity Assessment Method Order 2017 under section 6.10 of the BC Act.	This BDAR has been prepared by Brendan Fletcher, an Accredited Person (BAAS 25005) to apply the BAM under the BC Act.

Key issue	Requirement	Where addressed in this report
	6) The BDAR must include details of the measures proposed to address offset obligations.	Section 12 (Impact summary), Section 13
	7) Impacts on biodiversity values not covered by the BAM must be assessed. This includes a threatened aquatic species assessment (under Part 7A of *Fisheries Management Act 1994* (FM Act)) to address whether there are likely to be any significant impact on listed threatened species, populations or ecological communities listed under the FM Act.	This SEAR is addressed in a separate aquatic ecology assessment (Stantec, 2025).
	8) Identify whether the project, or any component of the project, would be classified as a Key Threatening Process (KTP) in accordance with the listings in the BC Act, FM Act and the EPBC Act.	Section 9.1.10
	9) Assess the potential impacts to Key Fish Habitat and / or threatened species from the release of treated wastewater into the Parramatta River.	This SEAR is addressed in a separate aquatic ecology assessment (Stantec, 2025).
	10) Assess the potential impacts to Key Fish Habitat and / or threatened species from the release of brine to a wastewater system with an ocean outfall or demonstrate how the project will be consistent with the existing environment protection licence (EPL 378).	This SEAR is addressed in a separate aquatic ecology assessment (Stantec, 2025).
	11) Demonstrate how the design and construction of the project avoids, minimises and mitigates impacts to Key Fish Habitat.	This SEAR is addressed in separate aquatic ecology assessment (Stantec, 2025).
	12) Detail the measures for avoiding and/or minimising impacts on native riparian vegetation, including identification of buffer zones for waterway crossings.	Section 8 (Avoid and minimise impacts)

1.1.3 Location

The project is located within the City of Parramatta and Ryde local government areas (LGAs) and within the suburbs of Dundas, Rydalmere, Parramatta, Camellia, Rosehill, Silverwater, Newington, Sydney Olympic Park, Wentworth Point, Melrose Park and Meadowbank. The project crosses the Parramatta River north of Rosehill Gardens Racecourse via an existing pipe bridge, and south of Memorial Park via horizontal directional drilling (HDD). The project crosses the Duck River and Newington Nature Reserve Wetlands via HDD near Pierre de Coubertin Park. The location of the project is shown in Figure 1-1:.

The area in which the project is located, including the study area and subject land as defined below, can be described as a mixed residential, commercial and industrial area within an urban context. Native vegetation is present within the area of the project but is generally limited to riparian and waterfront areas, suburban and regional parks, and street trees.

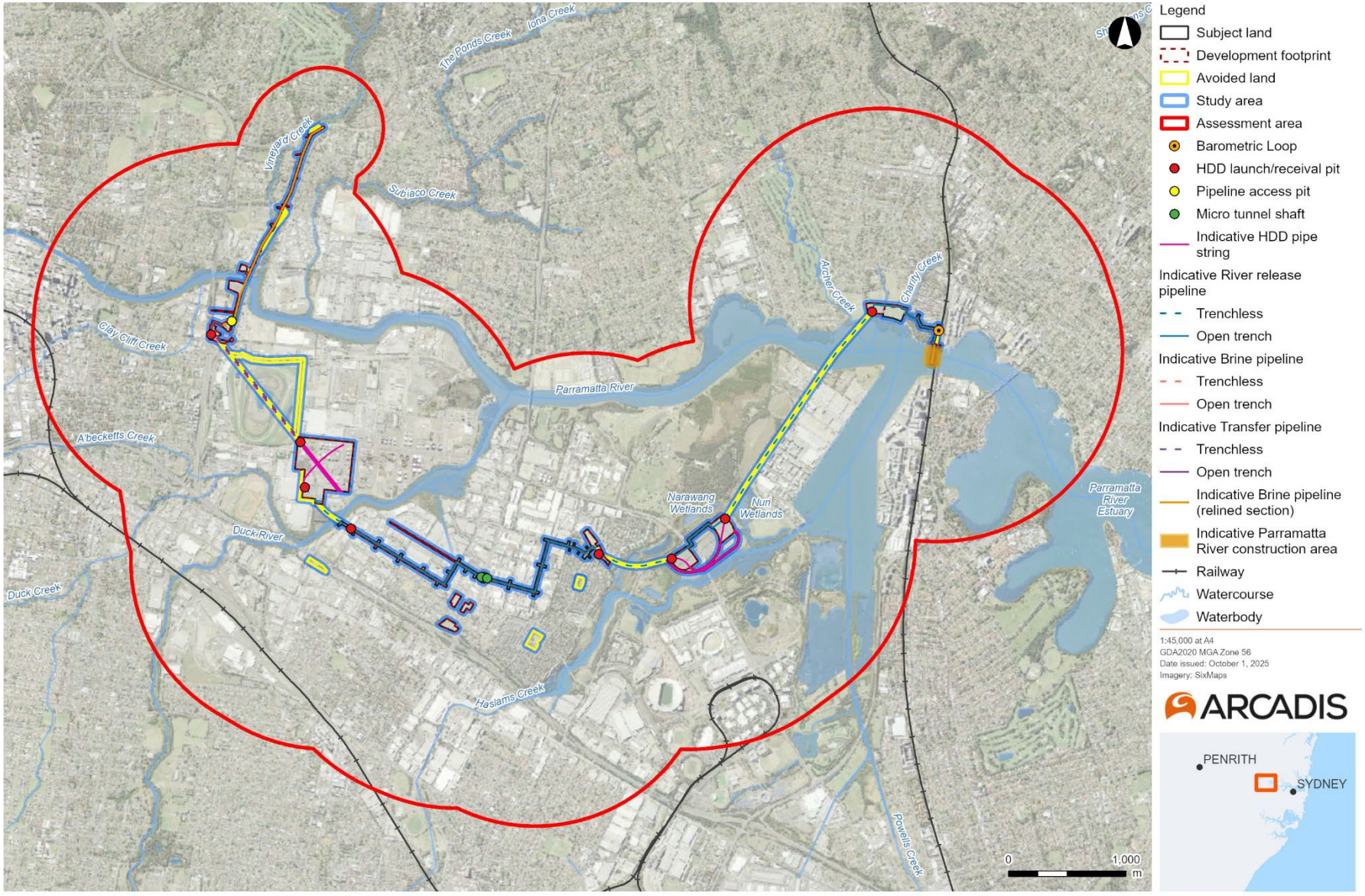


Figure 1-1: Site map

1.1.4 Study area and assessment area

The study area for the project is the area in which biodiversity surveys have been conducted. The assessment area, which is used to provide information on site context (Section 3), includes the subject land and a 1,500 m buffer surrounding the outside edge of the boundary of the subject land or 500 m along each side of the centre line of a linear-shaped proposal.

The study area encompasses the whole of the subject land, which includes pipeline alignments with above-ground impacts, the WRRF and construction compounds (all described below). The study area also includes areas that are under bored with horizontally directionally drilled pipeline alignments, which do not have impacts on surface vegetation, and areas considered for development during the project planning process and subsequently excluded from the development footprint and subject land. The portions of the study area that have been excluded from the subject land have been surveyed and are described in this BDAR, including in Section 8 on avoidance and minimisation measures, but are not included within the assessment of direct impacts.

The study area is 65.93 ha in extent and is shown in Figure 1-1. The assessment area is also shown in Figure 1-1.

1.1.5 The subject land, development footprint and avoided land

The BAM (DPIE, 2020a) defines the subject land as 'land subject to a development, activity, clearing, biodiversity certification or a biodiversity stewardship proposal'. The subject land is equivalent to the term 'impact assessment area' used in the EIS for the project, which refers to the maximum area that would be impacted by the project and within which Sydney Water wishes to have flexibility in planning approvals to have impacts. For the purpose of calculating credits, this BDAR assumes that all native vegetation within the subject land will be cleared. However, as a practical matter, this overstates impacts, as Sydney Water will seek to avoid direct impacts on native vegetation where compatible with construction requirements.

The subject land boundary includes all areas in which construction activities will take place, including temporary construction compounds and ancillary facilities. The operational footprint of the project is considerably smaller than the construction footprint, as once constructed the project will largely consist of underground pipelines running between the proposed WRRF and an upgraded Camellia pumping station. All areas within the operational footprint are included within the subject land.

For the linear portions of the project, i.e. the pipeline alignments, the subject land generally consists of an area approximately 10 m to either side of the centreline of an indicative pipeline alignment (Figure 1-1:, Figure 1-2 through Figure 1-10). The 20 m buffer has been established as a precautionary matter, but construction impacts may not extend to all portions of the 20 m width.

For the non-linear portions of the project, including the Camellia pumping station upgrade and the proposed WRRF, the subject land encompasses the site of the facility and surrounding areas required for construction, including 31 construction compounds. The subject land also includes small extensions from the pipeline alignments that may be needed for ancillary facilities.

The BAM defines the development footprint for a project as 'the area of land that is directly impacted by a proposed development'. The development footprint is equivalent to the term 'impact area' used in the EIS for the project, which refers to the area in which it is anticipated that the actual impacts of the project are likely to occur. For the purpose of calculating credits, this BDAR assumes that all native vegetation within the development footprint will be cleared. However, as a practical matter, this overstates impacts, as Sydney Water will seek to avoid direct impacts on native vegetation where compatible with construction requirements.

This BDAR also maps avoided land, which is land that lies within the study area but where impacts have been avoided through horizontally directionally drilling pipeline beneath river crossings and wetlands, moving

alignments to avoid native vegetation or other means. Avoided land is shown in Figure 1-1: and Figure 1-2 through Figure 1-10.

The extent of the subject land for the project is 50.53 ha. The extent of the development footprint is 43.92 ha.

1.1.6 Detailed description of project alignment

To facilitate describing the assessment and impacts of this spatially extensive infrastructure, components and the proposed alignment of the project are described in detail below, from west to east.

Segment 1 (Figure 1-2)

- The brine pipeline in this segment (between the NSOOS and the Camellia pumping station) repurposes an existing wastewater pipeline by relining it. Most of the pipeline is below ground, except where it crosses above Parramatta River on a pipe bridge.
- The brine pipeline between Camellia pumping station and the NSOOS runs from the Camellia pumping station to the south side of Kissing Point Road in Dundas. There is a small construction compound at the commencement of the alignment (C1). The brine pipeline in this section (and Segment 2) will involve relining an existing rising main, with excavation pits dug along the alignment to facilitate these works.
- The brine pipeline alignment turns from Kissing Point Road to run south along Rippon Avenue. At the turn from Kissing Point Road, there are two small construction compounds (C2 and C3).
- A small construction compound (C4) extends to the west along Anderson Avenue from Rippon Avenue.
- There is a small construction compound (C5) along a sidewalk between Rippon Avenue and the Yallamundi Light Rail Stop, just to the north of Anna Maria King Park.

Segment 2 (Figure 1-3)

- Two moderately sized construction compounds (C6 and C7) are located on the embankments to the north and south of Victoria Road, south of the southern terminus of Rippon Avenue.
- From the south embankment of Victoria Road, the brine pipeline alignment runs south along a service drive, through a carpark and then crosses Vineyard Creek. There is a moderately sized construction compound (C8) in mown lawn on the campus of the Western Sydney University (WSU) just south of Vineyard Creek.
- The brine pipeline alignment runs south along Railway Street on the WSU campus. There are small construction compounds between Railway Street and the Parramatta Light Rail (C9) and in a carpark south of WSU Early Learning Parramatta (C10).
- A large construction compound is located within a maintained lawn area of WSU just north of the Parramatta River (C11).
- For the crossing of Parramatta River, the existing pipeline over Parramatta River, attached to the railway crossing bridge, will be used.
- There is a large construction compound on the south bank of the Parramatta River in an industrial area (C12).

Segment 3 (Figure 1-4)

- South of the Parramatta River, the repurposed brine pipeline continues to run south alongside the railway alignment to the location of the upgraded Camellia pumping station (C15). There is a long linear construction compound extending west from the brine pipeline alignment (C13).
- From the Camellia pumping station to the south there is an open-trenched alignment for the transfer pipeline diverting wastewater from Camellia pumping station to the WRRF, and the brine pipeline. The transfer and brine alignment cross Grand Avenue North. There is a large construction compound north of Grand Avenue (C16) as well as a smaller construction compound attached (C14).
- Within C16 there is a launch/receival site for HDD. The transfer and brine pipeline alignment will be drilled (HDD) in a southeasterly direction underneath Rosehill Gardens Racecourse to avoid impacts to the racecourse operations, and existing services and planted native vegetation surrounding it.

Segment 4 (Figure 1-5)

- The new WRRF is located immediately southeast of Rosehill Gardens Racecourse (C17).
- The river release pipeline (which carries advanced treated water to the release area in the Parramatta River) runs from the WRRF in a south-easterly direction beneath Duck River. The launch pit for the HDD alignment under the Duck River is located within the WRRF site.
- The HDD alignment emerges from underneath the Duck River at an exit pit located on Carnarvon Street.
- From this exit pit, the river release pipeline will be open-trenched east along Carnarvon Street. A construction compound (C18) is located at this point.

Segment 5 (Figure 1-6)

- The river release pipeline alignment turns north for one block on Vore Street, then turns east again on Derby Street. There is a linear extension for a construction compound (C19) extending west from the junction of Vore and Derby Streets.
- The river release pipeline alignment will be drilled (HDD) under Silverwater Road to avoid traffic impacts. There are small subject land extensions to the north and south of the river release pipeline alignment on Silverwater Road. There are two construction compounds along Silverwater Road (C20 and C21). After emerging on the east side of Silverwater Road, the open-trenched river release pipeline alignment continues along Derby Street to Day Street, with small subject land extensions to the north and the south at Wetherill Street and extensions at the junction of Derby and Day Streets.
- From Day Street the open-trenched river release pipeline alignment runs north and turns east at Fariola Street.
- There are three construction compounds away from the main alignment where there will be laydown areas and ancillary facilities (C22, C23, C24).

Segment 6 (Figure 1-7)

- The river release pipeline alignment continues east along Fariola Street and Comaneci Avenue. There are small subject land extensions to the north and south of Comaneci Avenue and where Comaneci Avenue and Newington Boulevard intersect.
- The open-trenched alignment turns to the northeast along Newington Boulevard for a short distance, then enters Pierre de Coubertin Park. There are construction compounds within Pierre de Coubertin Park (C25 and C26).
- The HDD pit for drilling underneath the Narawang Wetlands is located within Pierre de Coubertin Park. The HDD alignment will cross underneath the Narawang Wetlands adjacent to the Holker Street Bridge.
- After crossing under the Narawang Wetlands, the HDD alignment emerges at the HDD pit within the carpark to the southwest of Urbnsurf (C27).

Segment 7 (Figure 1-8)

- Two HDD pipe strings will be laid within C27, on along the access road directly south of the P5 carpark and one to the slightly further south, adjacent to the native vegetation along Haslam's Creek.
- The river release pipeline alignment will be open-trenched from the carpark to the southwest of Urbnsurf (C27), cross the Holker Busway, and continue northeast along Hill Road to the north of Urbnsurf.
- In the P5 carpark northeast of Urbnsurf, another launch pit will be located to allow for further HDD (C27). The HDD alignment will run northeast underneath the Nuri Wetlands.

Segment 8 (Figure 1-9)

- The HDD alignment continues north from beneath the Nuri Wetlands to run northeast under Hill Road. The HDD alignment will cross the Parramatta River at a depth of about 20 m.

Segment 9 (Figure 1-10)

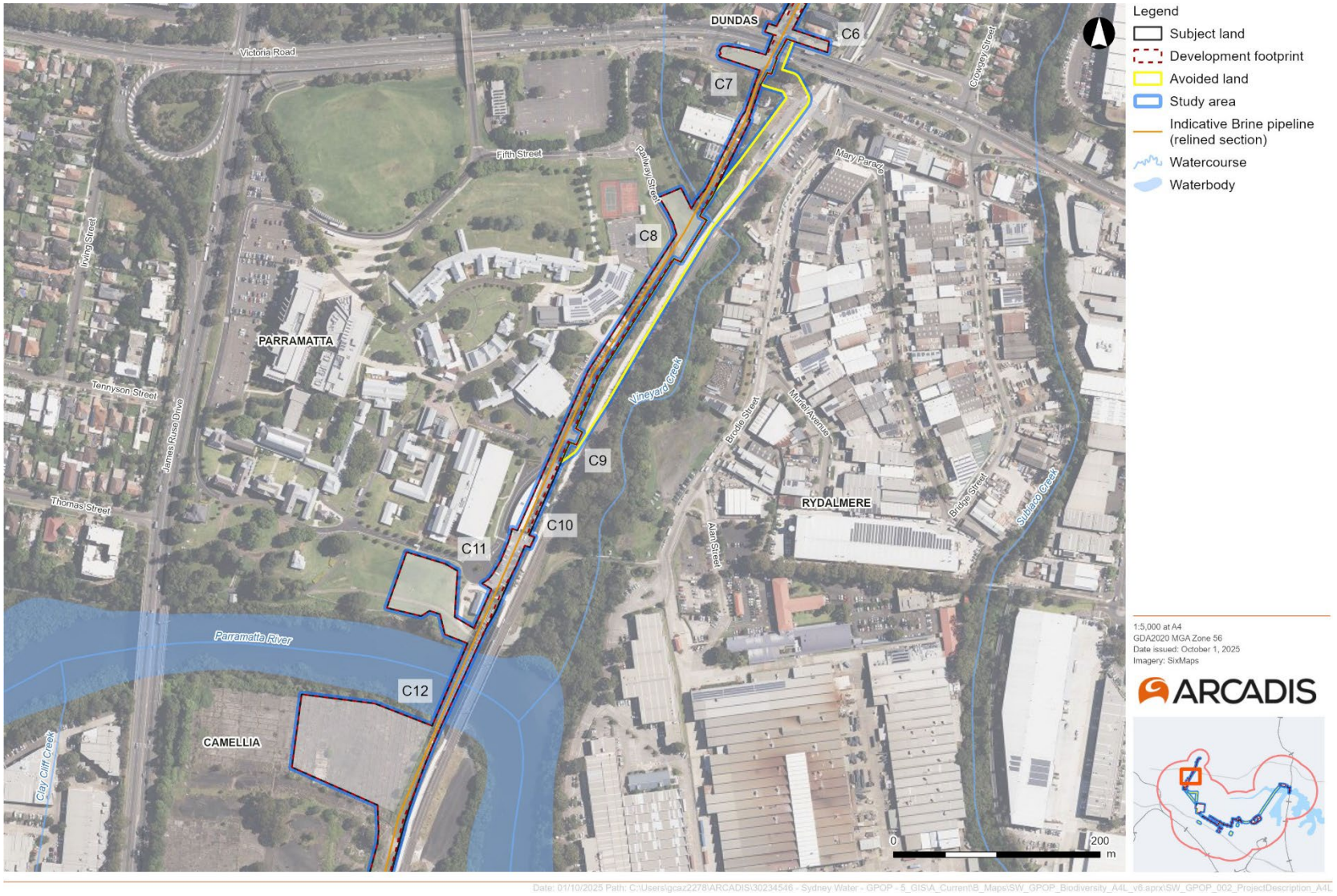
- The HDD pit for the HDD alignment after it crosses the Parramatta River is located within a sporting field in Meadowbank Park (C28). The alignment is then open-trenched in an easterly direction through

Meadowbank Park. The alignment across the unnamed channel in Meadowbank Park and Charity Creek would be above ground.

- From the eastern bank of Charity Creek, the open-trench river release pipeline alignment runs along a cleared area between apartment blocks to the north and native vegetation in Memorial Park to the south.
- At Meadow Crescent, the open-trenched alignment follows the Meadow Crescent street alignment almost to the north-south railway to the east of Memorial Park.
- Just to the west of the railway, the open-trenched river release pipeline alignment turns south to run through Memorial Park to the Parramatta River. The river release pipeline splits into eight parallel smaller pipelines below ground at Memorial Park. The eight pipes enter the Parramatta River at the carpark to the west of the John Witton Bridge and extend between 75 and 130 metres into the river. The discharge point for the river release pipeline has been designed to ensure mixing of advanced-quality treated water with Parramatta River water at a range of river heights.
- There are three small construction compounds near the John Whitton Bridge (C29, C30 and C31).



Figure 1-2: Segment 1



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Figure 1-3: Segment 2

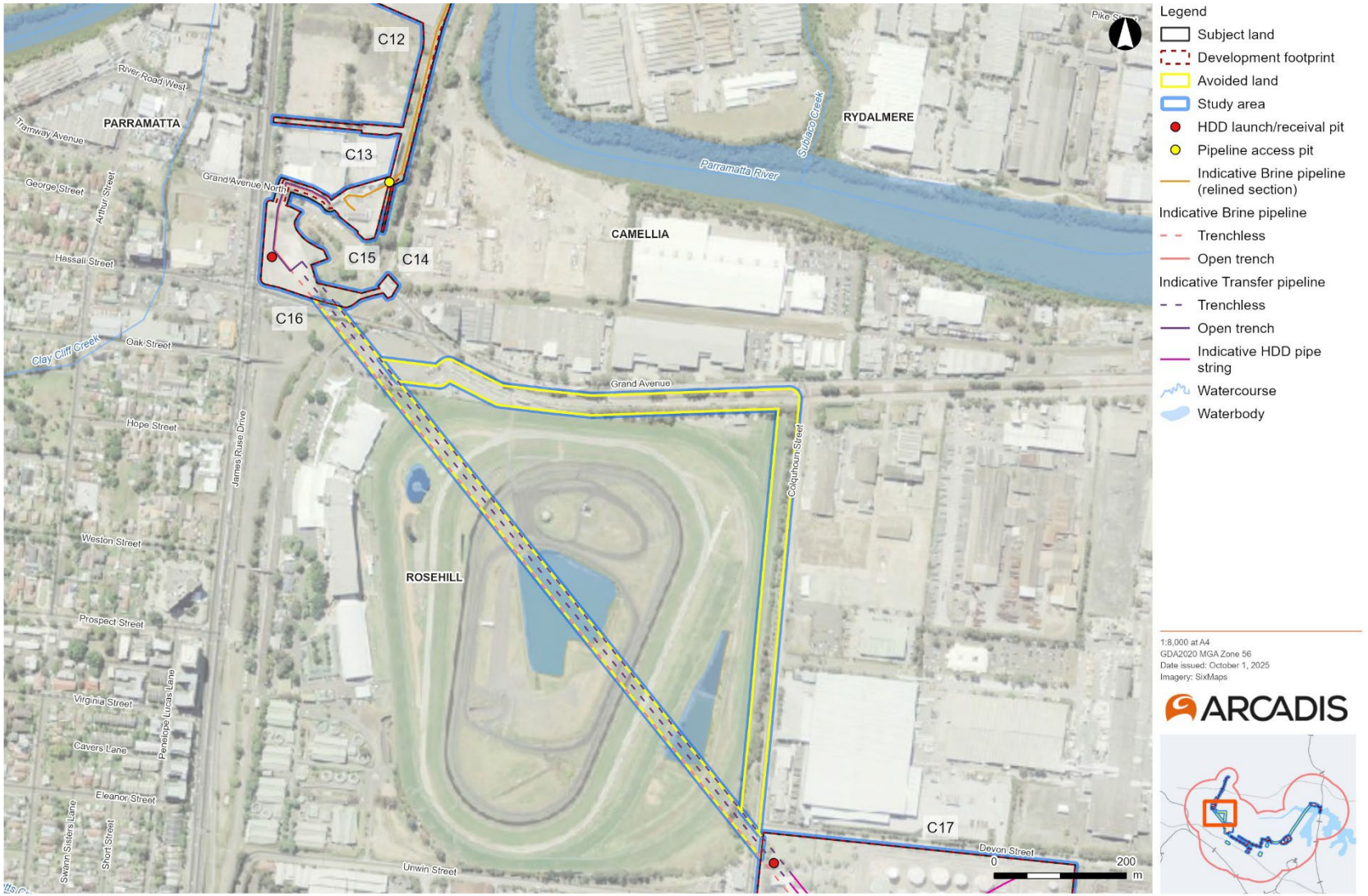


Figure 1-4: Segment 3

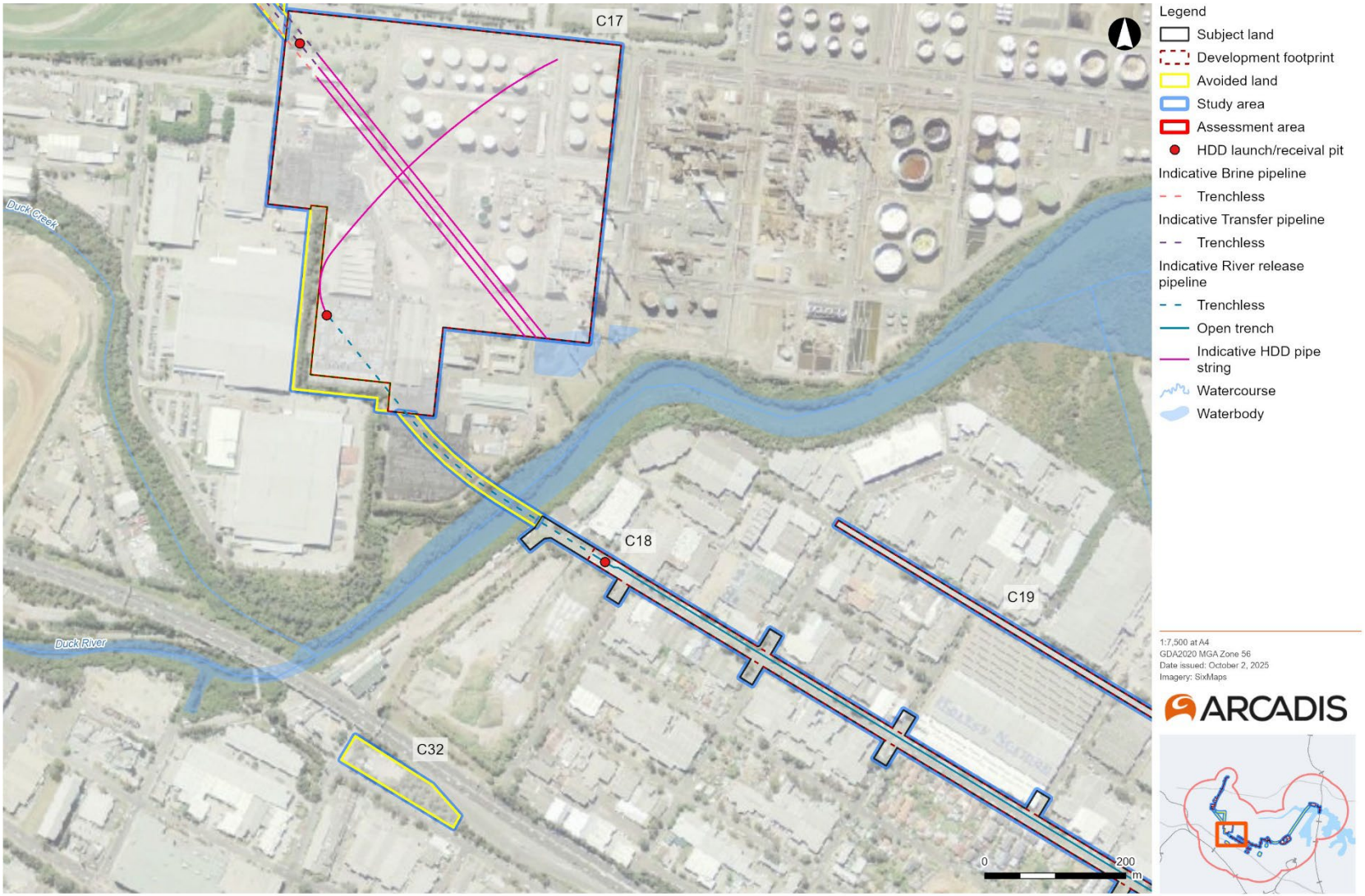


Figure 1-5: Segment 4

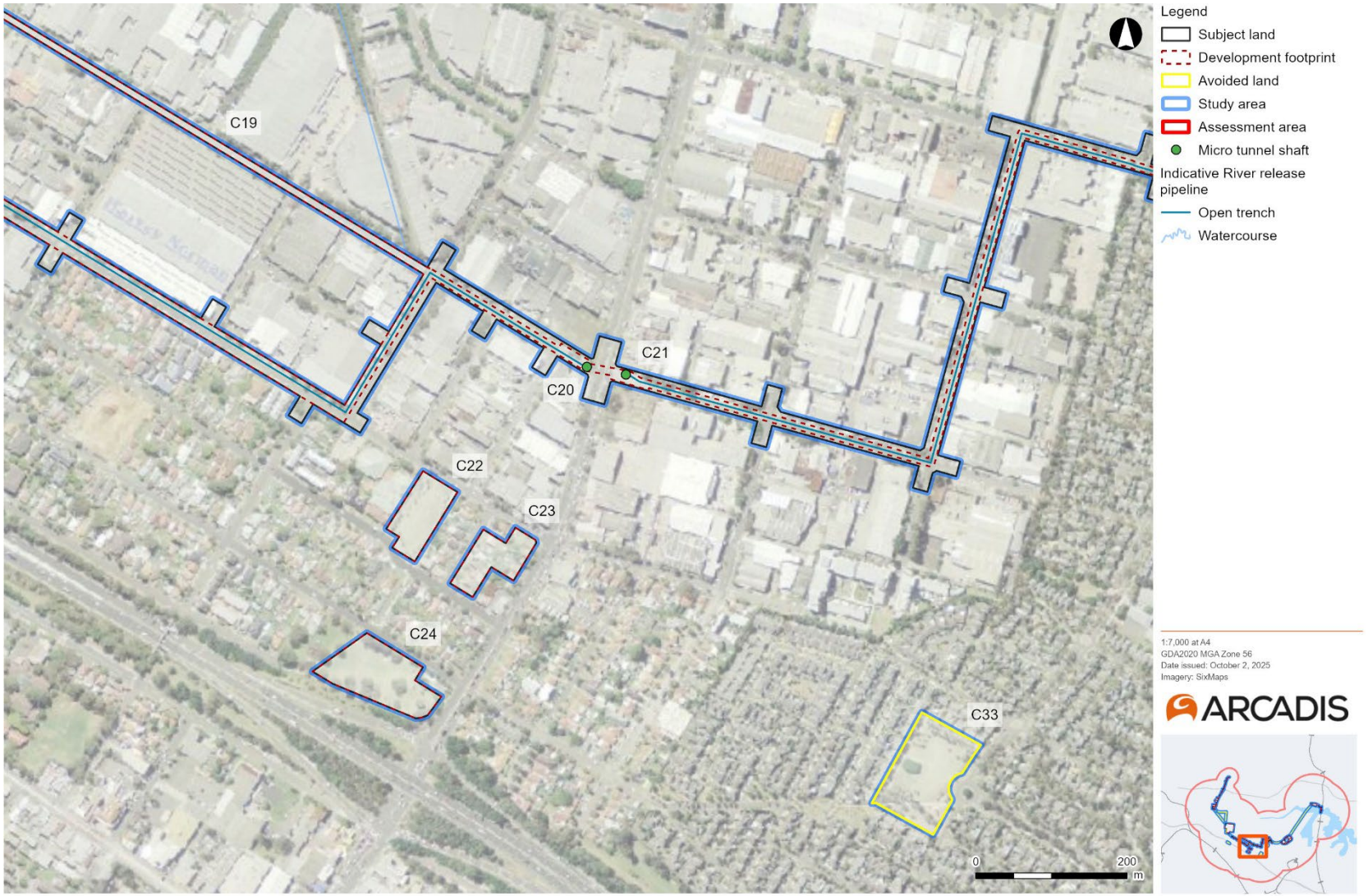
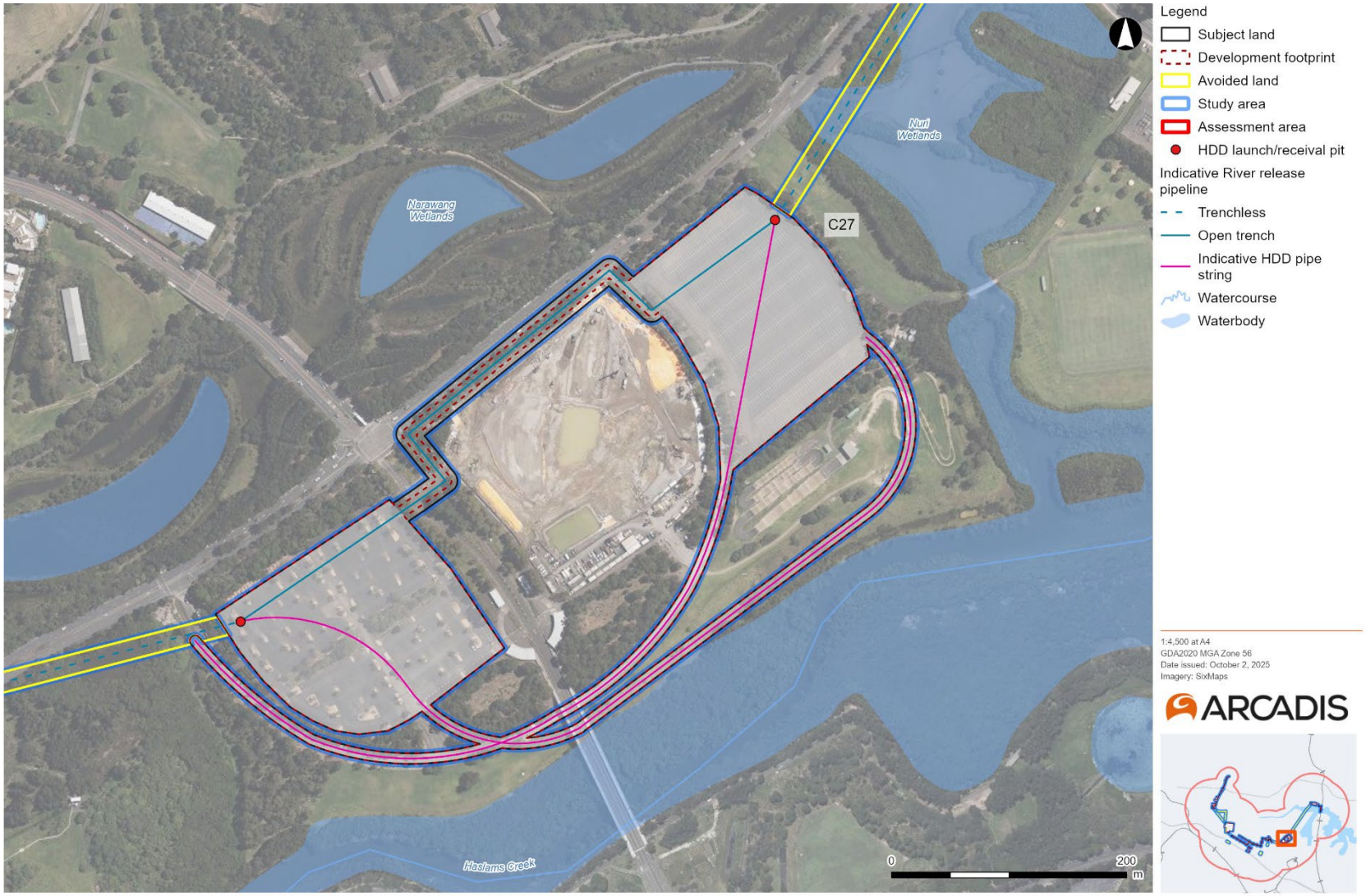


Figure 1-6: Segment 5



Figure 1-7: Segment 6



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Figure 1-8: Segment 7



Figure 1-9: Segment 8

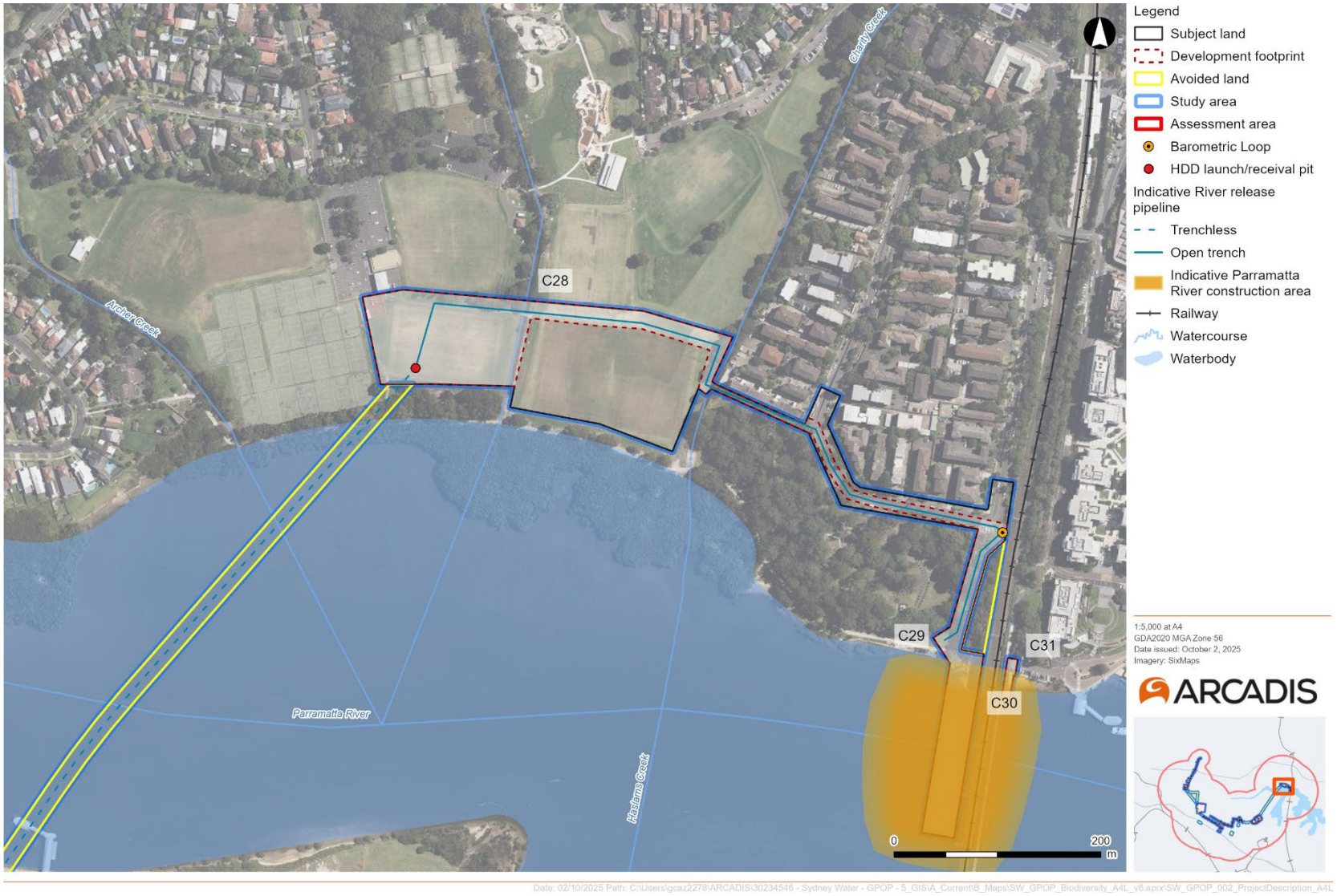


Figure 1-10: Segment 9

1.2 Biodiversity Offsets Scheme trigger

Under Section 7.9 of the BC Act, an application for approval to carry out State Significant Infrastructure under the EP&A Act must be accompanied by a BDAR, unless the Planning Agency Head and Environment Agency Head determine that the project will not have a significant impact on biodiversity values. No such determination has been made for this project. Accordingly, this BDAR has been prepared.

1.3 Excluded impacts/impacts not assessed under BDAR

This BDAR assesses the impacts of the clearing of native vegetation and the loss of habitat, as provided in Section 6.3(a) of the BC Act, and the impacts of actions of the project that are prescribed by regulation, as provided in Section 6.3(b) of the BC Act. Except as otherwise noted in Sections 6, 8.4 and 9.1.7, impacts to aquatic ecosystems within the Parramatta River are not assessed (excluded) within this report, as these are assessed within the GPOP Aquatic Ecology Impact Assessment (Stantec, 2025).

1.4 Matters of National Environmental Significance

A search of the EPBC Protected Matters Search Tool (PMST) was undertaken to identify any MNES within 10 km of the subject land (Appendix A). The following MNES were identified as reasonably likely to occur within the subject land:

- one Threatened Ecological Communities (TECs)
- eight threatened species
- 25 migratory species.

Assessments of Significance were done for these MNES (Appendix B). The Assessments of Significance all concluded that the project was unlikely to have a significant impact on the MNES. For this reason, an EPBC referral application is not recommended for impacts to terrestrial biodiversity. Impacts to MNES that occur within the Parramatta River are assessed within (Stantec, 2025).

The identification of the MNES for assessment are described in Section 7. Impacts to MNES are described in Section 9.1.8.

1.5 Information sources

The following publicly available documents were sourced and considered as part of this assessment:

- Biodiversity Assessment Methodology (BAM) (DPIE, 2020a)
- Biodiversity Assessment Methodology Calculator (BAM-C) (NSW DCCEEW, 2025a)
- NSW Soil and Land Information eSPADE (DPIE, 2025a)

The following vegetation mapping dataset (s) were reviewed and considered:

- State Vegetation Type Map (SVTM) (NSW DCCEEW, 2024a)

Additionally, database searches were undertaken as listed in Table 1-2:.

Table 1-2: Description of database searches

Database	Purpose of search	Date of database search
NSW BioNet Wildlife Atlas (NSW DCCEEW, 2024b)	Used to compile a list of threatened species records listed under the BC Act to within 10 km of the subject land (Appendix D)	15 October 2024

Managed by the NSW Department of Climate Change, Energy, the Environment and Water		
Protected Matters Search Tool (DCCEEW, 2024a) ***Managed by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW)***	Used to compile a list of potentially occurring MNES listed under the EPBC Act to within 10 km of the subject land (Appendix A)	15 October 2024
NSW BioNet Vegetation Classification (NSW DCCEEW, 2025b) ***Managed by the NSW Depatrment of Planning and Environment (DPE)***	Provides information on PCTs and their relationship to a vegetation formation and vegetation class (managed and maintained in the Vegetation Information Systems (VIS) Classification database).	Throughout the preparation of this BDAR
NSW BioNet Threatened Biodiversity Data Collection (TBDC) (NSW DCCEEW, 2025c) ***Managed by DPE***	Contains information for all listed threatened species, populations, and communities.	Throughout the preparation of this BDAR
NSW WeedWise (DPI, 2025a) ***Managed by DPI***	Identifies species listed as priority weeds for a LGA and their control requirements.	20 January 2025
Fisheries NSW Spatial Data Portal (DPI, 2025b) ***Managed by DPI***	Maps threatened fish species distribution in NSW.	20 January 2025

1.6 Legislative context

Field surveys and the preparation of this assessment have been undertaken in accordance with, or with reference to, the legislative acts and guidelines listed within this section. All work was carried out under the appropriate licenses, including scientific licenses as required under Section 2 of the BC Act (license number SL100646) and in accordance with the Animal Ethics Committee (AEC) (licence TRIM 13/339).

Table 1-3: Summary of legislative context

Legislation	Relevance to the project
Biodiversity Conservation Act 2016	The purpose of the BC Act is to maintain a healthy, productive, and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act seeks to establish a framework for assessment and offsetting of development impacts as well as investment in biodiversity conservation, specifically: • The NSW Biodiversity Offsets Scheme (BOS) (established under Part 6 of the BC Act) • The BAM (established under Section 6.7 of the BC Act) • The Biodiversity Assessment Requirements (established under Division 2 of Part 7 of the BC Act). Under the NSW BOS, an accredited assessor must apply the BAM in assessing the proposed impacts of the development. The purpose of the BAM is to assess certain impacts on threatened species and Threatened Ecological Communities (TECs), and their habitats, and the impact on biodiversity values, where required under the BC Act. This BDAR has been developed in accordance with the requirements of the Act.
Environment Protection and Biodiversity	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important

Conservation Act 1999	flora, fauna, ecological communities, and heritage places, defined in the EPBC Act as MNES. MNES identified in the Act include: • World heritage properties • National heritage places • Wetlands of international importance (listed under the Ramsar Convention) • Threatened species and communities • Migratory species protected under international agreements • Commonwealth marine areas • The Great Barrier Reef Marine Park • Nuclear actions (including uranium mines) • Water resources (that relate to unconventional gas development and large coal mining development). In accordance with Sections 67 and 67A of the EPBC Act, any works that have the potential to result in a significant impact on any MNES or on Commonwealth land are considered 'controlled actions' and require a referral to the Federal Minister for the Environment for approval. Consideration of the potential for the project to result in a significant impact to MNES has been addressed in Section 9.1.8 of this report.
Biosecurity Act 2015	The primary objective of the Biosecurity Act 2015 is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers, or potential carriers. Division 2 of the Biosecurity Act 2015 defines local control authorities for weeds. Schedule 1 of the Biosecurity Act 2015 outlines special provisions relating to weeds, including the duty of land occupiers to control and manage weeds.
Fisheries Management Act 1994	The *Fisheries Management Act 1994* (FM Act) provides for the identification, conservation and recovery of threatened fish, aquatic invertebrates and marine vegetation listed under Schedules 4, 4A and 5 of the Act. The FM Act also covers the identification and management of Key Threatening Processes (which affect threatened species or could cause other species to become threatened). If a planned development or activity is likely to have any impact on a threatened species listed under the FM Act, an Assessment of Significance as described under Part 7A: Division 12 must be undertaken. If the impacts are likely to be significant, or if critical habitat is affected, a Species Impact Statement must be prepared. Section 199 (Part 7: Division 3) of the FM Act states that consultation with the Minister must be undertaken by a public authority prior to carrying out dredging or reclamation works. Under the FM Act, dredging or reclamation works include the following: • Dredging work – excavation or removal of material from water land • Reclamation work – using any materials to fill in water land or depositing materials for construction of anything on water land (e.g., bridge) or draining of water from water land for the purposes of reclamation. Aquatic ecology impacts are assessed in (Stantec, 2025).
Biodiversity Assessment Method requirements	The BAM (DPIE, 2020a) is the assessment manual that outlines how an accredited person assesses impacts on biodiversity at subject land. The BAM provides: • A consistent method for the assessment of biodiversity on a proposed development or major proposal, or clearing site • Guidance on how a proponent can avoid and minimise potential biodiversity impacts • The number and class of biodiversity credits that need to be offset to achieve a standard of 'no net loss' of biodiversity. An accredited assessor must document the results of the BAM in a BDAR. The BDAR identifies how the proponent proposes to avoid and minimise impacts, any potential impact that could be characterised as serious and irreversible (according to specified principles) and

	the offset obligation required to offset the likely biodiversity impacts of the development or clearing proposal, expressed in biodiversity credits. The requirements for a BDAR are listed in Appendix 10 (Table 25 and Table 26) of the BAM and in Table 1-4:.

1.7 BAM information requirements

Table 1-4: Minimum information requirements for BDAR (DPIE, 2020a)

Section	Biodiversity Assessment Method requirement Information to be included	Where addressed
Introduction	Brief description of the proposal	Section 1.1.1
	Identification of subject land boundary including: • Operational footprint Construction footprint indicating clearing associated with temporary construction facilities and infrastructure.	Figure 1-1:
	General description of subject land	Sections 1.1.3, 1.1.5
	Sources of information used in the assessment, including reports and spatial data.	Section 1.5
	Identification and justification for entering the BOS	Section 1.2
Landscape	Identification of site context components and landscape features, including: • general description of subject land topographic and hydrological setting, geology and soils	Section 3.1 and 3.2
	• percent native vegetation cover in the assessment area	Section 3.3
	• IBRA bioregions and subregions	Section 3.2
	• rivers and streams classified according to stream order	Section 3.2
	• wetlands within, adjacent to and downstream of the site	Section 3.2
	• connectivity of different areas of habitat	Section 3.2
	• karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features	Section 3.2
	• areas of outstanding biodiversity value occurring on the subject land and assessment area	Section 3.2
	• any additional landscape features identified in any SEARs for the proposal	n/a
	• NSW (Mitchell) landscape on which the subject land occurs	Section 3.2
	• details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover	Section 2.1
Native vegetation	Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery.	Sections 4.2.1, 4.2.4, 4.3
	Provide justification for all parts of the subject land that do not contain native vegetation	Section 4.2.1
	Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area	Section 4.1

	Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Section 2.2
	Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data	n/a
	For each PCT within the subject land, describe: • PCT name and ID • Vegetation class • Extent (ha) within subject land • Evidence used to identify a PCT including any analyses undertaken, references, existing vegetation maps • Plant species relied upon for identification of the PCT and relative abundance of each species • If relevant, TEC status including evidence used to determine vegetation is the TEC Estimate of per cent cleared value of PCT	Section 4.3
	Describe the vegetation integrity assessment of the subject land, including: • Identification and mapping of vegetation zones • Description of vegetation zones within the subject land • Area (ha) of each vegetation zone • Assessment of patch size • Survey effort Use of relevant benchmark data from BioNet Vegetation Classification	Section 3.4, 4.3, 4.5
	Where use of more appropriate local benchmark data is proposed: • Identify the PCT or vegetation class for which local benchmark data will be applied • Identify published sources of local benchmark data • Describe methods of local benchmark data collection • Provide justification for use of local data rather than BioNet Vegetation Classification benchmark values Provide written confirmation from the decision-maker that they support the use of local benchmark data	n/a
Threatened species	Identify ecosystem credit species likely to occur on the subject land, including: • List of ecosystem credit species derived from the BAM-C • Justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy • Justification for addition of any ecosystem credit species to the list	Section 5.2.1
	Identify species credit species likely to occur on the subject land, including: • List of species credit species derived from the BAM-C • Justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy • Justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends • Justification for addition of any species credit species to the list	Section 5.2.2
	From the list of candidate species credit species, identify: • Species assumed present within the subject land (if relevant)	Section 5.4

• Species present within the subject land on the basis of being identified on an important habitat map for a species • Species for which targeted surveys are to be completed to determine species presence • Species for which an expert report is to be used to determine species presence	
Present the outcomes of species credit species assessments from: • Threatened species survey • Expert reports (if relevant) including justification for presence of the species and information used to make this determination	Section 5.4
Where survey has been undertaken include detailed information on: • Survey method and effort • Justification of survey method and effort if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published • Timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys • Survey personnel and relevant experience • Describe any limitations to surveys and how these were addressed/overcome	Details and experience of author/s and contributors in the frontmatter to this BDAR, Section 5.3
Where an expert report has been used in place of survey include: • Justification of the use of an expert report • Identify the expert, provide evidence of their expert credentials and departmental approval of expert status • All requirements of Box 3 have been addressed in the expert report	n/a
Where use of local data is proposed • Identify relevant species • Identify data to be amended • Identify source of information for local data, e.g. published literature, additional survey data, etc • Justify use of local data in preference to VIS Classification or TBDC data • Provide written confirmation from the decision-maker that they support the use of local data	n/a
Species polygon completed for species credit species present within the subject land ensuring that: • The unit of measure for each species is documented • For species assessed by area: – the polygon includes the extent of suitable habitat for the target species within the subject land – a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied • For species assessed by counts of individuals: – the number of individual plants present on the subject land – the method used to derive this number and evidence-based justification for the approach taken – the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	Section 5.4.2

	Identify the biodiversity risk weighting for each species credit species identified as present within the subject land	
Prescribed impacts	Identify potential prescribed biodiversity impacts on threatened entities, including: • Karst, caves, crevices, cliffs, rocks and other geological features of significance • Occurrences of human-made structures and non-native vegetation • Corridors or other areas of connectivity linking habitat for threatened entities • Waterbodies or any hydrological processes that sustain threatened entities • Protected animals that may use the proposed wind farm development site as a flyway or migration route • Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community • Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts • Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns	Section 6
	Where the proposed development is for a wind farm: • Identify a candidate list of protected animals that may use the development site as a flyway or migration route, including resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area • Provide details of targeted survey for candidate species of wind farm developments • Predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species	n/a
	Where the proposal may result in vehicle strike: • Identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	Sections 6, 8.4, 9.1.7
Avoid and minimise impacts	Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative: • Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology • Routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route • Alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location • Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	Section 8
	Describe efforts to avoid and minimise impacts to biodiversity values through proposal design	Section 8.3

	Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal	Sections 8.1 and 8.2
	Detail measures or options considered but not implemented because they are not feasible and/or practical	Section 8.5
Assessment of impacts	Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat	Section 9
	Assessment of indirect impacts on vegetation and threatened species and their habitat including: • Description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal • Documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications • Reporting any limitations or assumptions, etc. made during the assessment • Identification of the threatened entities and their habitat likely to be affected	Section 9.1.6
	Assessment of prescribed biodiversity impacts including: • Assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with: – karst, caves, crevices, cliffs, rocks and other features of geological significance – human-made structures – non-native vegetation – connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range – movement of threatened species that maintains their life cycle – water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities • Assessment of the impacts of wind turbine strikes on protected animals • Assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC • Evaluate the consequences of prescribed impacts • Describe impacts that are uncertain • Document limitations to data, assumptions and predictions	Sections 9.1.7, 9.1.8
Mitigation and management of impacts	Identification of measures to mitigate or manage impacts including: • Techniques, timing, frequency and responsibility • Identify measures for which there is risk of failure • Evaluate the risk and consequence of any residual impacts • Document any adaptive management strategy proposed	Section 10
	Identification of measures for mitigating impacts related to: • Displacement of resident fauna • Indirect impacts on native vegetation and habitat • Mitigating prescribed biodiversity impacts	Section 10
	Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain	Section 10
Impact summary	Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts including:	Section 11

	• Addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land • For each TEC, report the extent of the TEC in NSW • Addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land • For each threatened species, report the population size in NSW • Documenting assumptions made and/or limitations to information • Documenting all sources of data, information, references used or consulted Clearly justifying why any criteria could not be addressed	
Impact summary	Identification of impacts requiring offset	Section 11, Section 12
	Identification of impacts not requiring offset	Section 11, Section 12
	Identification of areas not requiring assessment	Section 11, Section 12
	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including: • Future vegetation integrity score for each vegetation zone within the subject land • Change in vegetation integrity score • Number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land • Biodiversity risk weighting for each Number of required species credits for each candidate threatened species that is directly impacted on by the proposal	Section 12.1
Biodiversity credit report	Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified	Appendix E
	BAM credit report in pdf format	Appendix E

2 Methods

The following section describes the methods used for database and field investigations.

2.1 Site context methods

2.1.1 Landscape features

Landscape features which are required to be identified by Section 3.1.3 of the BAM were initially retrieved from datasets held by NSW SEED (Sharing and Enabling Environmental Data in NSW) (NSW Government, 2025) and relevant government websites:

- Interim Biogeographic Regionalisation for Australia (IBRA) regions and subregions were identified using the Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Subregions) dataset (DCCEEW, 2025a) in NSW SEED.
- Rivers, streams, estuaries and wetlands were identified using the NSW Hydrography dataset (DCS, 2025) in NSW SEED.
- Groundwater Dependent Ecosystems (GDEs) were identified using the Spatial Layer of Probable Vegetation Groundwater Dependent Ecosystems in NSW dataset (NSW DCCEEW, 2022a) in NSW SEED.
- Habitat connectivity was described by the assessor using native vegetation cover mapping accessed as described in Section 2.1.2.
- Karst, caves, cliffs, rocks and other geological features of significance were identified in the first instance from the NSW Topo basemap within the NSW SEED Map (NSW Government, 2025).
- Areas of outstanding biodiversity value were identified from the Areas of Outstanding Biodiversity Value Register (NSW DCCEEW, 2025f).
- NSW (Mitchell) landscapes were identified from the NSW (Mitchell) landscapes, version 3.1 dataset (NSW DCCEEW, 2016a) in NSW SEED.
- Soil landscape types and soil hazards were identified using the Soil Landscapes of Central and Eastern NSW dataset (NSW DCCEEW, 2024c) in NSW SEED and soil profiles contained within eSpade version 2.2 (DPIE, 2025a).

For physical landscape features such as caves, cliffs and geological features, desktop research was ground-truthed through field survey. Rapid Assessment Points (RAPs), vegetation assessments and random meanders were used to incidentally observe and validate landscape features while the broader area was surveyed.

2.1.2 Native vegetation cover

The SVTM (NSW DCCEEW, 2024a) was used to initially assess native vegetation cover in the subject land and assessment area (Figure 2-1). This was supplemented with the Native vegetation of NSW mapping within the NSW Koala Habitat Information Base, which is a high-resolution model of native tree cover (NSW DCCEEW, 2025e).

2.1.3 Patch size

Section 4.3.2 of the BAM defines patch size as "*an area of native vegetation that*:

a. *Occurs on the development site or biodiversity stewardship site, and*

b. *Includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or ≤30 m for non-woody ecosystems).*

c. *Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site."*

Under the BAM, patch size is required to be assessed as one of four classes per vegetation zone mapped, being <5 hectares, 5-24 hectares, 25-100 hectares or >100 hectares. Patch size was calculated for the vegetation within the subject land using the field validated map of vegetation types and the updated native vegetation extent data based on the state mapping (NSW DCCEEW, 2024a).

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Database searches and literature reviews were conducted to identify existing information pertaining to the subject land and assessment area and inform site investigations. The SVTM and the BioNet Vegetation Classification database were used to identify initial PCTs (Section 4.1) (Figure 4-1:) in the subject land and assessment area, which were then validated during field investigations to finalise the PCTs (Section 4.2) and TECs (Section 4.3.4) present in the subject land.

2.2.2 Mapping native vegetation extent in the subject land

The native vegetation extent within the subject land was initially mapped using the SVTM (Figure 4-1:). During field investigations, ESRI-enabled devices were used to validate these results and to determine the accurate presence and extent of native vegetation which was then compiled and mapped using GIS software.

Site investigations were conducted to validate desktop results using methods including random meanders, RAPs, BAM plots and vegetation assessments in the subject land. Recent aerial imagery was used to validate and refine native vegetation cover within the subject land and assessment area where required.

2.2.3 Plot-based vegetation survey

BAM survey plots were conducted in accordance with the BAM guidelines (DPIE, 2020a). All plots conducted were laid out in a standard nested plot of 20 metres by 50 metres, 20 metres by 20 metres and 1 metre by 1 metre sub-quadrats used for the assessment of condition attributes at the plot site, except where conditions necessitated the use of a nested plot of 10 by 40 metres within a 10 by 100 plot. Plots were established by walking a random distance into the vegetation zone and establishing the plot on a random bearing while ensuring the plot would capture the attributes relevant to the vegetation zone.

Field surveys of the subject land to conduct BAM plots were carried out by Arcadis ecologists over one day in December 2024 and one in March 2025. Weather records from Sydney Olympic Park AWS (station 066212) for the dates of survey are detailed in Table 2-1.

Table 2-1: Weather condition during BAM plot surveys (BOM, 2024) (BOM, 2025)

Date	Temperature		Rain (mm)	Maximum wind gust	
	Min (°C)	Max (°C)		Direction	Speed (km/h)
02/12/2024	17.1	36.1	5.6	NNW	35
27/03/2025	17.4	26.5	0.0	E	28

Table 2-2: Data collected from plot-based vegetation surveys.

Attribute	Data collected
Location	Geographic co-ordinates (easting and northing; grid type MGA 94, Zone 56) – collected using GPS
Native and exotic species richness and cover	All plant species identified within the 20-metre x 20-metre nested quadrat were recorded. The cover (percentage of area of quadrat covered) and abundance of each species present was estimated. The growth form, stratum/layer and whether each species was native, exotic, or a high threat weed was recorded.
Number of trees with hollows	The number of living and dead trees with hollows within the 50-metre x 20-metre quadrat was recorded. A hollow was only recorded if: (a) the entrance could be seen; (b) the estimated entrance width was at least five centimetres; (c) the hollow appeared to have depth; (d) the hollow was at least one metre above the ground; and the (e) the centre of the tree was located within the sampled quadrat.
Tree stem size diversity and number of large trees	Tree stem size diversity was recorded by measuring the diameter at breast height (DBH) (i.e. 1.3 metres from the ground) of living trees (greater than five centimetres DBH) within each 50-metre x 20-metre quadrat. For multi-stemmed living trees, only the largest stem was included in the count. The number of large trees was determined by counting all trees with a DBH greater than the specified DBH of large trees for each vegetation formation, as noted in the VIS Classification Database (DPIE, 2021b).
Evaluation of regeneration:	Presence/absence of overstorey species present at the site that were regenerating (defined as seedlings or saplings with a DBH less than or equal to five centimetres).
Total length of fallen logs	Cumulative total of logs within each 50-metre x 20-metre quadrat with a diameter of at least 10 centimetres and a length of at least 0.5 metres.
Litter cover	Estimation of the average percentage groundcover of litter (i.e. leaves, seeds, twigs, branchlets and branches with a diameter less than 10 centimetres which is detached from a living plant) from within five sub-plots that measured one metre x one metre square spaced evenly on either side of the 50-metre central transect.

2.2.4 Vegetation integrity survey

Vegetation integrity is defined under the BAM as 'the condition of native vegetation assessed for each vegetation zone against the benchmark for the PCT'. Vegetation integrity surveys were undertaken in accordance with BAM Subsection 4.3.4, with native vegetation within the subject land being classified into PCTs and then separated into vegetation zones based on broad condition classes. The minimum number of plots required per zone area were completed as outlined in Table 3 of the BAM and below in Table 2-3.

Table 2-3: Minimum number of plots required per zone area (BAM Table 3).

Vegetation zone (ha)	Minimum number of plots
<2	1 plot
>2-5	2 plots
>5-20	3 plots
>20-50	4 plots
>50-100	5 plots
>100-250	6 plots
>250-1000	7 plots: more plots may be needed if the condition of the vegetation is variable across the zone

Vegetation zone (ha)	Minimum number of plots
>1000	8 plots: more plots may be needed if the condition of the vegetation is variable across the zone

The vegetation plot data was entered into the BAM credit calculator to generate vegetation integrity scores. Information on the number and location of BAM plots carried out for this BDAR can be found in Section 4.5.1.

2.3 Threatened flora survey methods

The following section describes the methods used for threatened flora surveys.

2.3.1 Review of existing information

Database searches (BioNet, PMST, BAM-C) were undertaken to identify threatened flora species within 10 km that required assessment within a BDAR. Species that were identified as part of this process were then filtered against the following criteria:

- The distribution of the species including the IBRA subregion in which the subject land occurs (Cumberland and Pittwater IBRA subregion),
- PCTs associated with the threatened species present in the subject land,
- Habitat constraints listed in the TBDC.

The species remaining after filtering have been assessed in this BDAR.

2.3.2 Habitat constraints assessment

Field investigation methods including RAPs, vegetation assessments and random meanders were used to assess habitat constraints and microhabitats for threatened species within the subject land. Habitat constraints and microhabitat features included:

- Soils and geology,
- Hydrology,
- Cover and abundance of native vegetation,
- Level of disturbance, weed presence and cover,
- Flora indicator species,
- Land management practices and fire regimes.

Habitat assessments for specific species are found in Section 5.2.

2.3.3 Field surveys

Targeted threatened flora surveys were conducted over four days in October and December 2024 and February and March 2025.

Field surveys for threatened flora species followed the methods described in *NSW Surveying threatened plants and their habitats* (DPIE, 2020b) and comprised parallel field traverses. This method consisted of walking in parallel traverses in areas of potential habitat for threatened flora species considered likely to occur within the subject land using both a GPS and tablet. The spacing between traverses was determined in accordance with Table 1 of the *NSW Surveying threatened plants and their habitats* (DPIE, 2020b).

Details of the threatened flora species targeted in surveys, their survey method and effort are detailed in Section 5.3.1.

2.4 Threatened fauna survey

The following section describes the methods used for threatened fauna surveys.

2.4.1 Review of existing information

Database searches (BioNet, PMST, BAM-C) were undertaken to identify threatened fauna species within 10km of the subject land that required assessment within the BDAR. Species that were identified as part of this process were then filtered against the following criteria:

- The distribution of the species including the IBRA subregion in which the subject land occurs (Cumberland and Pittwater IBRA subregions),
- PCTs associated with the threatened species present in the subject land,
- If the native vegetation cover within the assessment area was equal to or greater than the minimum required for the species,
- The patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species,
- The species is identified as an ecosystem or species credit species in the TBDC.

2.4.2 Habitat constraints assessment

Aerial imaging and field investigation methods including RAPs, vegetation assessments and random meanders were used to assess habitat constraints and microhabitats for threatened fauna species within the subject land. Habitat constraints and microhabitat features included:

- Habitat trees including hollow-bearing trees or trees with evidence of use e.g. nests,
- Core feed tree species, flowering shrubs and other foraging habitat,
- Condition and structure of native vegetation,
- Rocky outcrops, caves, hollow logs, litter cover,
- Artificial microbat roosts (culverts, bridges, tunnels, buildings and mines)
- Terrestrial shelter habitat such as coarse woody debris, rocky outcrops and artificial shelter (i.e. corrugated iron sheets, building refuse, rubbish) for invertebrates, amphibians, reptiles and small terrestrial mammals.
- Habitat corridors and fragmentation,
- Presence and condition of aquatic habitat.

Habitat assessments for specific species are found in Section 5.2.

2.4.3 Field surveys

Targeted threatened fauna surveys were conducted over 34 days between October 2024 and August 2025. The general methods used to undertake threatened fauna surveys are detailed in the sections below.

2.4.3.1 General fauna surveys

The following general fauna surveys were conducted to detect threatened species or their habitat:

- **Hollow-bearing tree surveys:** Hollow-bearing trees were recorded across the subject land to detect potential sheltering, roosting and/or breeding habitat for threatened and non-threatened fauna. Hollow-bearing tree surveys involved traversing the subject land and identifying tree hollows with the naked eye and binoculars. Hollow size and the position of the hollow on the tree (e.g. branch, trunk) was recorded. Signs of fauna occupation, tree species, DBH and whether it was living, or a stag were also noted.
- **Canopy searches:** Canopy searches were undertaken opportunistically across the subject land to detect presence of threatened fauna. Canopy searches were also undertaken to detect the presence of

important fauna habitat features such as large stick nests. Canopy searches involved traversing the subject land and inspecting the canopy of trees with the naked eye and binoculars. Signs of fauna occupation and presence of important fauna habitat features (e.g. nests) were documented.

2.4.3.2 Incidental fauna surveys

Field surveys also included incidental searches for indirect evidence of fauna, such as scats, nests, burrows, tracks, scratches, chewed cones and diggings. Incidental diurnal fauna surveys also involved recording all fauna species opportunistically seen or heard during surveys (Appendix F).

2.4.3.3 Targeted threatened fauna surveys

Targeted threatened fauna surveys were undertaken for all species credit threatened fauna species likely to occur in the subject land, including species returned by the BAM-C and requiring survey in accordance with Section 5.2 of the BAM.

Targeted fauna surveys were designed to address the requirements outlined in the Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft (DEC, 2004). The following guidelines were also used to determine appropriate survey requirements for threatened fauna:

- Threatened Biodiversity Data Collection (NSW DCCEEW, 2025c)
- 'Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method (OEH, 2018a)
- NSW Survey Guide for Threatened Frogs: a guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE, 2020c)
- Survey guidelines for Australia's threatened birds: guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (CoA, 2010a)
- Survey guidelines for Australia's threatened mammals: guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (CoA, 2011a).

Details of the threatened fauna species targeted in surveys, their survey method and effort are detailed in Section 5.3.2.

2.5 Limitations

Surveys were carried out in accordance with Chapters 4 and 5 of the BAM. Where minor adjustments to prescribed methods have been made, (e.g., by using 10 x 100 m BAM plots), they have been documented in this BDAR (see Sections 4.5.1 and 5.3). The level of field survey is considered adequate for the types and condition of native vegetation communities and threatened species habitats occurring within the subject land.

3 Site context

The following section describes the details of the site context.

3.1 Assessment area

The assessment area includes the subject land and land within a 500-metre linear development buffer. For those portions of the subject land that are not linear in nature, namely, the WRRF and Camellia Pump Station Camellia pumping station, the standard 1,500-metre buffer was employed. The assessment area can be seen in Figure 3-1.

3.2 Landscape features

Landscape features in the assessment area and subject land are described in Table 3-1. These landscape features were used to identify biodiversity values and habitat suitability for threatened species in the subject land.

Table 3-1: Landscape features in the assessment area and subject land

Landscape features	Description
IBRA bioregions and IBRA subregions	The subject land and assessment area are located within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) bioregion. The subject land and assessment area mostly sits within the Cumberland IBRA subregion with a small section in the east falling within the Pittwater IBRA subregion (Figure 3-1:). The Cumberland IBRA subregion was entered into the BAM Calculator as the dominant IBRA subregion.
Rivers, streams, estuaries and wetlands	The following aquatic features (Figure 3-1:) have been identified as occurring within the subject land: • Parramatta River and Estuary • Duck River • Vineyard Creek • Charity Creek. These additional aquatic features (Figure 3-1:) have been identified within the assessment area: • Duck Creek • Haslams Creek • Powells Creek • Archer Creek • A'becketts Creek • Clay Cliff Creek • Subiaco Creek • Narawang Wetland • Nuri Wetlands. Neither the Narawang nor Nuri Wetlands is listed on the Directory of Important Wetlands Australia or Ramsar-listed. These wetlands are constructed wetlands part of the development of Sydney Olympic Park.
Groundwater Dependent Ecosystems	Groundwater Dependent Ecosystems (GDEs) are ecological communities that are dependent, either entirely or in part, on the presence of groundwater for their health or survival. As part of this assessment, the NSW High Ecological Value Aquatic Ecosystems (HAVAE) mapping ((NSW DCCEEW, 2025d) was reviewed to determine the

Landscape features	Description
	occurrence of potential groundwater dependent ecosystems within and surrounding the subject land and assessment area. It was found that there low, medium and high GDEs within and surrounding the assessment area (Figure 3-2:). However, the subject land for the project avoids these areas. Where GDEs are crossed by pipeline alignments, the pipelines are horizontally directionally drilled. The Groundwater Impact Assessment Report (Jacobs, 2025) prepared for the project concluded that the project is not expected to cause significant adverse impacts on groundwater levels, quality or sensitive receptors. Further detail can be found in that report.
Key Fish Habitat	The Parramatta River is listed as Key Fish Habitat (KFH), as are Haslam's Creek and the Duck River (Figure 3-1), all of which are near or adjacent to the subject land. Aquatic ecology impacts are assessed in (Stantec, 2025).
Habitat connectivity	The BAM defines connectivity as 'the measure of the degree to which an area of native vegetation is linked with other areas of vegetation'. Connectivity of native vegetation within the subject land, particularly native vegetation that conforms to a PCT, is fair to poor. Within Memorial Park in Meadowbank, native vegetation within the subject land has been identified as PCT 4058: Sydney Hinterland Red Gum Riverflat Forest. This vegetation connects with narrow bands of riparian vegetation along the Parramatta River extending west to Parramatta (Figure 3-4). Across the Parramatta River to the south, there are patches of native vegetation in Sydney Olympic Park, along the southern bank of the Parramatta River, and along the banks of the Duck River. To the east, approximately 3.5-5 km away, there is native vegetation along the Lane Cove River and its tributaries. Mobile fauna species such as birds, microbats and the Grey-headed Flying Fox could potentially make use of this limited connectivity. However, terrestrial fauna such as arboreal mammals and reptiles have very limited opportunities to move between this native vegetation and larger patches of terrestrial native vegetation in the Lane Cove River catchment and Sydney Olympic Park.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No karst, caves, crevices, cliffs, rocks or other geological features of significance have been identified within the subject land or assessment area.
Areas of outstanding biodiversity value	Areas of outstanding biodiversity value (AOBVs) as defined under the BC Act are currently limited to areas that were previously declared as critical habitat under the *Threatened Species Conservation Act 1995.* No declared areas of outstanding biodiversity value as defined under the BC Act have been identified within the subject land or assessment area.
NSW (Mitchell) landscape	The subject land is located within the Ashfield Plains and Port Jackson Basin Mitchell Landscapes (Figure 3-1:). The Ashfield Plains is characterised by undulating hills and valleys on horizontal Triassic shale and siltstone, occasional quartz sandstones especially near the margin of the Port Jackson landscape (DECC, 2002). Elevation is generally between 0 to 45 m with a local relief of <20 m. Soils are described as red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys. Vegetation typically contains an open forest of broad-leaved ironbark (*Eucalyptus fibrosa* spp. *fibrosa*), grey box (*Eucalyptus moluccana*), with tea-tree (*Leptospermum* sp.) along creeks and forests of turpentine (*Syncarpis glomulifera*), red mahogany (*Eucalyptus resinifera*), grey gum (*Eucalyptus punctata*), Sydney blue gum (*Eucalyptus saligna*) and blackbutt (*Eucalyptus pilularis*) with a grassy understorey of kangaroo grass (*Themeda triandra*) on moister sites.

Landscape features	Description
	The Port Jackson Basin Mitchell landscape is described (DECC, 2002) as occurring on a deep elongated harbour with steep cliffed margins on horizontal Triassic quartz sandstone. General elevation ranged from 0 to 80 m with a local relief of 10 to 50 m. 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*). Estuarine sands were originally dominated by saltmarsh but have been taken over by grey mangrove (*Avicennia marina*) in the past century. A small portion of the assessment area occurs in the Pennant Hills Ridges Mitchell landscape, which is found across the northern tips of the assessment area.
Soil hazard features	The subject land is situated across a patchwork of five soils landscape types with large areas occurring in disturbed terrain (NSW DCCEEW, 2024c) (Figure 3-3:). The landscape, soil and hazard features of these soil landscape types within the subject land are as follows: ***Gymea*** *Landscape: Undulating to rolling rises and low hills on Hawkesbury Sandstone. Local relief 20–80 m, slopes 10–25%. Rock outcrop <25%. Broad convex crests, moderately inclined sideslopes with wide benches, localised rock outcrop on low broken scarps. Extensively cleared open-forest (dry sclerophyll forest) and eucalypt woodland.* *Soils: Shallow to moderately deep (30-100 cm) Yellow Earths and Earthy Sands on crests and inside of benches; shallow (<20 cm) Siliceous Sands on leading edges of benches; localised Gleyed Podzolic Soils and Yellow Podzolic Soils on shale lenses; shallow to moderately deep (<100 cm) Siliceous Sands and Leached Sands along drainage lines.* *Hazards: Localised steep slopes, high soil erosion hazard, rock outcrop, shallow highly permeable soil, very low soil fertility.* ***Birrong*** *Landscape: Level to gently undulating alluvial floodplain draining Wianamatta Group shales. Local relief to 5 m, slopes <3%. Broad valley flats. Extensively cleared tall open-forest and woodland* *Soils: Deep (>250 cm) Yellow Podzolic Soils and Yellow Solodic Soils on older alluvial terraces; deep (>250 cm) Solodic Soils and Yellow Solonetz on current floodplain.* *Hazards: Localised flooding, high soil erosion hazard, saline subsoil, seasonal waterlogging, very low soil fertility.* ***Ettalong*** *Landscape: Level to very gently undulating coastal swamps. Local relief <5 m, slopes <2%. Water table at <100 cm. Hummocky surface, shallow lakes and very shallow water tables. Closed sedgeland and tall open forest.* *Soils: Deep (>150 cm) Organic Acid Peats, Peaty Podzols and Humus Podzols often overlying buried Siliceous Sands.* *Hazards: Flooding, permanently high water table, extremely acid organic soil of low fertility.* ***Blacktown***

Landscape features	Description
	Landscape: Gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes. Cleared Eucalypt woodland and tall open forest (dry sclerophyll forest). *Soils: Wianamatta Group—Ashfield Shale consisting of laminite and dark grey siltstone, Bringelly Shale which consists of shale with occasional calcareous claystone, laminite and infrequent coal, and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone.* *Hazards: Highly acidic, low to very low fertility, high aluminium toxicity and hard-setting surfaces.* ***Lucas Heights*** *Landscape: Gently undulating plateau surfaces and ridges of the Mittagong formation (alternating bands of shale and fine-grained sandstone), 200–1,000 m wide, with level to gently inclined slope gradients of <10%. Local relief is <30 m. Rock crop is absent.* *Extensively to completely cleared dry sclerophyll low open-forest and low woodland.* *Soils: Moderately deep (50–150 cm), hard setting Yellow Podzolic Soils and yellow Soloths on ridges and plateau surfaces. Lateritic Podzolic Soils on ridges and plateau surfaces. Lateritic Podzolic Soils on crests; Yellow Earths on shoulders of plateaux and ridges. Earthy Sands in valley flats.* *Hazards: Hard-setting surfaces, low fertility, high potential aluminium toxicity and moderate localised erosion.* The assessment area is situated on an additional three soil landscapes: Glenorie, Deep Creek and Hawkesbury along the westernmost and northern edges respectively.

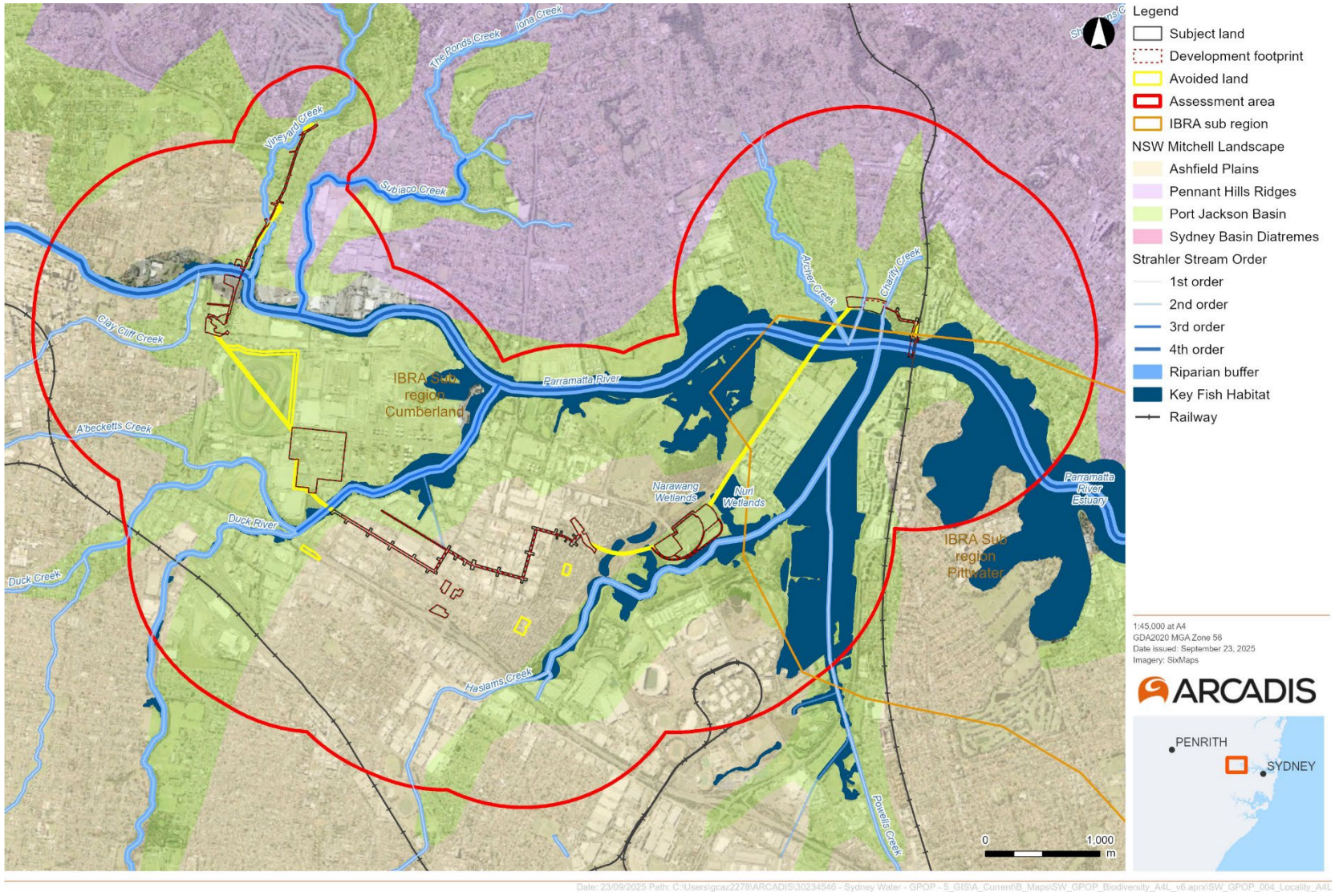
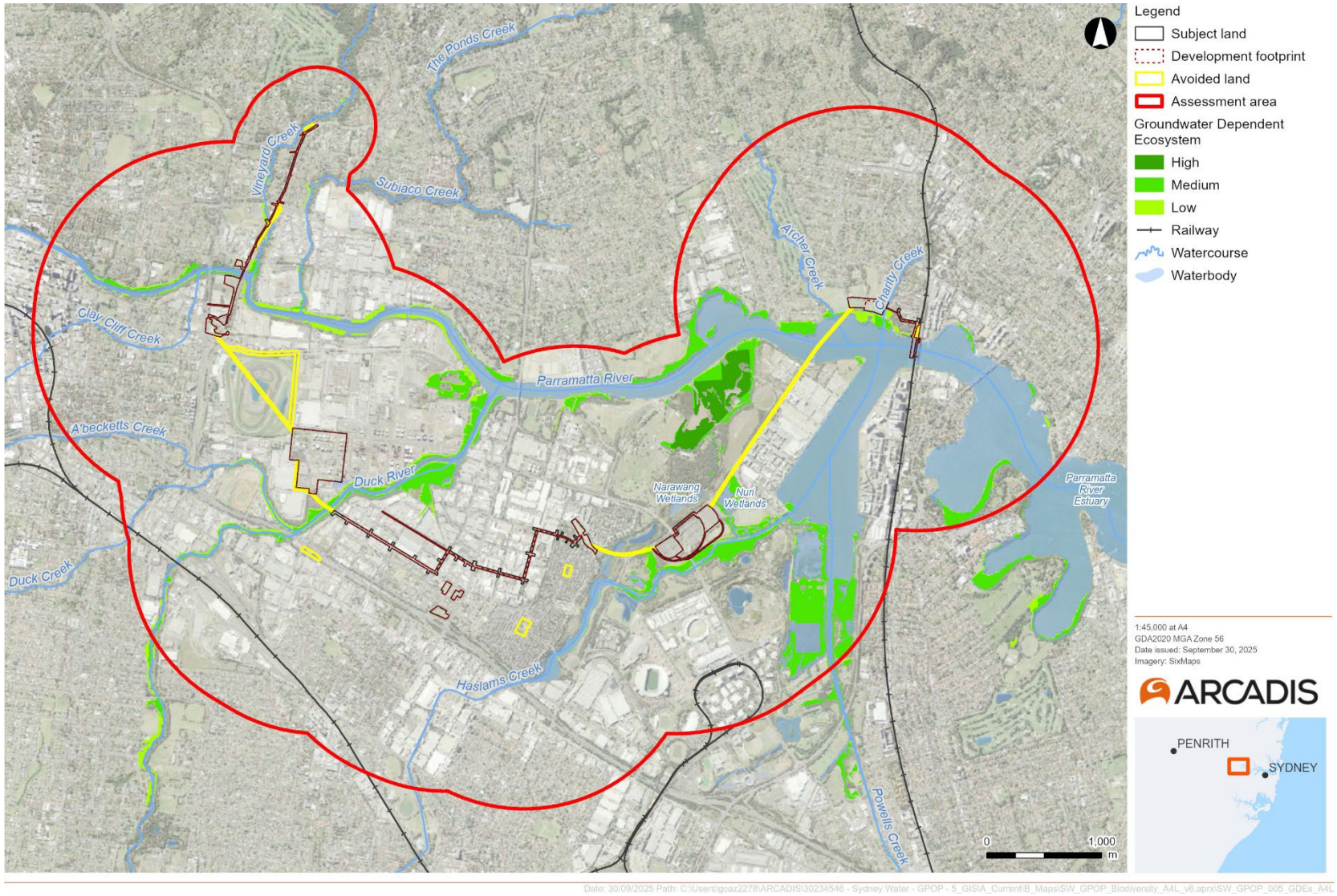


Figure 3-1: Location map



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Figure 3-2: Ground Dependent Ecosystems within the assessment area

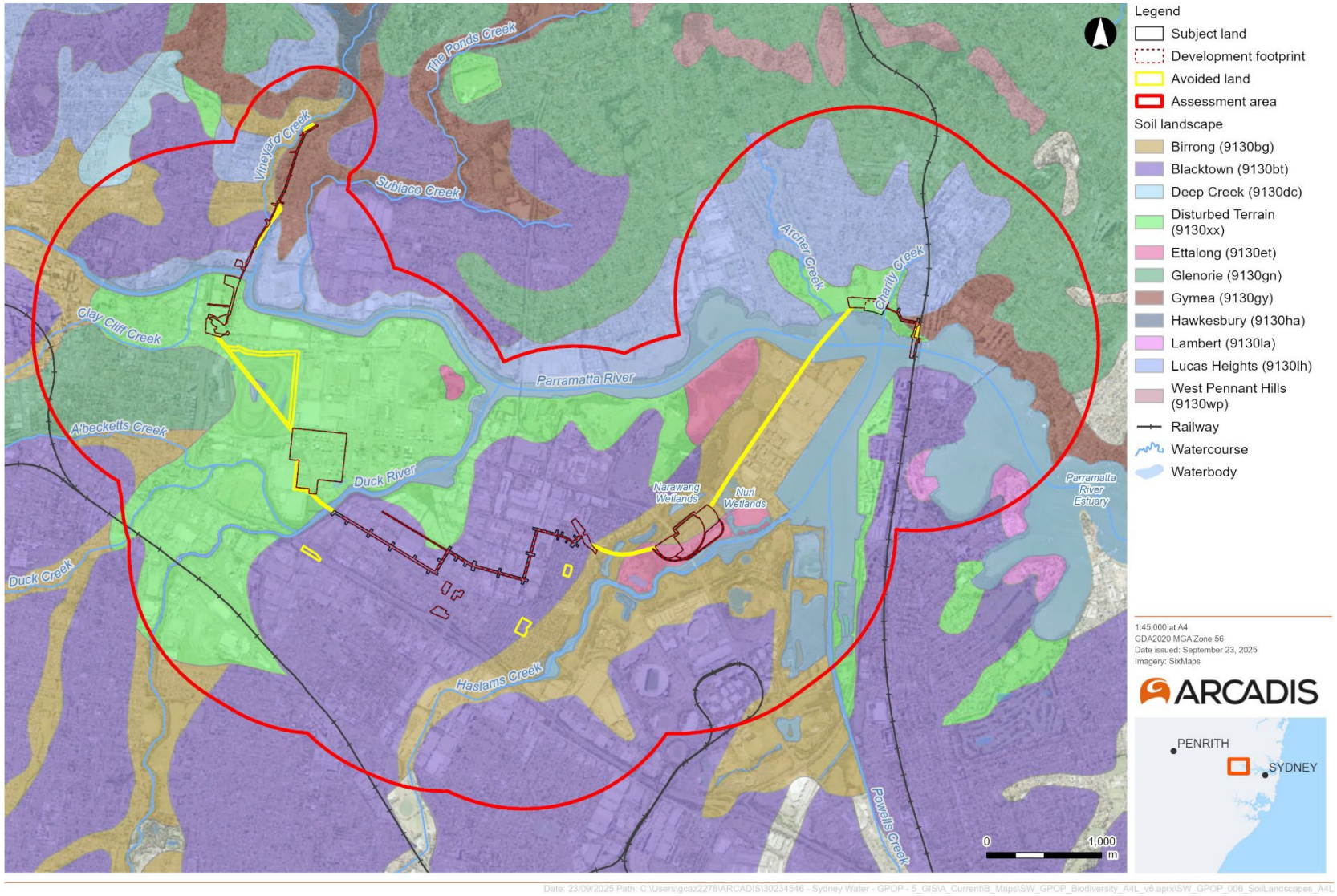


Figure 3-3: Soils landscapes within the assessment area

3.3 Native vegetation cover

The SVTM (NSW DCCEEW, 2024a) and the Native vegetation of NSW mapping within the NSW Koala Habitat Information Base (NSW DCCEEW, 2025e) were used to map native vegetation within the 1,500 metre buffer area surrounding the non-linear components of the project and the 500 metre buffer area surrounding the linear components of the project (Figure 3-4:). Table 3-2 provides a summary of native vegetation cover in the assessment area.

Table 3-2: Native vegetation cover in the assessment area

Assessment area (ha)	3,723.37
Total area of native vegetation cover (ha)	439.35
Percentage of native vegetation cover (%)	11.80
Class (0-10, >10-30, >30-70 or >70%)	>10-30

3.4 Patch size

Vegetation within the subject land largely consists of exotic vegetation, planted native vegetation and small, highly fragmented patches of remnant or naturally revegetated native vegetation. While fragmented within the subject land, the native vegetation is connected to larger areas of native vegetation via the riparian corridors of the Parramatta River, Duck River and Haslam's Creek and through small patches of planted native vegetation within suburban neighbourhoods. Although these connections are narrow and often in poor condition, patches of native vegetation within the subject land can be conservatively considered to be connected with larger patches of native vegetation in the Lane Cove Valley and within Sydney Olympic Park. Accordingly, in accordance with section 5.3.2 of the BAM, the patch size for all vegetation zones within the subject land was conservatively assigned as being within the >100 hectares class. A patch size of 101 hectares was entered into the BAM Calculator for all vegetation zones.

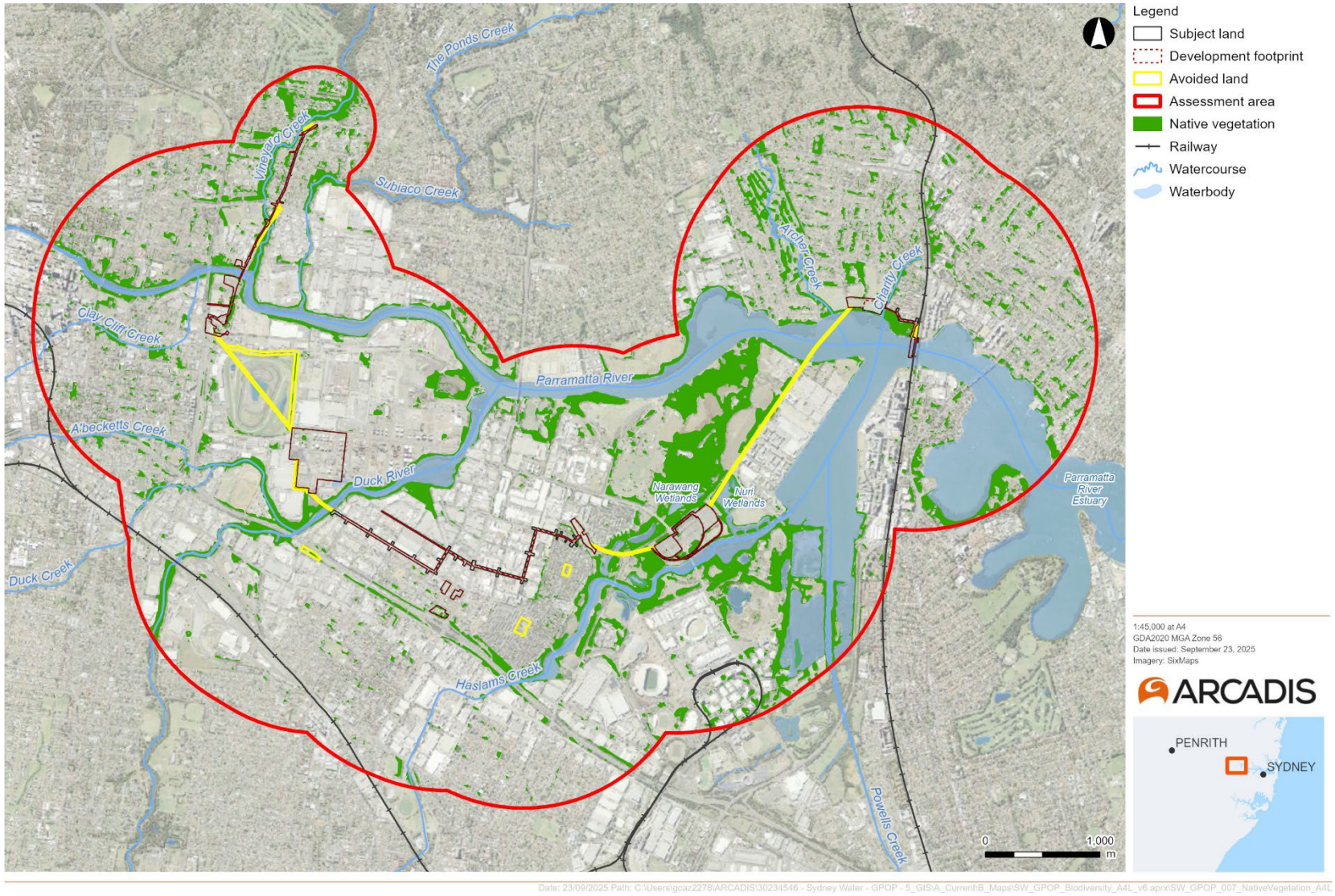


Figure 3-4: Map of native vegetation within the assessment area

4 Native vegetation, threatened ecological communities and vegetation integrity

4.1 State Vegetation Type Mapping

Vegetation communities identified by the NSW State Vegetation Type Map (SVTM) (NSW DCCEEW, 2024a) within the subject land, study area and assessment area are shown in Figure 4-1:. Detailed maps are shown in Figure 4-2 through Figure 4-10.

The SVTM identifies only one PCT within the subject land – PCT 3176: Sydney Enriched Sandstone Moist Forest. This PCT and its associated BC and EPBC listings are shown in Table 4-1. Associated listings in Table 4-1 and Table 4-2 are provided for information only and do not necessarily apply within the subject land or assessment area. Threatened ecological community listings are applied to ground-truthed native vegetation in Section 4.4.

Table 4-1: PCTs mapped by the SVTM within the subject land

PCT ID	PCT name	Associated BC Act listing	Associated EPBC Act listing
3176	Sydney Enriched Sandstone Moist Forest	Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion CEEC, when occurring in the catchment of Gore Creek including Lane Cove Bushland Park	n/a

PCTs mapped more widely in the assessment area by SVTM are listed in Table 4-2.

Table 4-2: PCTs mapped by the SVTM within the assessment area

PCT ID	PCT name	Associated BC Act listing	Associated EPBC Act listing
3259	Sydney Coastal Shale-Sandstone Forest	Duffy's Forest Ecological Community in the Sydney Basin, where it occurs in association with laterite soils or soils derive from shale and laminate lenses on Hawkesbury sandstone geology in Ku-ring-gai, Manly, Warringah, Pittwater or Hornsby LGAs	n/a
3262	Sydney Turpentine Ironbark Forest	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion CEEC	Turpentine-Ironbark Forest of the Sydney Basin Bioregion CEEC, where condition thresholds are met
3445	Lower Northern Coastal Hills Red Gum Grassy Forest	n/a	n/a
3448	Castlereagh Ironbark Forest	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion Endangered Ecological Community (EEC), where consistent with substrate and diagnostic plant species outlined in paragraphs 5 and 6, respectively, of the final determination Shale/Gravel Transition Forest in the Sydney Basin Bioregion EEC, where consistent with substrate and diagnostic plant species outlined	Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion Endangered Ecological Community CEEC, where condition thresholds are met Cumberland Plain Shale Woodlands and Shale-Grave Transition Forest, where key diagnostic criteria and

PCT ID	PCT name	Associated BC Act listing	Associated EPBC Act listing
		in paragraphs 5 and 6, respectively, of the final determination	condition thresholds are met per section 4 and 5 of the listing advice
3963	Estuarine Reedland	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC	Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC, where condition thresholds are met
3972	Sydney Creekflat Wetland	Sydney Freshwater Wetlands in the Sydney Basin Bioregion, where it occurs in Deep Creek Warringah	n/a
4023	Coastal Valleys Swamp Oak Riparian Forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC	Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC, where condition thresholds are met
4025	Cumberland Red Gum Riverflat Forest	NSW River-Flat Eucalypt Forest on Coastal Floodplains EEC, where it occurs within the stated elevation range	Commonwealth River-flat Eucalypt Forest on Coastal Floodplains CEEC, where it occurs at elevations below 250 m asl and condition thresholds are met
4028	Estuarine Swamp Oak Twig-rush Forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC	Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC, where condition thresholds are met
4091	Grey Mangrove-River Mangrove Forest	n/a	n/a
4097	Samphire Saltmarsh	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC The Shorebird Community occurring on the relict tidal delta sands at Taren Point EEC, where it occurs on the eastern side of Taren Point between Captain Cook Bridge and Shell Point	Subtropical and Temperate Coastal Sandmarsh Vulnerable Ecological Community (VEC), where condition thresholds are met

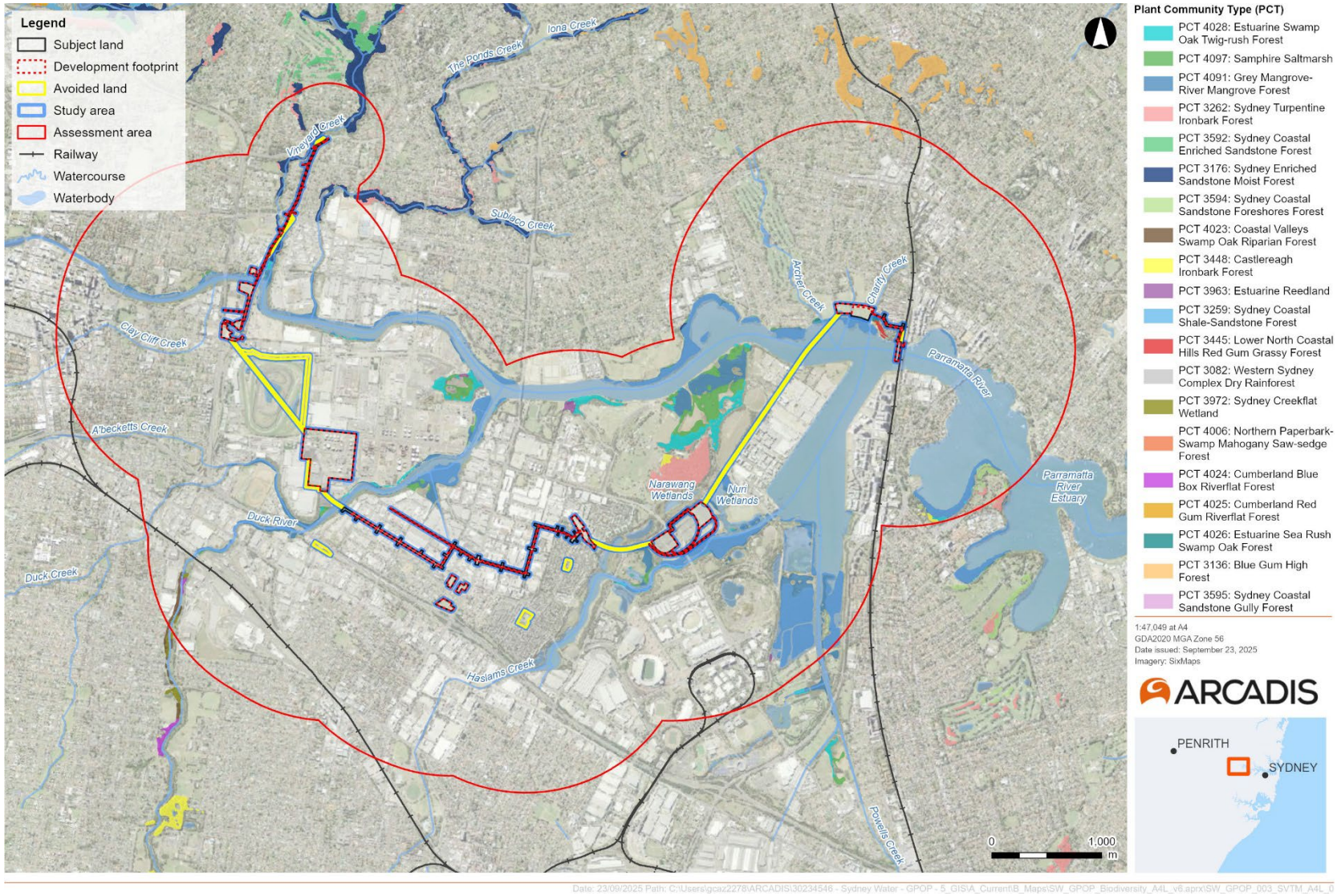


Figure 4-1: State vegetation mapping

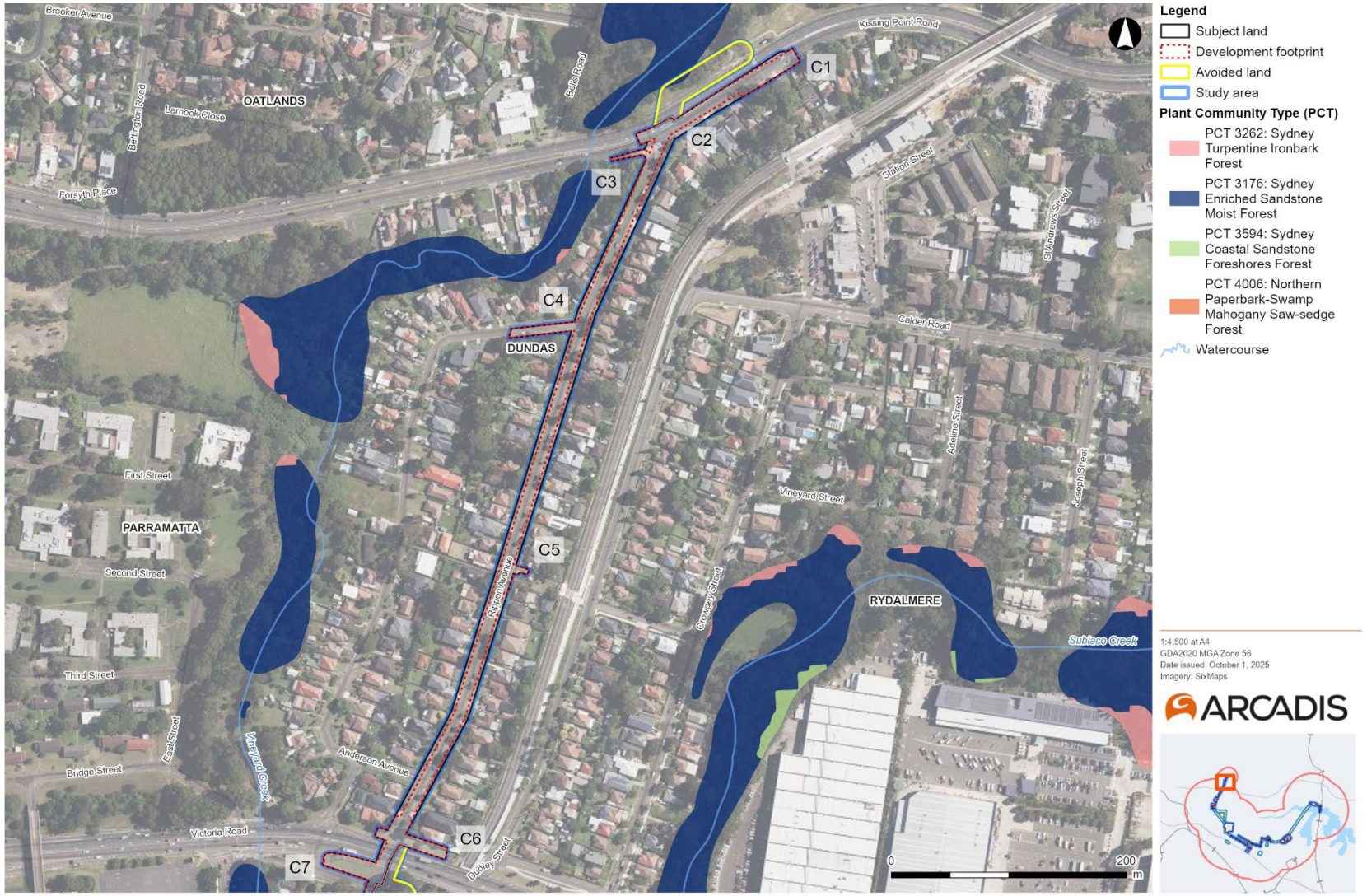


Figure 4-2: Stage vegetation mapping, Segment 1

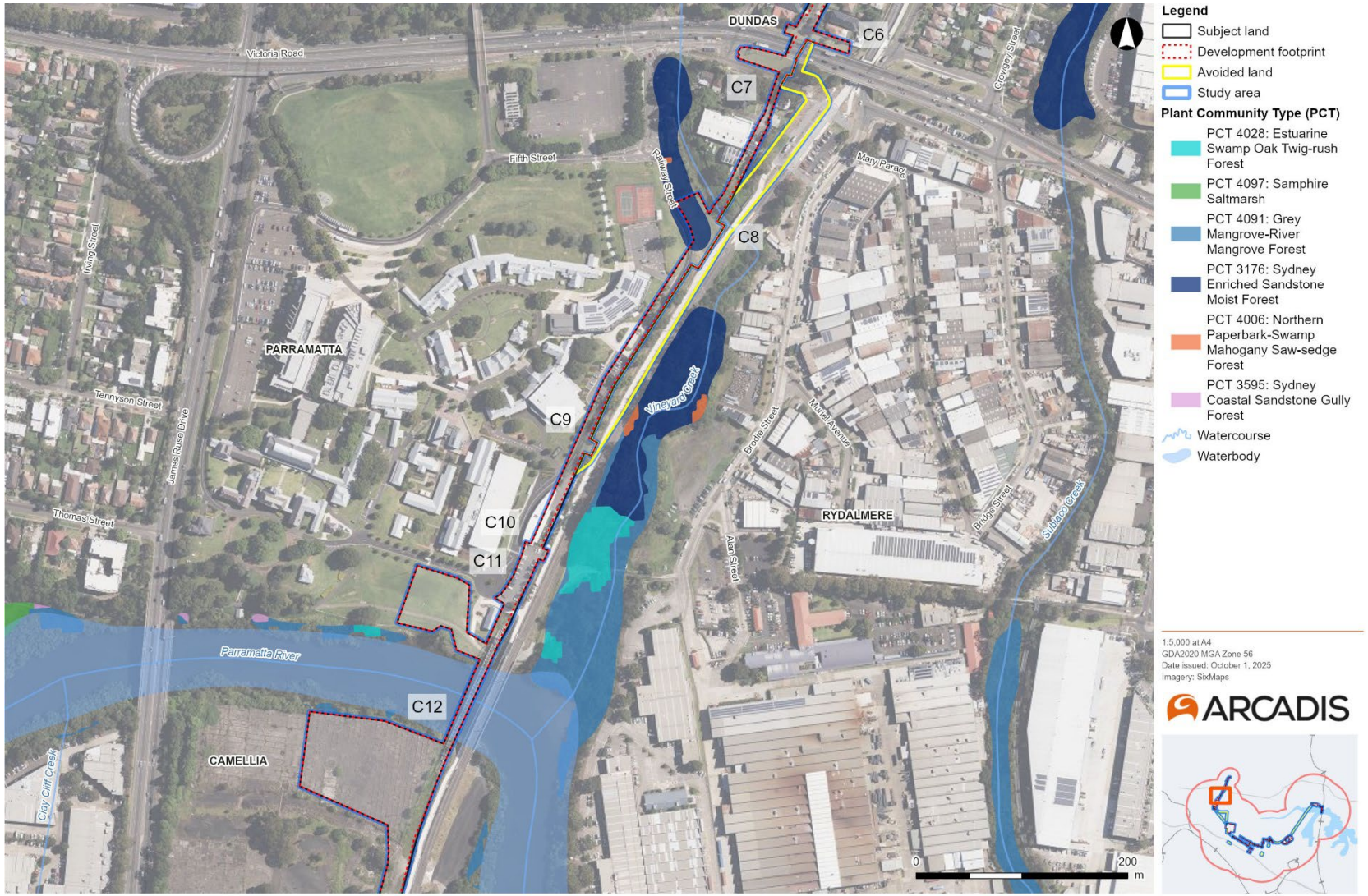


Figure 4-3: State vegetation mapping, Segment 2

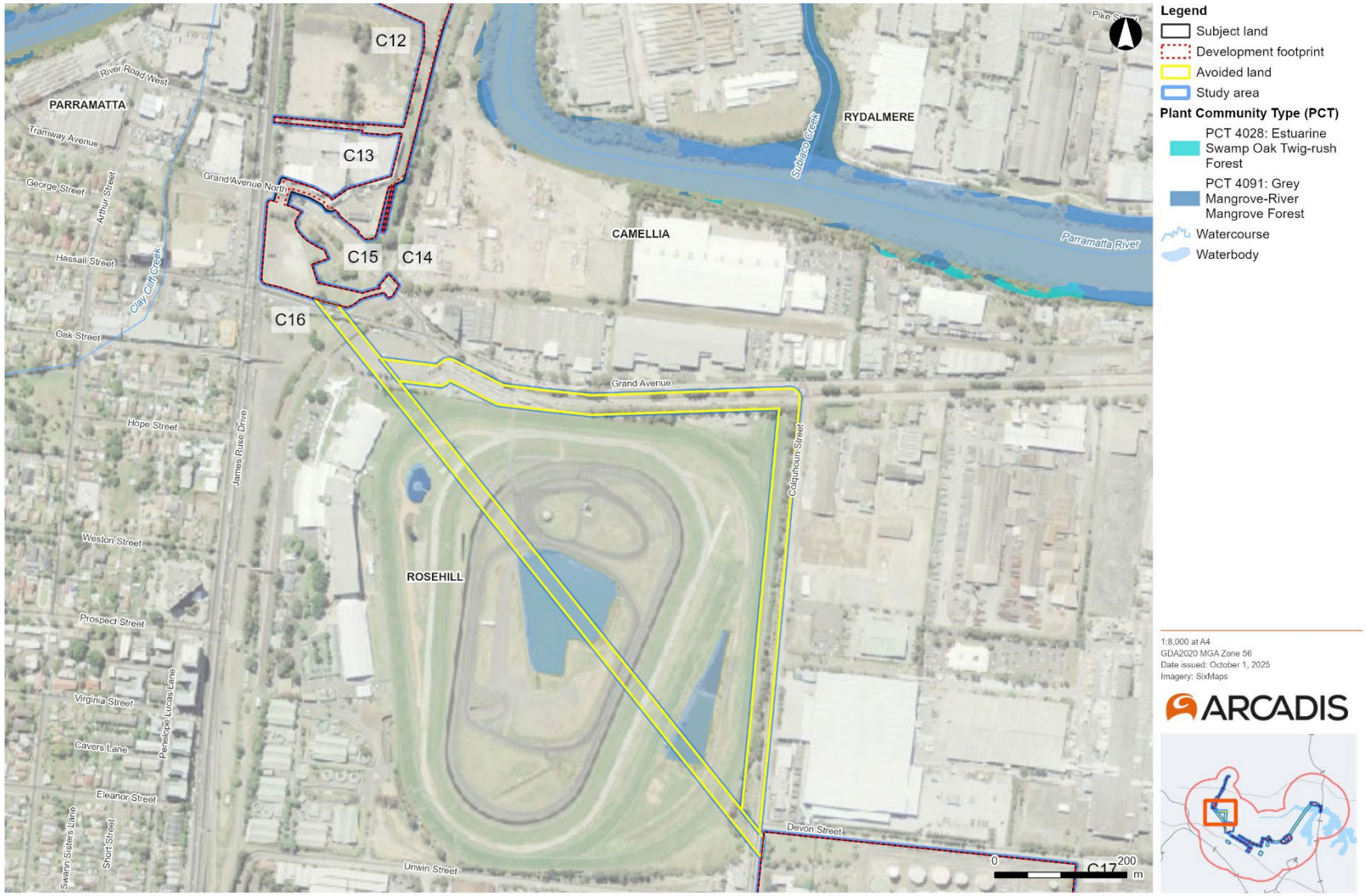


Figure 4-4: State vegetation mapping, Segment 3

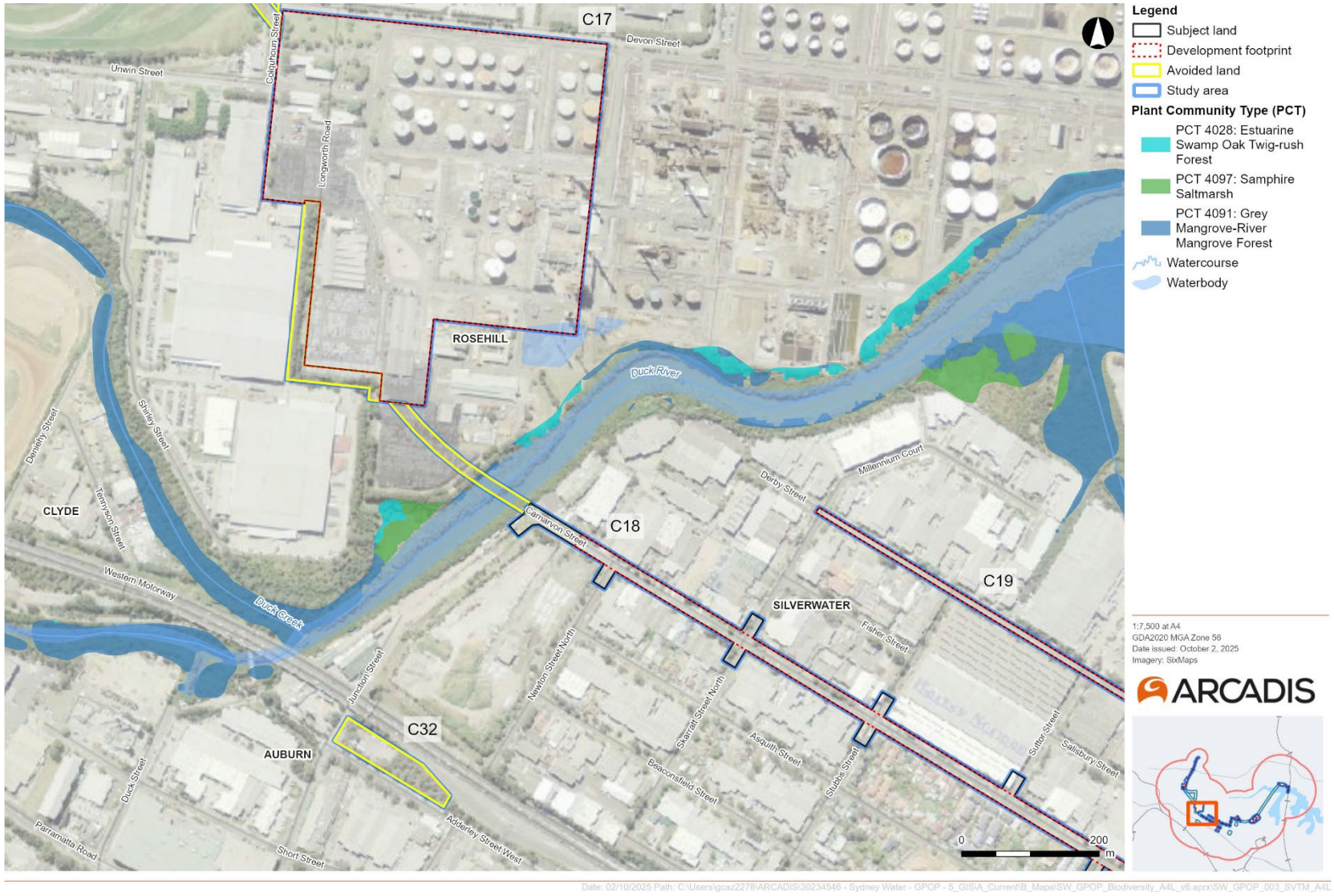


Figure 4-5: State vegetation mapping, Segment 4

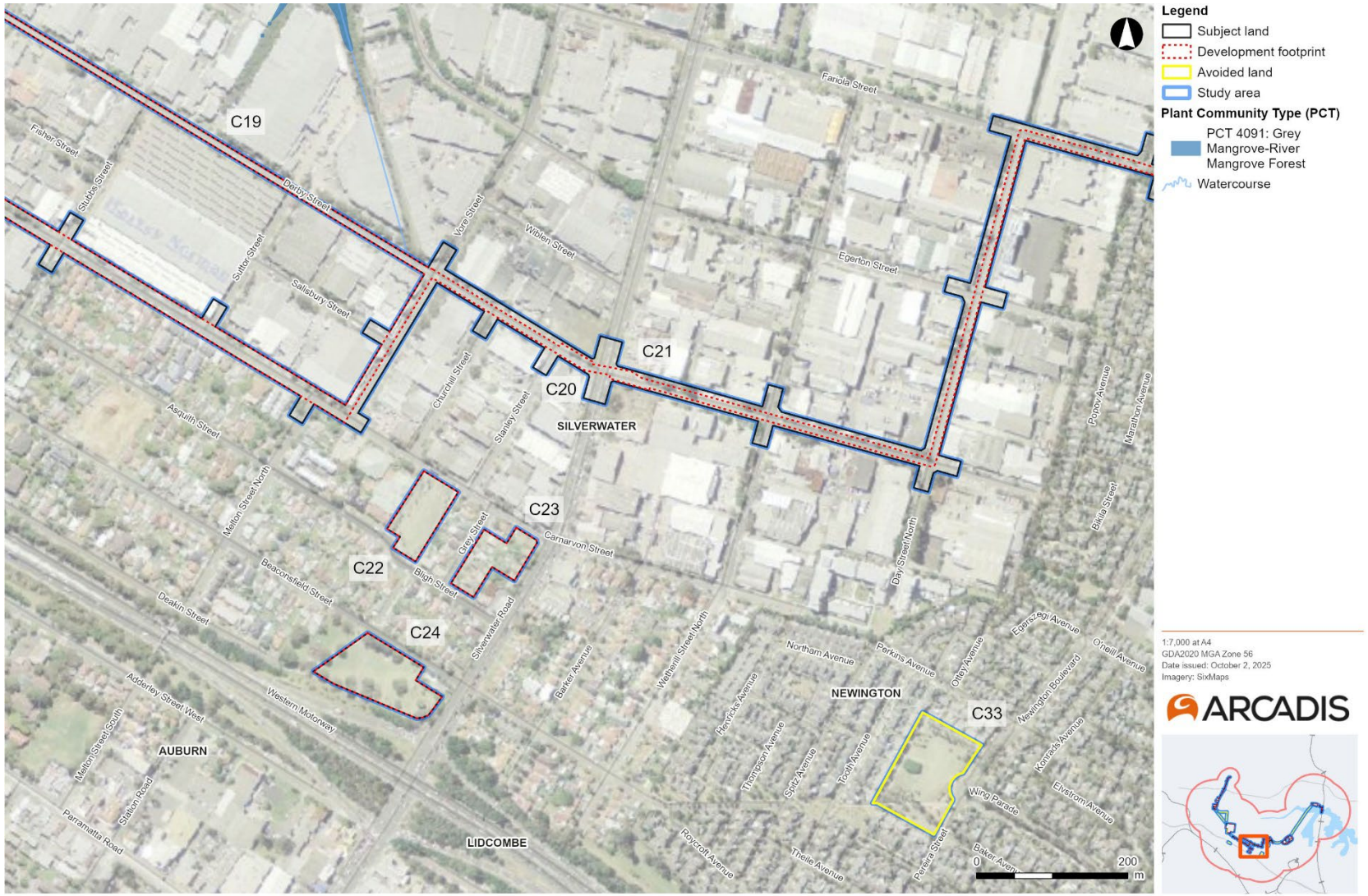
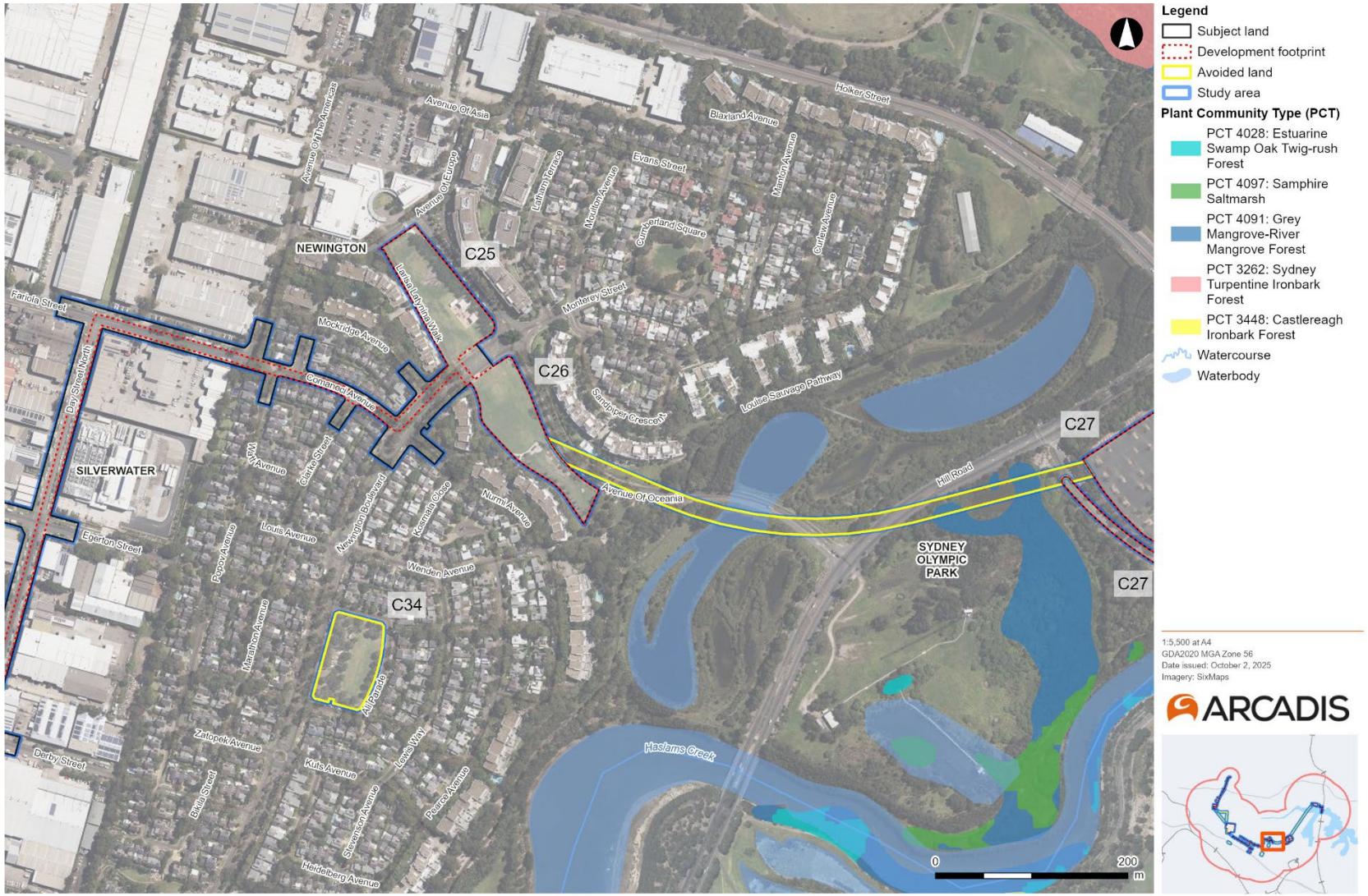


Figure 4-6: State vegetation mapping, Segment 5



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Figure 4-7: State vegetation mapping, Segment 6

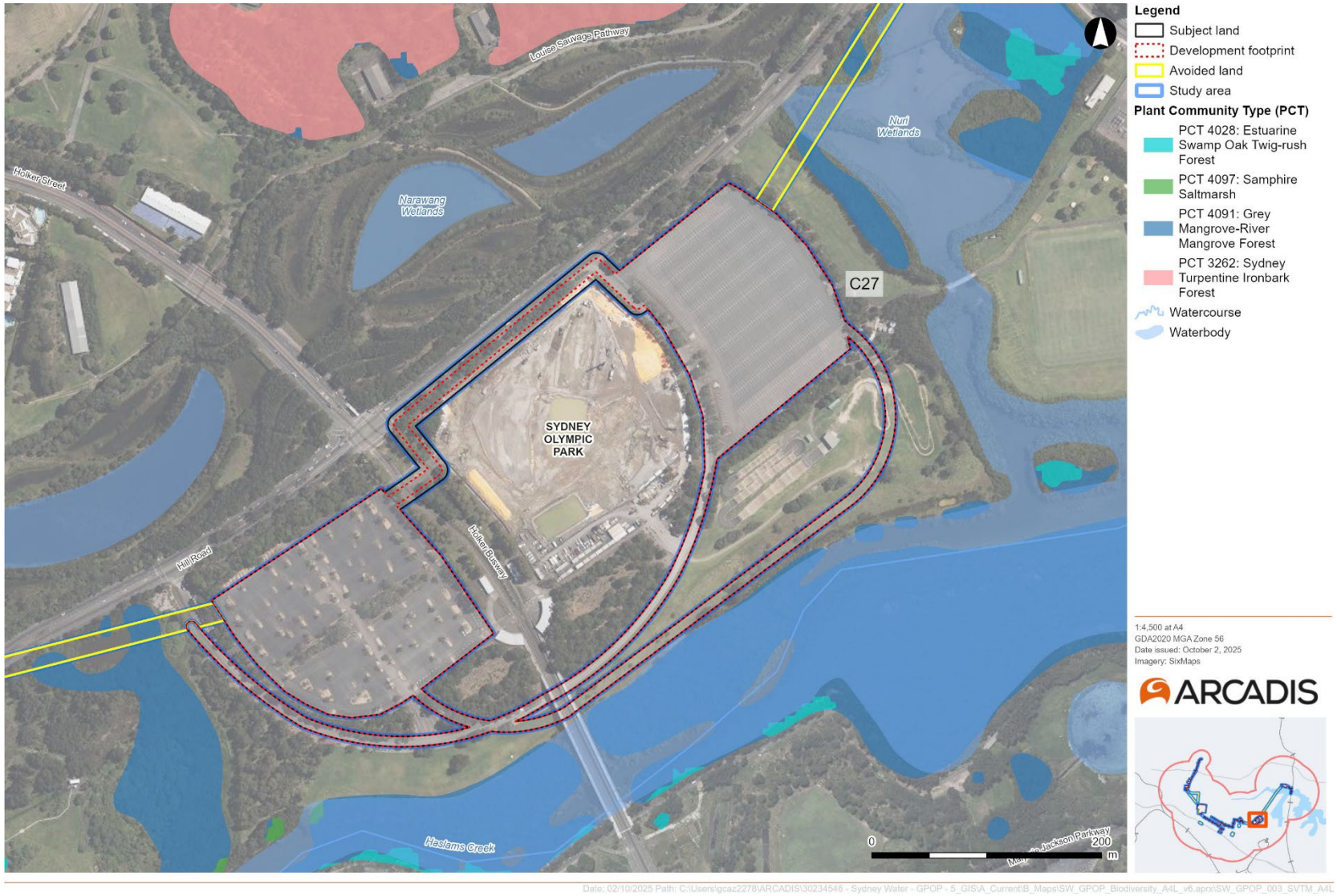


Figure 4-8: State vegetation mapping, Segment 7

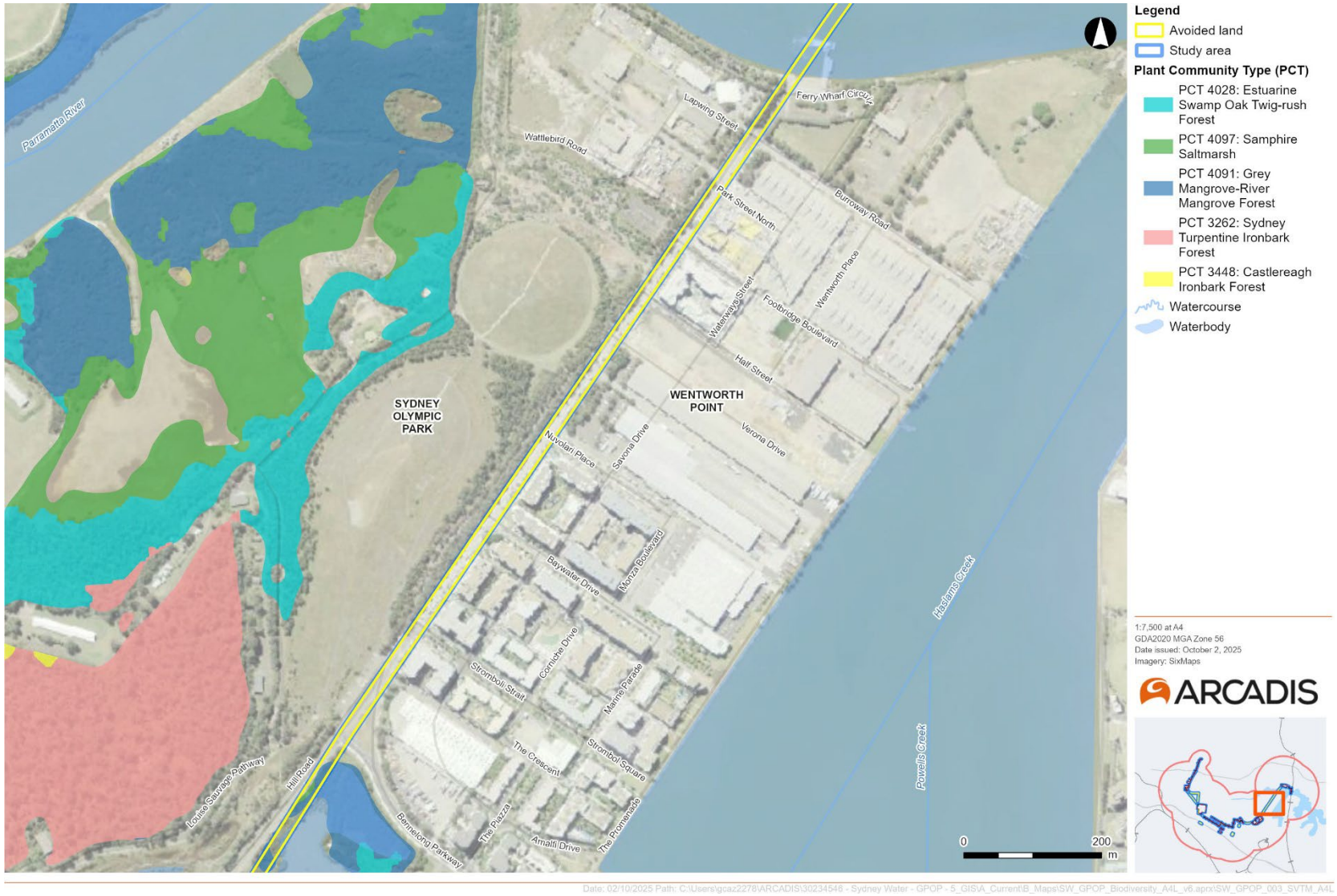


Figure 4-9: State vegetation mapping, Segment 8

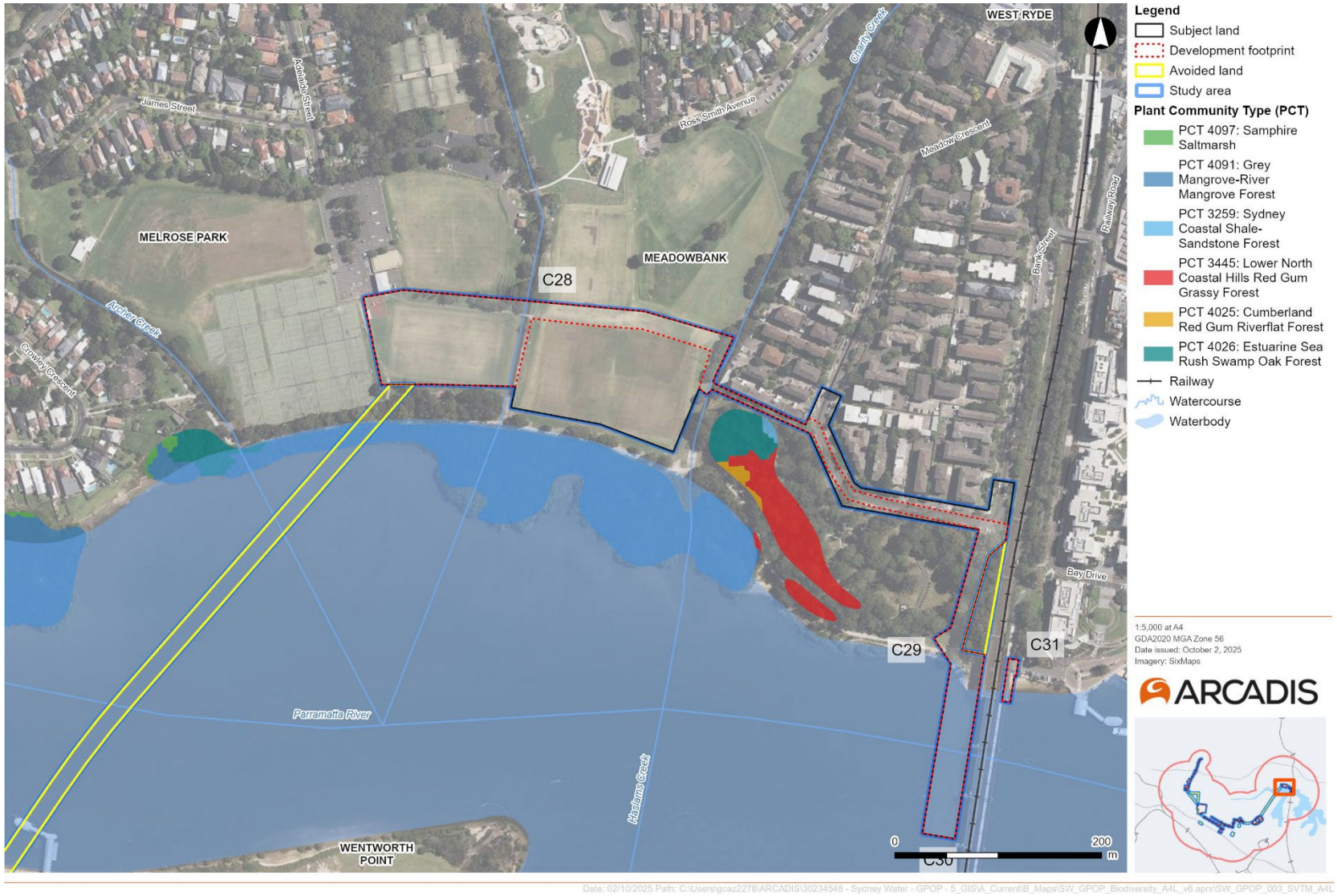


Figure 4-10: State vegetation mapping, Segment 9

4.2 Ground-truthed vegetation

This section describes the ground-truthed extent of native vegetation and vegetation communities identified using the field survey methods described in Section 2.2 and Section 2.3, the differences between ground-truthed vegetation and SVTM, the PCTs identified within the subject land, and the vegetation integrity of PCTs within the subject land.

4.2.1 Native vegetation extent and species identified

A total of 4.97 ha within the 50.53 ha of the subject land was identified as supporting native vegetation, including both planted native vegetation and native vegetation conforming to a NSW PCT. Of the total area of native vegetation, 4.78 ha consists of planted native vegetation (non-PCT) and 0.18 ha consists of areas identified as a PCT.

The remainder of the subject land, a total of 45.56 ha, does not support native vegetation. These areas include roads, buildings, cleared areas, exotic vegetation and miscellaneous facilities and infrastructure. Areas that do not support native vegetation do not require further assessment under the BAM, except where they represent habitat for threatened species (BAM Section 4.1.2).

A total of 9.92 ha of native vegetation was identified within the study area, which includes both the subject land and areas assessed but avoided by the project through HDD or design choices. Of this native vegetation, 7.59 consists of planted native vegetation (non-PCT) and 2.33 consists of areas identified as a PCT.

A total of 210 flora species were identified in the study area, of which 118 were native and 92 were exotic (Appendix G). The nomenclature in this report follows the Flora of NSW (Harden, 1990-2002) and updates provided in PlantNET (RBGDT, 2023).

4.2.2 Vegetation communities identified

Two PCTs and three planted native vegetation zones were identified within the subject land. An additional three PCTs were identified within avoided land within the study area. These ground-truthed vegetation communities are listed with their extents and associated TECs in Table 4-3:. Ground-truthed vegetation communities are illustrated in Figure 4-11 through Figure 4-20. Where scale of the overview map (Figure 4-11) inhibits identification of native vegetation patches, please refer to the segment maps.

Table 4-3: Vegetation communities identified within the subject land and study area

PCT ID	PCT name	Associated BC Act listing	Associated EPBC Act listing	Vegetation zone	Extent in the study area (ha)	Extent in avoided land (ha)	Extent in the subject land (ha)
3176	Sydney Enriched Sandstone Moist Forest	Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion Critically Endangered Ecological Community (CEEC), when occurring in the catchment of Gore Creek including Lane Cove Bushland Park	n/a	n/a	0.08	0.08	0.00
3320	Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion CEEC	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest CEEC where condition thresholds are met	n/a	0.27	0.27	0.00
4028	Estuarine Swamp Oak Twig-rush Forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC	Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC where condition thresholds are met	Low-Camellia Park	0.70	0.70	0.00
				Low-Sydney Olympic Park	0.20	0.14	0.06
4058	Sydney Hinterland Red Gum Riverflat Forest	NSW River-Flat Eucalypt Forest on Coastal Floodplains EEC where it occurs within the stated elevation range	Commonwealth River-flat Eucalypt Forest on Coastal Floodplains CEEC where it occurs at elevations below 250 m asl and condition thresholds are met	Moderate	0.02	0.00	0.02
				Low	0.28	0.18	0.10
4091	Grey Mangrove-River Mangrove Forest	n/a	n/a	n/a	0.78	0.78	0.00
			Subtotal – PCT native vegetation communities	n/a	**2.33**	**2.15**	**0.18**
Planted native vegetation		n/a	n/a	Street trees	2.44	0.23	2.20

PCT ID	PCT name	Associated BC Act listing	Associated EPBC Act listing	Vegetation zone	Extent in the study area (ha)	Extent in avoided land (ha)	Extent in the subject land (ha)
		n/a	n/a	Suburban parks	3.60	2.26	1.34
		n/a	n/a	Sydney Olympic Park	1.55	0.31	1.23
			Subtotal – Planted native vegetation	n/a	**7.59**	**2.80**	**4.78**
			Total area native vegetation	n/a	**9.92**	**4.95**	**4.97**

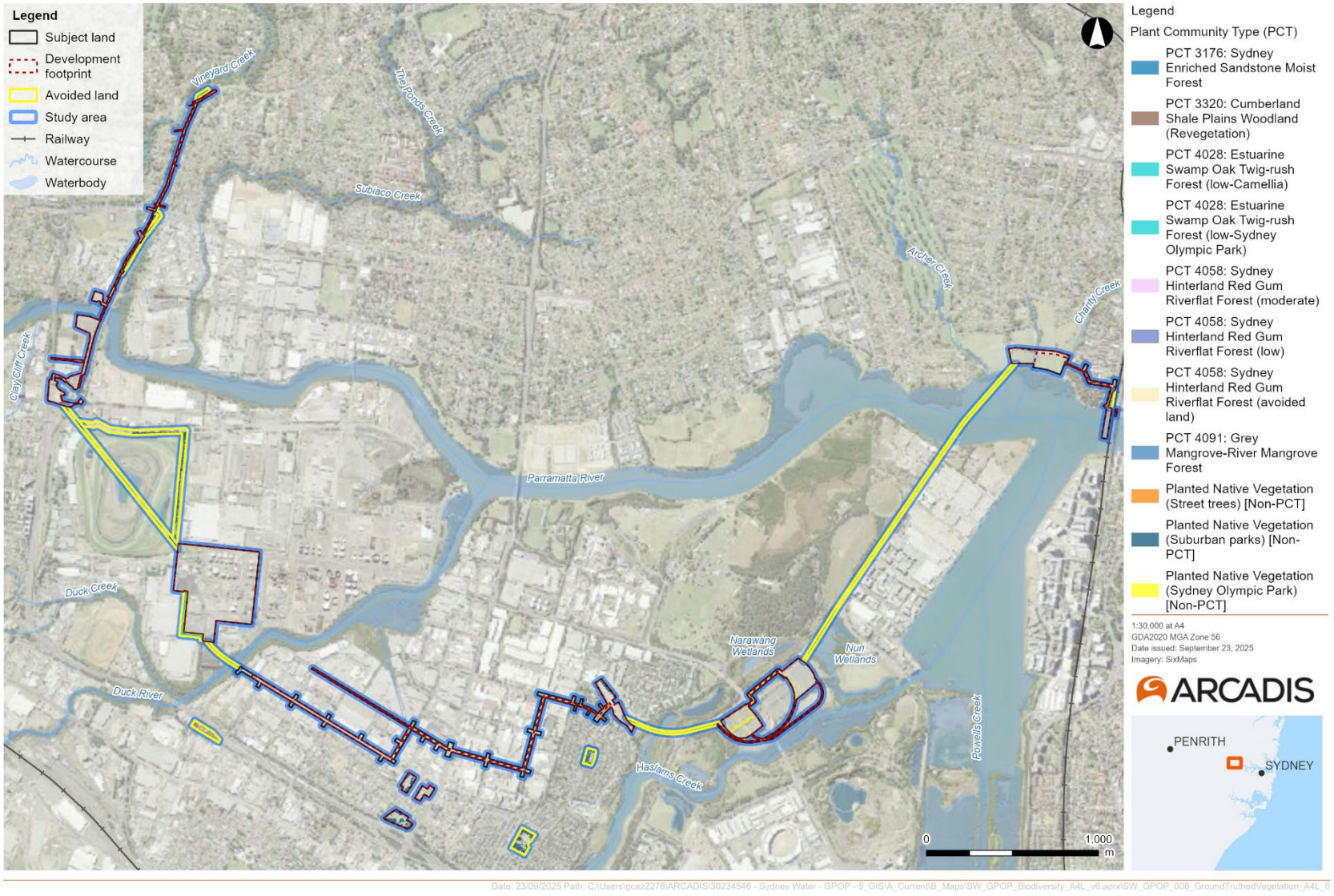
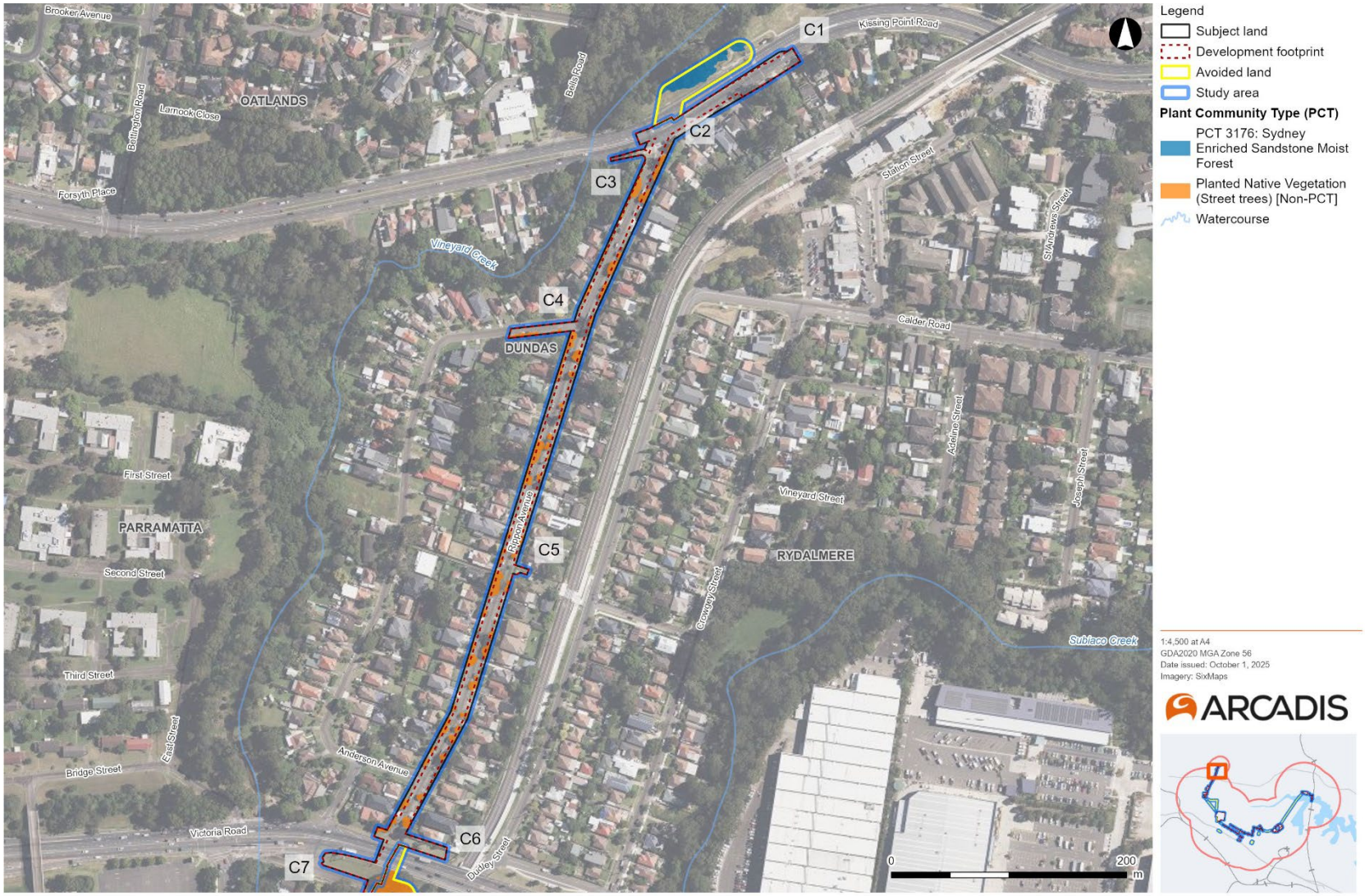


Figure 4-11: Ground-truthed vegetation



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Figure 4-12: Ground-truthed vegetation – Segment 1



Figure 4-13: Ground-truthed vegetation – Segment 2

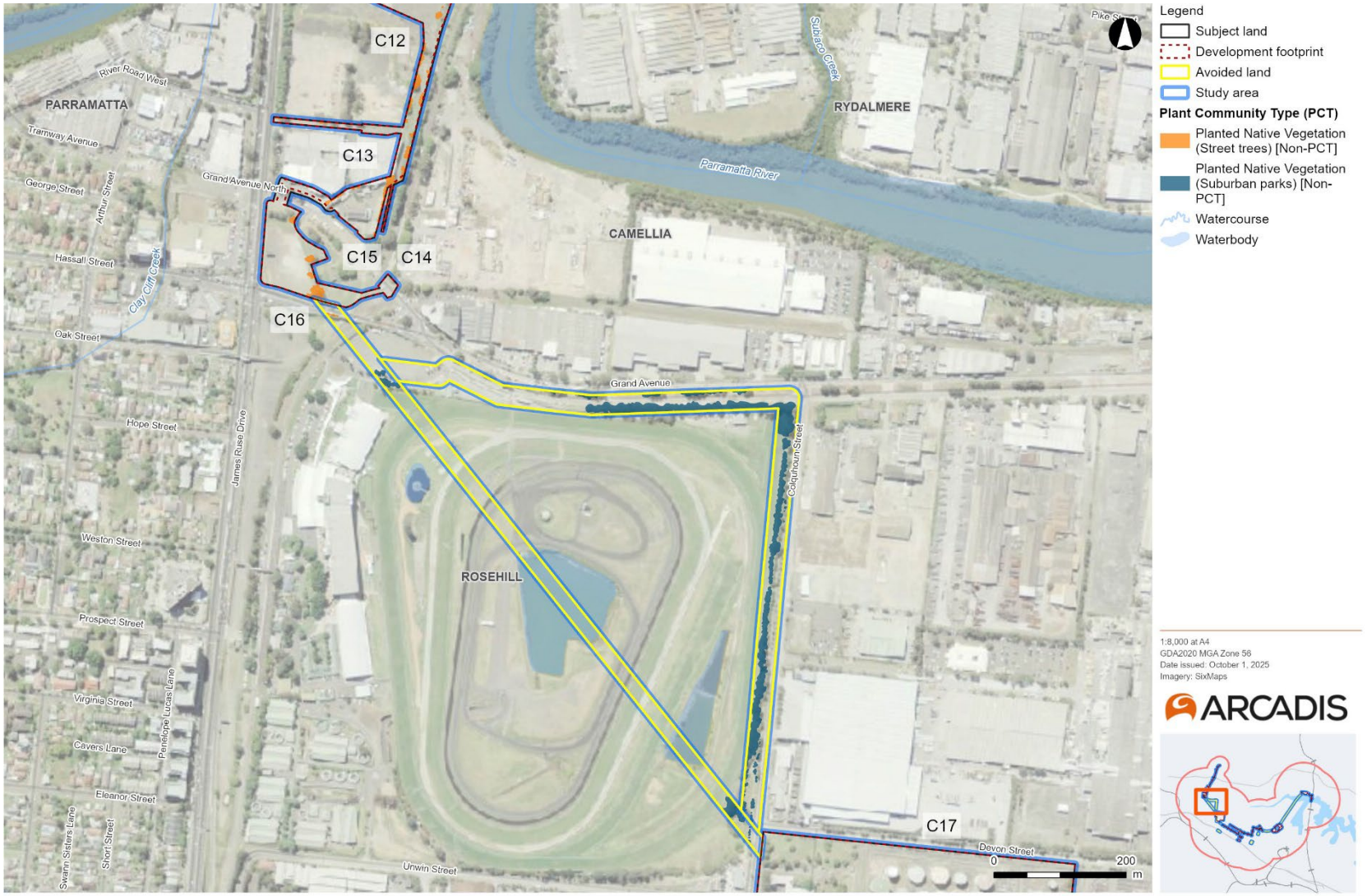


Figure 4-14: Ground-truthed vegetation – Segment 3

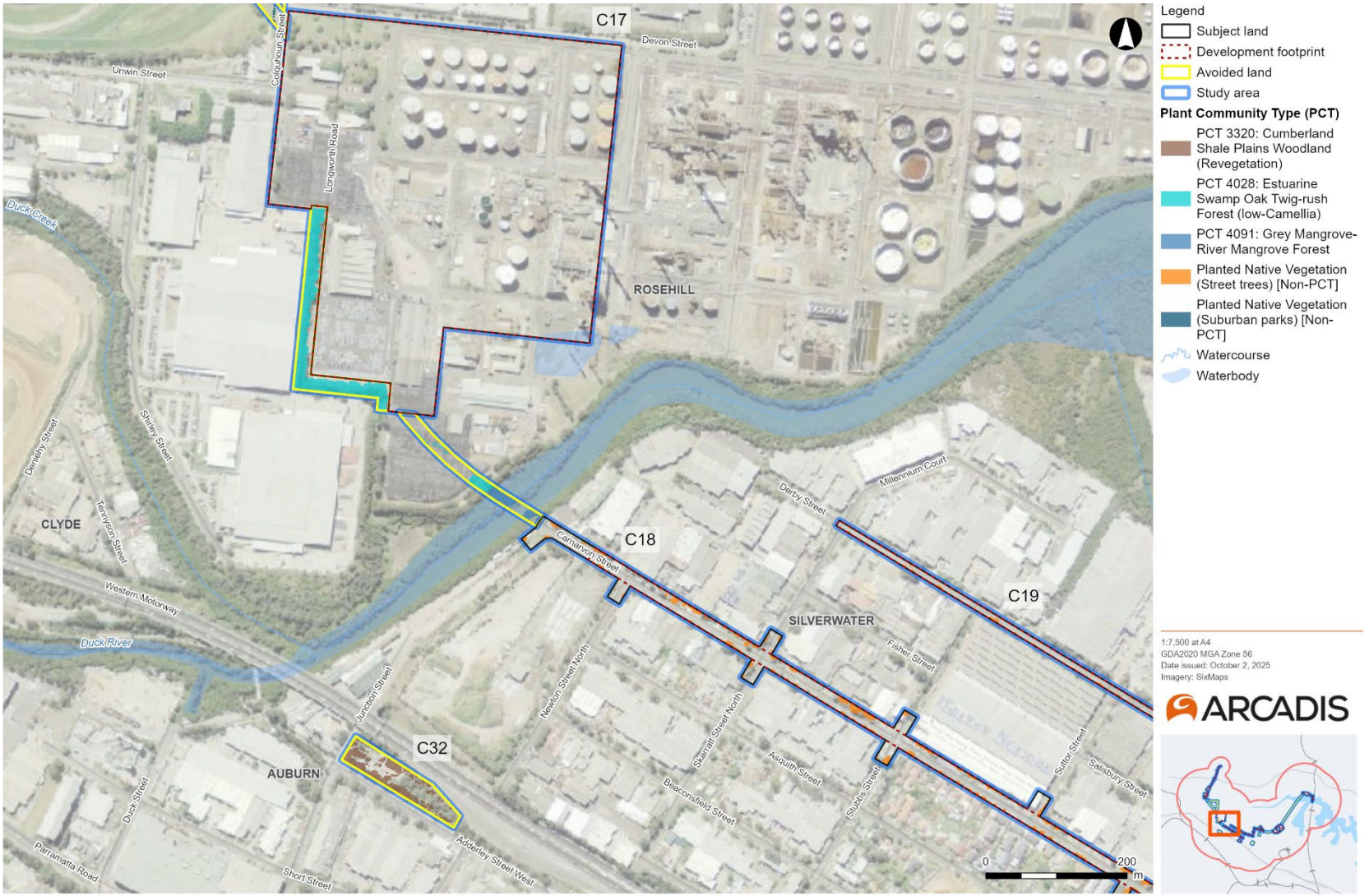


Figure 4-15: Ground-truthed vegetation – Segment 4

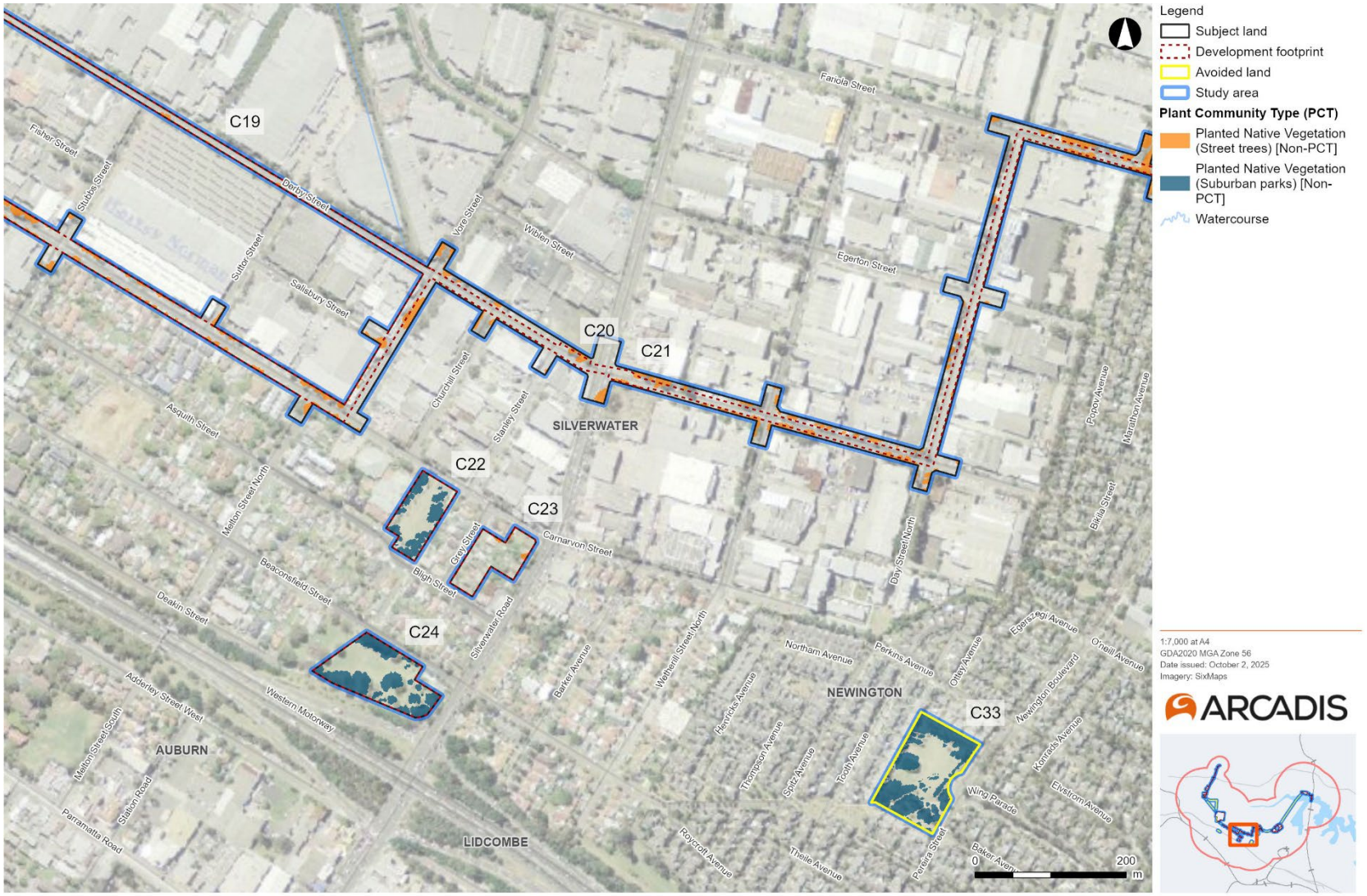


Figure 4-16: Ground-truthed vegetation – Segment 5

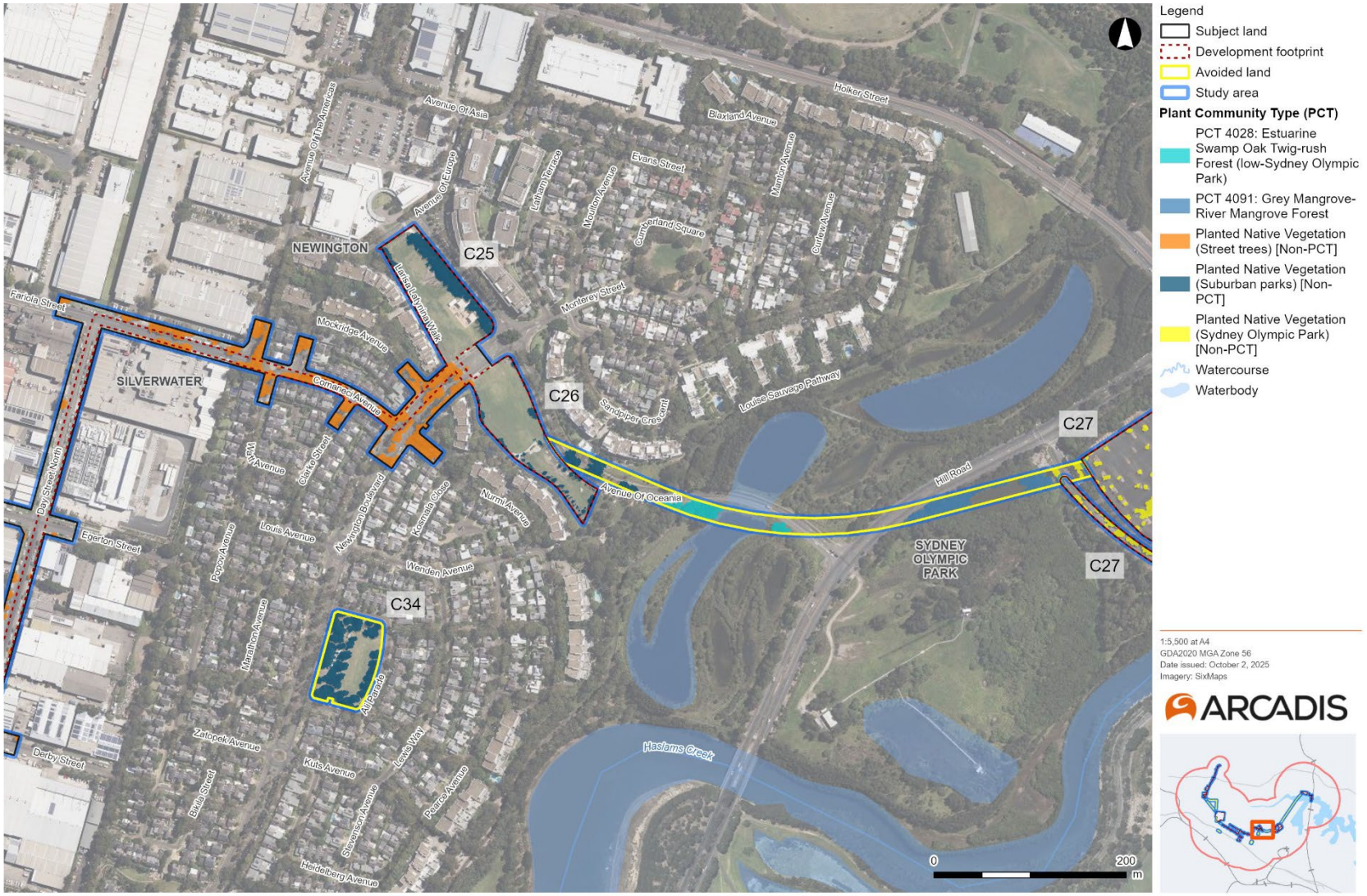


Figure 4-17: Ground-truthed vegetation – Segment 6

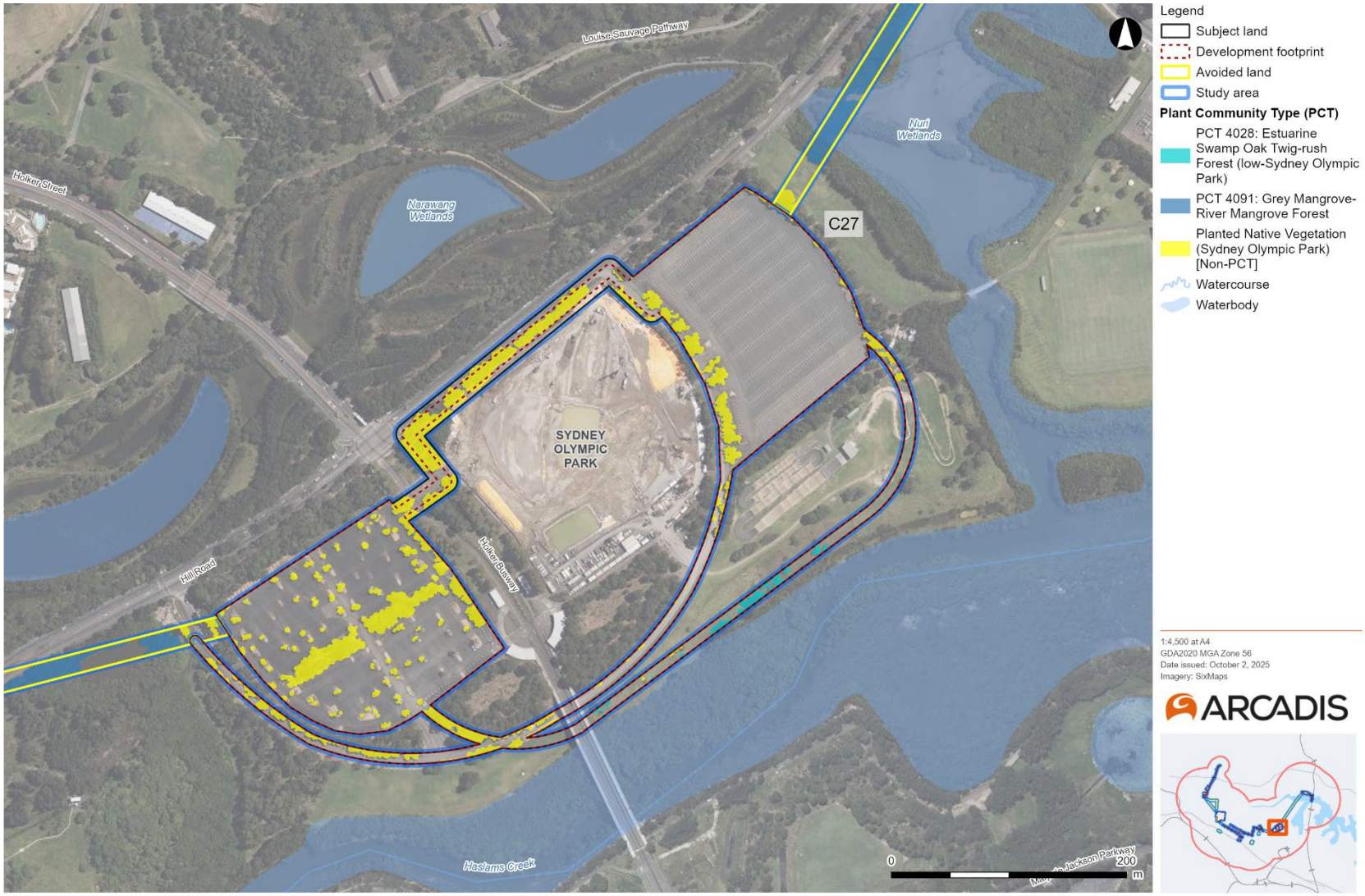
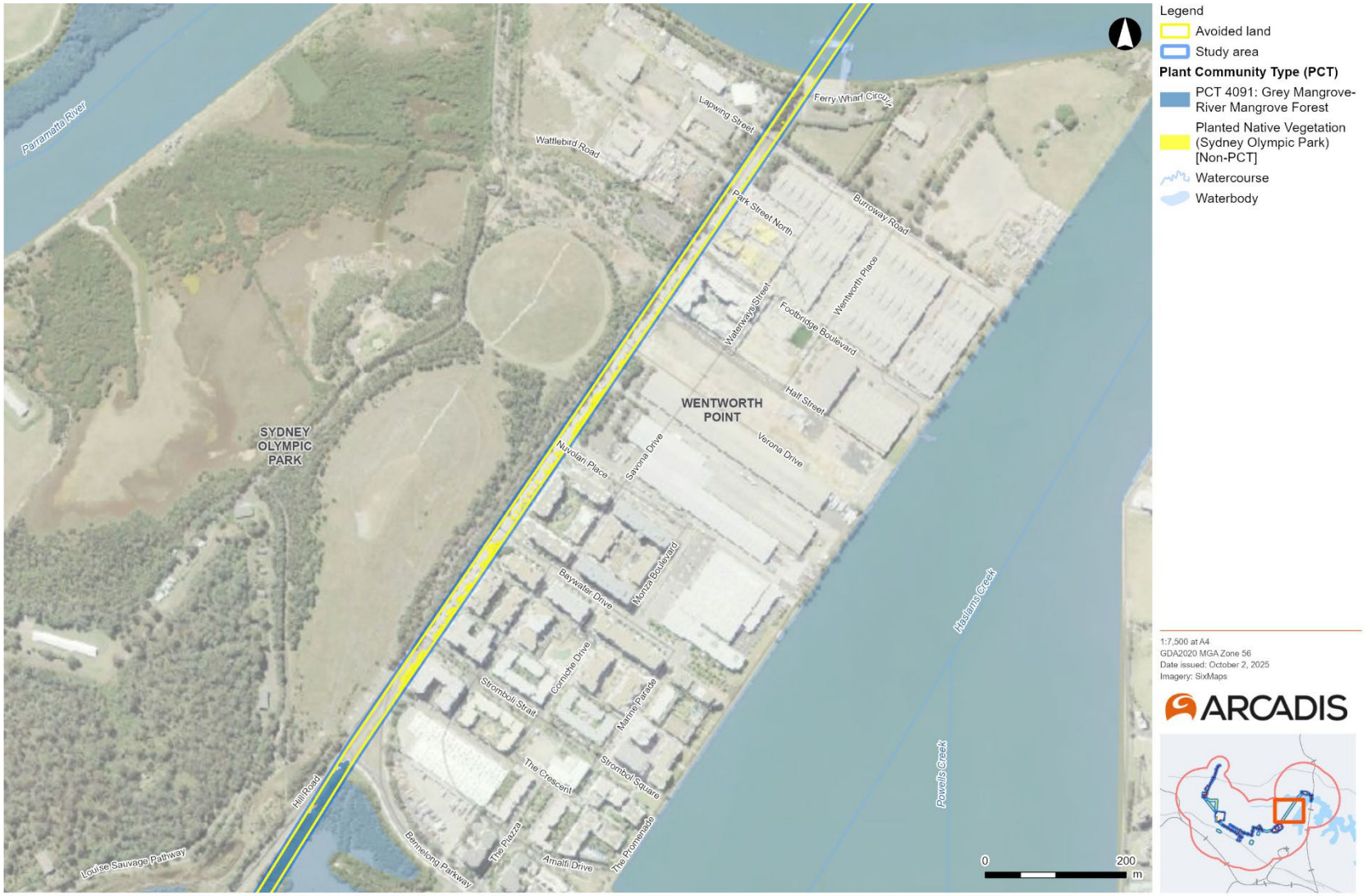


Figure 4-18: Ground-truthed vegetation – Segment 7



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Figure 4-19: Ground-truthed vegetation – Segment 8

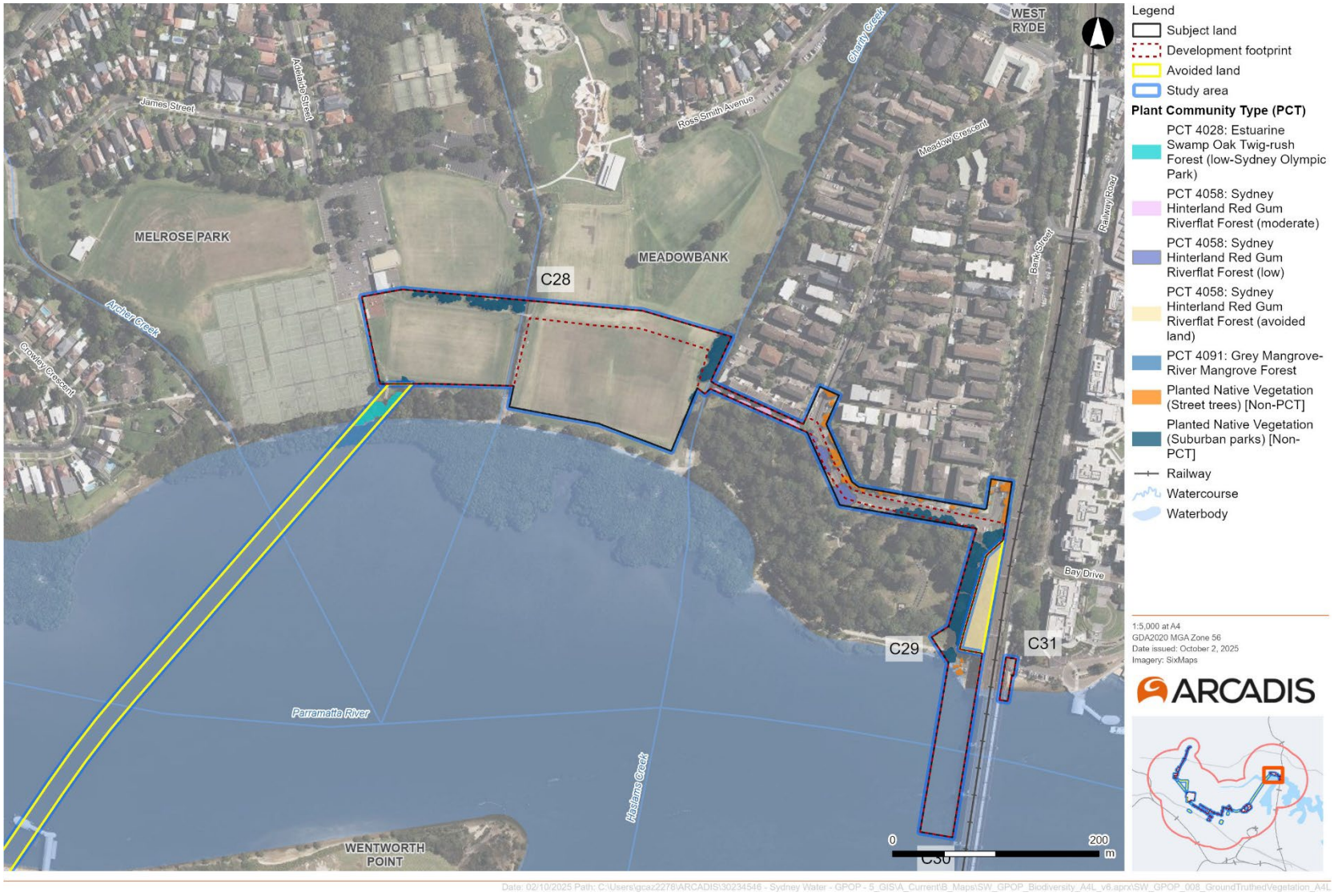


Figure 4-20: Ground-truthed vegetation – Segment 9

4.2.3 Description of vegetation within the subject land and study area

The pipeline alignments for the project extend over more than 10 linear km of urban land. Within the subject land, street trees and planted native vegetation in landscaped areas are the dominant forms of vegetation. Native vegetation conforming to a PCT type is limited within the subject land to some patchy, low-condition revegetation south of UrbnSurf in Sydney Olympic Park, and a mixture of remnant and planted native vegetation within Memorial Park in Meadowbank. Native vegetation is more extensive within the avoided lands that comprise the remainder of the study area, particularly in areas that are horizontally directionally drilled.

To facilitate understanding of the assessment of vegetation communities across this extensive, largely linear study area, detailed descriptions of vegetation within each of the project segments described in Section 1.1.61.1.4 and adjacent areas that have been avoided follow. Exotic species have been denoted with a "*".

Segment 1 (Figure 4-12)

Vegetation within Segment 1 consists of a mix of native and exotic street trees. Native trees have been classified as Planted Native Vegetation (street trees). There is no PCT vegetation within this segment. Detailed descriptions follow.

- Most of Segment 1 and Segment 2 will be relining an existing pipeline. Access to the pipe is needed via maintenance holes, but not across the full alignment.
- At the commencement of the brine pipeline alignment, and within the small construction compound there (C1), street trees include *Platycladus orientalis* (Chinese arborvitae)*, *Jacaranda mimosifolia* (Jacaranda)* and *Murraya paniculata* (Murraya)*.
- There is a patch PCT 3176: Sydney Enriched Sandstone Moist Forest within a former alignment in Fred Robertson Park to the north of the final alignment. The alignment was revised to avoid impacts to this native vegetation.
- There is no native vegetation within construction compounds C2 and C3. Exotic trees include *Nerium oleander* (Oleander)* and *Acer negundo* (Boxelder maple)*.
- At construction compound C4, street trees include *Callistemon viminalis* (Weeping Bottlebrush), *Pittosporum undulatum* (Sweet Pittosporum), *Melaleuca linariifolia* (Flax-leaved Paperbark) and *Ulmus parvifolia* (Chinese Elm)*.
- The most common street tree along the alignment on Rippon Avenue is *C. viminalis*. Other species include *Prunus cerasifera* (Cherry Plum)*, *Liquidamber styraciflua* (Sweetgum)*, *Banksia spinulosa* (Hairpin Banksia).
- Vegetation within construction compound C6 on the north embankment to Victoria Road is limited to exotic grasses such as *Cenchrus clandestinus* (Kikuyu)* and *Paspalum dilatatum* (Paspalum)*. Within construction compound C7 on the south embankment of Victoria Road, there are six recently planted *Corymbia maculata* (Spotted Gum) within exotic grasses, and some overhanging canopy from a *Eucalyptus saligna* (Sydney Blue Gum).

Segment 2 (Figure 4-13)

Vegetation within Segment 2 consists of a mix of native and exotic street trees. Native trees have been classified as Planted Native Vegetation (street trees). There is no PCT vegetation within this segment. Detailed descriptions follow.

- From the south embankment of Victoria Road, the brine pipeline alignment runs south along a service drive, which is adjacent to overhanging *Eucalyptus microcorys* (Tallowwood).
- The brine pipeline alignment continues south through a carpark and then crosses Vineyard Creek. Vegetation on either bank of Vineyard Creek is largely exotic, including *Cinnamomum camphora* (Camphor Laurel)*, *Erythrina* sp. (Coral Tree)*, *Cardiospermum grandiflorum* (Balloon Vine)*, *Ricinus communis* (Castor Oil Plant)*, *Ageratina adenophora* (Crofton Weed)* and *Persicaria lapthifolia* (Pale Knotweed).

- Within the construction compound (C8) on the campus of the Western Sydney University (WSU) south of Vineyard Creek, vegetation consists of exotic grasses such as *C. clandestinus*.*
- Along Railway Street on the UWS campus, most vegetation is exotic, including *Celtis senensis* (Japanese Hackberry)*, *C. camphora** and *Schinus molle* (Pepper Tree)*, with some planted *Lophostemon confertus* (Brush Box) interspersed.
- Construction compounds C9 and C10 are lined with *L. confertus* and *Photinia serratifolia* (Chinese Photinia)*.
- There is an area of avoided land to the west of the final alignment. This area does not contain native PCT vegetation, but the final alignment avoids impacts to planted native street trees.
- Construction compound C11 is primarily maintained exotic lawn. Within the grassed area are a number of recently planted *Ficus rubiginosa* (Port Jackson Fig) and *Waterhousea floribunda* (Weeping Lilly Pilly).
- For the crossing of Parramatta River, the existing pipeline over Parramatta River (dedicated pipe bridge), will be used. Where the brine pipeline meets the support structure on the northern bank there is weedy vegetation including *Lantana camara* (Lantana)*, *C. grandiflorum** and *R. communis**. The railway crossing passes above some small *Casuarina glauca* (Swamp Oak).
- Construction compound C12 is almost entirely paved. At the eastern edge of the paved area of C12 are a handful of exotic and native trees including *C. sinensis**, *Olea europaea* (Common olive)*, *L. confertus* and *C. camphora**.

Segment 3 (Figure 4-14)

Vegetation within Segment 3 consists of a mix of native and exotic street trees and plantings within suburban parks. Native trees have been classified as Planted Native Vegetation (street trees) and Planted Native Vegetation (suburban parks). There is no PCT vegetation within this segment.

- South of the Parramatta River, the brine pipeline alignment runs south alongside the railway alignment to the location of the upgraded Camellia pumping station (C15). Native vegetation within the railway corridor is dominated by *L. confertus* and also includes such native and exotic ornamentals as *Lomandra confertifolia* (Mat-rush) and *Cenchrus setaceus* (Fountain Grass)* and weeds such as *L. camara** and *Rubus fruticosus* sp. agg. (Blackberry)*.
- Construction compound C12 is almost entirely paved. The edges of C13 are lined with *C. camphora**, *Senna pendula** and *Populus* sp. (Poplar)*.
- Vegetation within Camellia pumping station (C15) mostly consists of exotic species such as *Cupressus* sp. (Cypress)*, *Phoenix canariensis* (Canary Island Date Palm)* and *Syagrus romanzoffiana* (Cocos Palm)*. *Acacia floribunda* (White Sally Wattle) and *Melaleuca styphelioides* (Prickly-leaved Tea Tree) are found at the edge of the site.
- From construction compound C14 to the south of the Camellia pumping station, there is an open-trenched alignment for the brine and transfer pipelines, which crosses Grand Avenue North and the Parramatta Light Rail. There is a large construction compound north of Grand Avenue (C16) as well as a smaller construction compound attached (C14).
- Within C16 there are several planted native trees including *Corymbia citriodora* (Lemon-scented Gum), *Angophora floribunda* (Rough-barked Apple), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus botryoides* (Bangalay), as well as the exotic *C. camphora** and *O. europaea*.* Construction compound C14 is unvegetated.
- The brine and transfer pipelines would be horizontally directionally drilled under Rosehill Gardens Racecourse to the WRRF. This avoids impacts to the racecourse and also to extensive patches of planted native vegetation along Grand Avenue and Colquhoun Street, where an open-trenched alignment was considered.

Segment 4 (Figure 4-15)

Vegetation within Segment 4 consists of avoided native PCT vegetation and street trees within the subject land.

- The new WRRF (C17) is adjacent to a patch of PCT 4028: Estuarine Swamp Oak Twig-rush Forest. This native vegetation has been avoided by the project.
- The launch pit for an HDD alignment under the Duck River is located within the WRRF site (river release pipeline).
- As the HDD alignment crosses the Duck River, it avoids impacts to patches of PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4091: Grey Mangrove-River Mangrove Forest.

Segment 5 (Figure 4-16)

Vegetation within Segment 5 consists of a mix of native and exotic street trees and plantings within suburban parks. Native trees have been classified as Planted Native Vegetation (street trees) and Planted Native Vegetation (suburban parks). There is no PCT vegetation within this segment.

- The HDD alignment for the river release pipeline emerges from underneath the Duck River at an exit pit located on Carnarvon Street. The Carnarvon Street open-trenched river release pipeline alignment is lined with planted native street trees, predominantly *Melaleuca quinquenervia* but also including *L. confertus*, *C. viminalis*, *F. rubiginosa*, as well as exotic species such as *Fraxinus* sp. (Ash)*, *Magnolia grandiflora* (Southern Magnolia)*, *J. mimosifolia**, *Robinia pseudoacacia* (Mop Top Robinia)* and *Plumeria* sp. (Frangipani)*.
- To the south of construction compound C18 a construction compound (C32) was planned on Sydney Water and Transport for NSW land adjacent to the Western Motorway. Following field survey that identified PCT 3320: Cumberland Shale Plains Woodland at the site, C32 was removed from the subject land to avoid impacts to this native vegetation.
- Construction compound C19 has somewhat different street trees from Carnarvon Street, including *Tristaniopsis laurina* (Water Gum), *Corymbia maculata* (Spotted Gum), *Eucalyptus microcorys* (Tallowwood). These trees also characterise Derby Street and Day Street northeast of the Silverwater Road crossing, near construction compounds C20 and C21.
- Construction compounds C22 and C24 are located in suburban parks. These parks are planted with a variety of native and exotic species, which are described in detail in Section 4.3.7.2.
- Two construction compounds located in suburban parks in Newington and Silverwater (C33 and C34) were determined not to be required for the project. Removing them from the impact area avoids indirect impacts to the planted native vegetation within those suburban parks.

Segment 6 (Figure 4-17)

Vegetation within Segment 6 consists of avoided native PCT vegetation and planted native vegetation within the subject land.

- Along Fariola Street and Comaneci Avenue in Newington, street trees are strongly dominated by *Corymbia maculata* (Spotted Gum), with occasional *Brachychiton acerifolius* (Illawarra Flame Tree) and *L. confertus.*
- Construction compounds C25 and C26 are located in within Pierre de Coubertin Park. The planted native vegetation in these parks is described in detail in Section 4.3.7.2.
- The HDD pit for drilling underneath the Narawang Wetlands is located within Pierre de Coubertin Park. The HDD alignment for the river release pipeline will cross underneath the Narawang Wetlands adjacent to the Holker Street Bridge, where it goes under patches of PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4091: Grey Mangrove-River Mangrove Forest.

Segment 7 (Figure 4-18)

Vegetation within Sydney Olympic Park includes planted native vegetation and a small patch of PCT 4028: Estuarine Swamp Oak Twig-rush Forest within a laydown area for HDD pipe string (C27). This vegetation is described in detail in Sections 4.3.2.2, 4.3.7.3 and 4.3.7.3.

- The HDD alignment for the river release pipeline emerges at the HDD pit within the carpark to the southwest of Urbnsurf (C27).

- In the P5 carpark northeast of Urbnsurf, another launch pit will be located to allow for further HDD (C27). The HDD alignment will run northeast underneath the Nuri Wetlands where it will go under PCT 4091: Grey Mangrove-River Mangrove Forest.

Segment 8 (Figure 4-19)

All of Segment 8 will be horizontally directionally drilled. Avoided vegetation includes avoided patches of PCT 4091: Grey Mangrove-River Mangrove Forest adjacent to Hill Road and planted native vegetation along Hill Road.

Segment 9 (Figure 4-20)

Vegetation within the final segment of the project and river release pipeline includes planted native vegetation and small patches of PCT 4058: Sydney Hinterland Red Gum Riverflat Forest.

- The HDD pit for the HDD alignment after it crosses the Parramatta River is located within a sporting field in Meadowbank Park (C28). The open-trenched river release pipeline alignment through Meadowbank Park is lined with planted *M. quinquenervia*.
- From the eastern bank of Charity Creek, the open-trenched river release pipeline alignment runs along a cleared area between an apartment block to the north and native vegetation in Memorial Park to the south. Here the subject land overlaps slightly with vegetation mapped as PCT 4058: Sydney Hinterland Red Gum Forest (moderate). This vegetation is described in detail in Section 4.3.3.2.
- The open-trenched alignment that follows the Meadow Crescent Street alignment overlaps with vegetation mapped as PCT 4058: Sydney Hinterland Red Gum Forest (low). This vegetation is described in detail in Section 4.3.3.2.
- Where the open-trenched river release pipeline alignment turns south to run through Memorial Park to the Parramatta River, it crosses through patches of vegetation mapped as Planted Native Vegetation (suburban parks). Species within these patches include *Eucalyptus grandis* (Flooded Gum), *L. confertus*, *Grevillea robusta* (Silky Oak), *E. robusta* (Swamp Mahogany), *F. rubiginosa*, *Syncarpia glomulifera* (Turpentine), *C. maculata*, and *Casuarina glauca* (Swamp Oak).
- Adjacent to the river release pipeline alignment and outside the subject land, there is a small patch of PCT 4058: Sydney Hinterland Red Gum Forest (avoided land).
- There are three small construction compounds near the John Whitton Bridge (C29, C30 and C31). These are located within carparks.

4.2.4 Changes to mapped native vegetation extent between the SVTM and ground-truthed vegetation mapping

The SVTM maps very little native vegetation with the subject land. Field survey has largely confirmed the general location and extent of native vegetation communities within the subject land but has increased both the extent of native vegetation and the PCTs mapped. Changes in mapping are as follows, from west to east:

- The SVTM maps a very small sliver of PCT 3176: Sydney Enriched Sandstone Moist Forest within the subject land near Vineyard Creek. This area has not been mapped as native vegetation within ground-truthed vegetation mapping, as it consists of exotic lawn on Western Sydney University campus (compare Figure 4-2 and Figure 4-12).
- The SVTM does not map any native vegetation within or near the footprint of the WRRF (C17). Field survey has identified a very small patch of PCT 4028: Estuarine Swamp Oak Twig-rush Forest adjacent to but outside the WRRF footprint (compare Figure 4-5 and Figure 4-15).
- The SVTM does not map any native vegetation within the footprint of laydown areas for HDD pipe string south of C27 in Sydney Olympic Park. Field survey has identified a small occurrence of PCT 4028: Estuarine Swamp Oak Twig-rush Forest within the HDD pipes string laydown footprint (compare Figure 4-8 and Figure 4-18).

- The SVTM does not map any native vegetation within the river release pipeline alignment within Memorial Park in Meadowbank. Field survey has identified a small occurrence of PCT 4058: Sydney Hinterland Red Gum Riverflat Forest within the river release pipeline alignment in Memorial Park (compare Figure 4-10 and Figure 4-20).

4.2.5 Non-native vegetation

There are extensive areas of non-native vegetation throughout the highly urbanised subject land for this project, in the form of exotic street trees, exotic lawns and ornamental plantings, and weeds within PCTs. In accordance with Section 4.1.2 of the BAM, this exotic vegetation is not assessed in this BDAR except insofar as it is habitat for threatened species.

4.3 Vegetation community descriptions

4.3.1 Overview

Descriptions of the vegetation communities present within the subject land and study area are provided in the following sections. Excerpts from the BioNet Vegetation Classification profile are presented for each of the PCTs identified within the subject land and study area in order to provide a baseline for a 'typical' occurrence of the PCT. Following the BioNet profile, descriptions are provided of the PCT as observed within the subject land. Descriptions of the planted native vegetation and exotic vegetation observed within the subject land are also provided. Exotic species have been denoted with a "*".

4.3.2 PCT 4028 – Estuarine Swamp Oak Twig-rush Forest

4.3.2.1 BioNet profile for PCT 4028

The BioNet profile data for PCT 4028 can be viewed below in Table 4-4:.

Table 4-4: Attribute information for PCT 4028 in the subject land

Attribute	PCT 4028 in the subject land
Vegetation formation	KF_CH9 Forested Wetlands
Vegetation class	Coastal Floodplain Wetlands
PCT name	Estuarine Swamp Oak Twig-rush Forest
PCT ID	4028
Conservation status	BC Act: Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (EEC) EPBC Act: Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community (EEC)
Estimate of percent cleared	63.36 %
Vegetation description (NSW DCCEEW, 2025b)	A tall to very tall open forest or woodland featuring ***Casuarina glauca*** and usually *Machaerina juncea* and *Juncus kraussii* subsp. *australiensis*, occurring on the edges of tidal estuarine flats and tidal creek flats along the NSW coast, usually at elevations of below 10 metres asl. *Casuarina glauca* almost always forms a sparse to mid-dense tree layer, rarely accompanied by *Melaleuca quinquenervia*. A sparse or very sparse small tree or scrub layer of *Melaleuca ericifolia* is occasionally present, while other Melaleuca species and other trees or shrubs only rarely occur. The mid-dense ground layer is primarily comprised of sedges, rushes, reeds and grasses that are tolerant of inundation, very frequently including *Machaerina juncea*

Attribute	PCT 4028 in the subject land
	and *Juncus kraussii* subsp. *australiensis*, commonly with *Phragmites australis*. Other species occasionally occurring in the ground layer include *Samolus repens*, *Lobelia anceps* and *Gahnia clarkei*, while more rare species include *Sporobolus virginicus*, *Apium prostratum* and *Hemarthria uncinata*, the latter three with variable cover from site to site. This PCT has been recorded from Sawtell south to Tuross Head, however, is likely to occur elsewhere along the NSW coast on the margins of brackish water bodies and watercourses. It is floristically related to PCT 4026 which occurs in similar environments, however PCT 4028 has a more consistent cover of *Casuarina glauca* and includes more species that are not tolerant of saline conditions. PCT 4028 occurs at slightly higher elevations than PCT 4026, or further upstream in areas with less frequent inundation. PCT 4028 overlaps spatially in the Hunter region with PCT 4038, with which it also weakly overlaps floristically, however PCT 4038 has thick *Melaleuca nodosa* which is only very rare and very sparse in PCT 4028.
Extent in subject land (ha)	0.06

4.3.2.2 PCT 4028 as observed within the subject land and study area

PCT 4028 occurs within the subject land at a single location in the southern HDD pipe string in Sydney Olympic Park (C27). It also occurs adjacent to the subject land along the western boundary of the WRRF site in Camellia (C17), in land avoided by the project. PCT 4028 is in a highly disturbed state in both locations.

At the Camellia location, PCT 4028 occurs at the outlets of two underground stormwater drains within an industrial area. The stormwater drains discharge into a concrete-lined channel that is crowded with dense aquatic and semi-aquatic vegetation such as *Typha orientalis* (Broadleaf Cumbungi), *Cyperus eragrostis* (Umbrella Sedge)*, *Sagittaria platyphylla* (Sagittaria)* and *Persicaria decipiens* (Slender Knotweed). The steep banks above the concrete channel are lined with mature *Casuarina glauca* (Swamp Oak), several regenerating *Glochidion ferdinandi* (Cheese Tree) and a large *Cinnamomum camphora* (Camphor Laurel)*. There are a handful of native understorey species such as *Homalanthus populifolius* (Bleeding Heart), *Acacia longifolia* (Sydney Golden Wattle) and *Cayratia clematidea* (Slender Grape). However, understorey vegetation is strongly dominated by exotic species, including *Solanum sisymbriifolium**, *Sida rhombifolia* (Paddy's Lucerne)*, *Bidens pilosa* (Cobbler's Pegs)*, *Lantana camara* (Lantana)* and *Solanum mauritianum* (Wild Tobacco Bush)*.

At the Sydney Olympic Park location, PCT 4028 occurs as a few small patches of *C. glauca* adjacent to mangrove forest (PCT 4091), with an almost entirely exotic understorey. *C. glauca*, *Acacia linifolia* (White Wattle) and *Centella asiatica* (Indian Pennywort) were the only native species recorded in the vegetation community. Approximately 80% of all groundcover was *Cenchrus clandestinus* (Kikuyu)* or *Chloris gayana* (Rhodes Grass)*, with the majority of the balance including such species as *Parietaria judaica* (Pellitory)*, *B. pilosa**, *Verbena bonariensis* (Purpletop)* and *Solanum nigrum* (Black-berry Nightshade)*.

4.3.2.3 Vegetation zones

PCT 4028 occurs in a single vegetation zone within the study area – low. However, because the two sites where PCT 4028 has been recorded occur approximately 3.5 km from each other and species composition between the two sites is significantly different, two vegetation zones have been created based on location: PCT 4028 (low – Camellia) and PCT 4028 (low – Sydney Olympic Park).

Photographs of each vegetation zone are in Plate 4-1 and Plate 4-2.



Plate 4-1: PCT 4028 (low – Camellia)



Plate 4-2: PCT 4028 (low – Sydney Olympic Park)

4.3.2.4 Justification of PCT selection

Determination of the most appropriate PCT for this vegetation community used the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation and floristics of vegetation. An initial filtering was carried out based on the IBRA Bioregion (Sydney) and subregion (Cumberland), the Forested Wetlands vegetation formation, and the species occurring within the BAM plots conducted at the two sites. Any PCTs identified that do not occur within the Cumberland subregion of the Sydney Bioregion were excluded from further analysis.

A total of 10 attributes were filtered for. The PCTs listed below matched 7, 8 or 9 attributes and were selected for further assessment:

- PCT 4028: Estuarine Swamp Oak Twig-rush Forest (9 matches)
- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (9 matches)
- PCT 4056: Southern Estuarine Swamp Paperbark Creekflat Scrub (8 matches)
- PCT 3985: Coastal Floodplain Swamp Paperbark Scrub (7 matches)
- PCT 4023: Coastal Valleys Riparian Forest (7 matches)
- PCT 4026: Estuarine Sea Rush Swamp Oak Forest (7 matches).

PCT 4028 was selected as the best-fit PCT on the basis that it matched a high number of attributes filtered for (9 of 10) and was consistent with the species recorded on site at canopy, shrub and groundcover level. The dominant canopy species recorded in BAM plots for the site, *C. glauca*, is the dominant and diagnostic canopy species for PCT 4028. The three shrub species recorded in plots, *A. linifolia, A. longifolia,* and *H. populifolius*, all occur within PCT 4028. Although only three groundcover species were recorded in plots, two of them, *T. orientalis* and *P. decipiens*, occur within PCT 4028. The characteristic landscape position of PCT 4028, which is 'on the edges of tidal estuarine flats and tidal creek flats along the NSW coast' (NSW DCCEEW, 2025b), is consistent with the location of the vegetation community within the subject land.

The remaining PCTs were not selected for the following reasons:

- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest was not selected because it is not dominated by *C. glauca.*
- PCT 4056: Southern Estuarine Swamp Paperbark Creekflat Scrub was not selected because it is dominated by *Melaleuca ericifolia* (Swamp Paperbark), which is not present within the subject land.
- PCT 3985: Coastal Floodplain Swamp Paperbark Scrub was not selected because it is dominated by *Melaleuca ericifolia* (Swamp Paperbark), which is not present within the subject land.
- PCT 4023: Coastal Valleys Riparian Forest was not selected because it is characterised by a mix of *C. glauca* and eucalypts. No eucalypts were recorded within this vegetation community in the subject land.
- PCT 4026: Estuarine Sea Rush Swamp Oak Forest, despite having only 7 of 10 attribute matches (IBRA region/subregion, vegetation formation and native species), is relatively consistent with the vegetation community in the canopy. However, it was not selected because understorey species recorded are more consistent with PCT 4028. *H. populifolius* and *P. decipiens*, which were both recorded at the Camellia site, are absent from PCT 4026 and present in PCT 4028.

4.3.2.5 Alignment with BC Act TECs

PCT 4028 is associated with the BC-listed Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC (Swamp Oak Floodplain Forest or SOFF). The BC Act includes all occurrences of any vegetation community that is within the listed community as described in the final determination; accordingly, the native vegetation within the subject land falls within the listed community.

4.3.2.6 Alignment with EPBC Act TECs

PCT 4028 is associated with the EPBC-listed Coast Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC (Swamp Oak Floodplain Forest or SOFF). Under the EPBC Act, vegetation communities must meet certain condition thresholds to be considered part of the listed community.

The native vegetation within the vegetation zone PCT 4028 Estuarine Swamp Oak Twig-rush Forest (low-Sydney Olympic Park) does not meet the required thresholds, as detailed in Table 4-5. Therefore, this vegetation zone is not considered to be part of the EPBC-listed community.

The native vegetation within the vegetation zone PCT 4028 Estuarine Swamp Oak Twig-rush Forest (low-Camellia) was not assessed against EPBC thresholds as it is not within the subject land and will not be directly impacted by the project.

Table 4-5: EPBC condition thresholds for Swamp Oak Floodplain Forest

Condition thresholds	Large patch The patch is at least 5ha	Medium patch The patch is at least 2 ha and less than 5 ha	Small contiguous patch** The patch is at least 0.5 ha and less than 2 ha, and is connected to a larger area of native vegetation of at least 5 ha	Small patch The patch is at least 0.5 ha and less than 2 ha	Assemblage of PCT 4028 within the subject land
High quality Predominantly native understory Non-native species comprise less than 20% of the total understorey vegetation cover*	Category A A large patch that meets key diagnostics and has a predominantly native understorey	Category B A medium patch that meets key diagnostics and has a predominantly native understorey	Category B A small patch that meets key diagnostics and has a predominantly native understorey and is contiguous with another large area of native vegetation	Category C A small patch that meets key diagnostics and has a predominantly native understorey	NOT CONSISTENT with PCT 4028 (low – Sydney Olympic Park) PCT 4028 within the subject land does not contain a predominantly native understorey with less than 20% exotic understorey vegetation cover.
Good quality Mostly native understorey Non-native species comprise less than 50% of total understorey vegetation cover* AND transformer species*** comprise less than 30% of total understorey vegetation cover*	Category B A large patch that meets key diagnostics and has a mostly native understorey	Category C A medium patch that meets key diagnostics and has a mostly native understorey	Category C A small patch that meets key diagnostics and has a mostly native understorey and is contiguous** with another large area of native vegetation	-	NOT CONSISTENT with PCT 4028 (low – Sydney Olympic Park) PCT 4028 within the subject land does not contain a mostly native understorey with less than 50% exotic understorey vegetation cover.
Moderate quality Some native understorey	Category C A large or medium patch that meets key	Category C A large or medium patch that meets key	-	-	NOT CONSISTENT with PCT 4028 (low – Sydney Olympic Park)

Non-native species comprise less than 80% of total understorey vegetation cover * AND transformer species***	diagnostics and has some native understorey	diagnostics and has some native understorey		Non-native species comprise more than 80% of total understorey vegetation cover within the Sydney Olympic Park plot.

4.3.3 PCT 4058 – Sydney Hinterland Red Gum Riverflat Forest

4.3.3.1 BioNet profile for PCT 4058

The BioNet profile data for PCT 4058 can be viewed below in Table 4-6:.

Table 4-6: Attribute information for PCT 4058 in the subject land

Attribute	PCT 4025 in the subject land
Vegetation formation	KF_CH9 Forested Wetlands
Vegetation class	Coastal Floodplain Wetlands
PCT name	Sydney Hinterland Red Gum Riverflat Forest
PCT ID	4058
Conservation status	BC Act: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (EEC) EPBC Act: River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (CEEC)
Estimate of percent cleared	28.40%
Vegetation description (NSW DCCEEW, 2025b)	A tall to very tall sclerophyll open forest with a mid-stratum of soft-leaved shrubs and small trees and a mesic, grassy ground cover found on alluvial flats of streams in the Sydney and Central Coast hinterland. It is known from the Nattai, Wollondilly, lower Coxs and Butchers Creek catchments, on streams draining sandstone in western Sydney, and along Wollombi Brook. A common feature of these catchments is the mix of quartz and clay-rich substrates which contribute a sandy component to the alluvium. The canopy very frequently includes red gum eucalypts (***Eucalyptus tereticornis*** or *Eucalyptus amplifolia*), commonly associated with ***Angophora floribunda***. The sparse mid-stratum is layered and almost always includes tall Acacia species such as *Acacia parramattensis* or *Acacia floribunda*. The scattered shrubs that complete the mid-stratum commonly include ***Breynia oblongifolia***, ***Bursaria spinosa*** and the scrambler Rubus parvifolius. The ground layer is typically characterised by a dense cover of grasses, soft-leaved forbs, vines and ferns. *Microlaena stipoides* and *Entolasia marginata* are almost always present and ***Oplismenus aemulus***, ***Dichondra repens*** and *Sigesbeckia orientalis* subsp. *orientalis* are very frequent. Common ground covers include *Clematis glycinoides*, *Lobelia purpurascens*, *Adiantum aethiopicum*, *Pteridium esculentum* and *Stephania japonica* var. *discolor*. This PCT typically occurs at elevations below 200 metres asl in a warm, moist climate. It shares several habitat and floristic characteristics with PCTs 4025 and 3258. It has similar canopy species to PCT 4025, however that PCT lacks mesic shrubs and vines and occurs in catchments dominated by clay-rich substrates. This PCT and PCT 3258 both occur on alluvium with a sandy component and in a sheltered landscape position, however blue gums are very frequent in the canopy of the latter PCT.
Extent in subject land (ha)	0.12

4.3.3.2 PCT 4058 as observed within the subject land and study area

PCT 4058 occurs within the subject land and study area in Memorial Park in Meadowbank. PCT 4058 at this site is generally within a disturbed state, with relatively non-diverse understorey that is dominated by exotic or disturbance-tolerant native species. The shrub layer varies from absent to moderate. Much of the vegetation

community occurs within maintained suburban parkland, with a mown or mulched understorey. However, a patch of fully structured vegetation near Charity Creek may be remnant vegetation.

The canopy of PCT 4058 within Memorial Park is dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple). *Casuarina glauca* (Swamp Oak), *Eucalyptus punctata* (Grey Gum) and *Corymbia maculata* (Spotted Gum) also occur frequently. Where shrubs occur, species include *Breynia oblongifolia* (Coffee Bush), *Bursaria spinosa* (Blackthorn) and *Homalanthus populifolius* (Bleeding Heart). Outside maintained areas dominated by exotic lawn or mulch, groundcover species include *Imperata cylindrica* (Blady Grass), *Oplismenus aemulus* (Australian Basket Grass) and *Pandorea pandorana* (Wonga Wonga Vine).

4.3.3.3 Vegetation zones

PCT 4058 occurs in two vegetation zones within the subject land – moderate and low. PCT 4058 also occurs within avoided land along the southeastern boundary of the park.

PCT 4058 (moderate) occurs in the northwest corner of Memorial Park in an area that may be remnant vegetation. PCT 4058 is fully structured within this patch with canopy characteristic of the vegetation community, shrubs that include *B. oblongifolia* and *B. spinosa*, and a largely native groundcover dominated by *I. cylindrica* and *P. pandorana*.

PCT 4058 (low) occurs along Meadow Crescent. In this vegetation zone, native trees that are characteristic of PCT 4058 such as *E. tereticornis* occur in the verge adjacent to the street, but the understorey consists of mown, largely exotic grasses. Shrubs and smaller native trees have been removed, and the vegetation community in this vegetation zone consists solely of remnant trees.

PCT 4058 (avoided land) may also be remnant vegetation. The canopy here consists of a mix of species that is not entirely typical of PCT 4058, but also not inconsistent with the PCT, such as *E. punctata*, *C. glauca, G. ferdinandi* and *C. maculata*. The understorey is not maintained and largely consists of exotic species such as *Ehrharta erecta* (Panic Veldtgrass)*, *Lantana camara* (Lantana)* and *Bromus catharticus* (Prairie Grass)*, but there are also natives including *Lomandra longifolia* (Spiny Mat-rush), *Dianella caerulea* (Blue Flax-lily) and *Tetragonia tetragonoides* (New Zealand Spinach).

Photographs of each vegetation zone are in Plates 4-3, 4-4 and 4-5.



Plate 4-3: PCT 4058 (moderate)



Plate 4-4: PCT 4058 (low)



Plate 4-4: PCT 4058 (avoided land)

4.3.3.4 Justification of PCT selection

Determination of the most appropriate PCT for this vegetation community used the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation and floristics of vegetation. An initial filtering was carried out based on the IBRA Bioregion (Sydney) and subregion (Cumberland) and the species occurring within the BAM plots conducted within Memorial Park. Any PCTs identified that do not occur within the Cumberland subregion of the Sydney Bioregion were excluded from further analysis. In addition, PCTs within the Rainforest vegetation formation were excluded, as the vegetation community within Memorial Park did not conform to this formation.

A total of 16 attributes were filtered for. The PCTs listed below matched either 15 or 16 attributes and were selected for further assessment:

- PCT 3136: Blue Gum High Forest (16 matches)
- PCT 3592: Sydney Coastal Enriched Sandstone Forest (16 matches)
- PCT 3594: Sydney Coastal Sandstone Foreshores Forest (16 matches)
- PCT 3176: Sydney Enriched Sandstone Moist Forest (15 matches)
- PCT 3262: Sydney Turpentine Ironbark Forest (15 matches)
- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (15 matches).

In addition, PCT 4025: Cumberland Red Gum Riverflat Forest was assessed further, despite matching only 12 of the 16 attributes filtered for, because the two dominant native canopy species within Memorial Park, *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple), are among the most dominant canopy species within PCT 4025.

PCT 4058 was selected as the best-fit PCT on the basis that it matched a high number of attributes filtered for (15 of 16), was consistent with the species recorded on site at canopy, shrub and groundcover level, and

occupies a landscape position consistent with the location of the vegetation. The two dominant canopy species recorded in BAM plots for the site, *E. tereticornis* and *A. floribunda*, are the first and second most common tree canopy species within PCT 4058 (the mid-canopy *Acacia parramattensis* is the most common tree species in PCT 4058). *Breynia oblongifolia* (Coffee Bush) and *Bursaria spinosa* (Blackthorn), which were both recorded on site, are the first and third most frequently recorded shrub species, respectively, in PCT 4058. The native groundcover species recorded within the BAM plot, *Imperata cylindrica* (Blady Grass), *Oplismenus aemulus* (Australian Basket Grass), Pandorea pandorana (Wonga Wonga Vine) and *Cayratia clematidea* (Slender Grape) are all commonly recorded in PCT 4058. In addition, PCT 4058 is commonly found in catchments with a 'mix of quartz and clay-rich substrates which contribute a sandy component to the alluvium' (NSW DCCEEW, 2025b). The landscape position of Memorial Park is consistent with this. It is on the banks of the Parramatta River within the Gymea soil landscape, which contains Hawkesbury sandstone with minor shale lenses (NSW DCCEEW, 2024c).

The remaining PCTs were not selected for the following reasons:

- PCT 3136: Blue Gum High Forest was not selected because its defining tree species, *Eucalyptus saligna* (Sydney Blue Gum), was not recorded, and the two dominant canopy species on site, *E. tereticornis* and *A. floribunda*, are relatively uncommon within PCT 3136.
- PCT 3592: Sydney Coastal Enriched Sandstone Forest was not selected because its three most common canopy species, *Angophora costata* (Sydney Red Gum), *Allocasuarina littoralis* (Black She-oak) and *Corymbia gummifera* (Red Bloodwood), were not recorded, and the two dominant canopy species on site, *E. tereticornis* and *A. floribunda*, are uncommon within PCT 3592
- PCT 3594: Sydney Coastal Sandstone Foreshores Forest was not selected because three of its four most common canopy species, *A. costata*, *Notelaea longifolia* (Large Mock-olive) and *Banksia integrifolia* (Coast Banksia) were not recorded, and the two dominant canopy species on site, *E. tereticornis* and *A. floribunda*, are uncommon within PCT 3594.
- PCT 3176: Sydney Enriched Sandstone Moist Forest was not selected because its three most common canopy species, *A. costata, Syncarpia glomulifera* (Turpentine) and *Eucalyptus pilularis* (Blackbutt), were not recorded or are uncommon within Memorial Park, and the two dominant canopy species on site, *E. tereticornis* and *A. floribunda*, are uncommon within or absent from PCT 3176.
- PCT 3262: Sydney Turpentine Ironbark Forest was not selected because its defining tree species, *S. glomulifera* was not recorded within the BAM plot and was relatively uncommon within Memorial Park, and two dominant canopy species on site, *E. tereticornis* and *A. floribunda*, are relatively uncommon within PCT 3262.
- PCT 4025: Cumberland Red Gum Riverflat Forest, despite having only 12 of 16 attribute matches (IBRA region/subregion and native species), is relatively consistent with the vegetation community in the canopy. However, it was not selected because groundcover species recorded are more consistent with PCT 4058. The two most dominant groundcover species, *P. pandorana* and *I. cylindrica*, are both more common in PCT 4058 than in PCT 4025. In addition, several species recorded within the BAM plot, including *Glochidion ferdinandi* (Cheese Tree) and *Ficus rubiginosa* (Port Jackson Fig), are entirely absent from PCT 4025 but are present within PCT 4058.

4.3.3.5 Alignment with BC Act TECs

PCT 4058 is associated with the BC-listed River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC (Red Gum Riverflat Forest or RGRF). The BC Act includes all occurrences of any vegetation community that is within the listed community as described in the final determination; accordingly, the native vegetation within the subject land falls within the listed community.

4.3.3.6 Alignment with EPBC Act TECs

PCT 4058 is associated with the EPBC-listed River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria CEEC (Red Gum Riverflat Forest or RGRF). Under the EPBC Act, vegetation communities must meet certain condition thresholds to be considered part of the listed community.

The native vegetation within the vegetation zone PCT 4058 Sydney Hinterland Red Gum Riverflat Forest (moderate) meets the threshold for Good condition – Class C1 Small patch in good condition (Table 4-7). Therefore, this vegetation zone is considered to be part of the EPBC-listed community.

The native vegetation within the vegetation zone PCT 4058 Sydney Hinterland Red Gum Riverflat Forest (low) does not meet the required thresholds, as detailed in Table 4-7. Therefore, this vegetation zone is not considered to be part of the EPBC-listed community.

Table 4-7: EPBC Act condition thresholds for Red Gum Riverflat Forest

Condition thresholds	Large patch ≥2 ha Small contiguous patch** Patch size ≥ 0.5 ha within a larger area of native vegetation ≥ 5 ha	Small patch The patch is at least 0.5 ha and less than 2 ha	Assemblage of PCT 4058 within the subject land
High condition **≥ 80% of its total perennial understorey is comprised of native species** **AND** **Ground cover richness ≥ 10 native species per sample plot** **AND** **≥ 20 large trees per ha**	**Class A1** Large or contiguous patch in high condition	**Class B1** Small patch in high condition	**NOT CONSISTENT with PCT 4058 (moderate)** PCT 4058 (moderate) does not contain ≥ 20 large trees per ha **NOT CONSISTENT with PCT 4058 (low)** PCT 4058 (low) within the subject land and study area do not contain ≥ 10 native species per sample plot
Good condition with arboreal mammals **≥ 50% of its total perennial understorey is comprised of native species** **AND** **Ground cover richness ≥ 6 native species per sample plot** **AND** **≥ 10 large trees per ha** **AND** **Evidence of 4 or more species of arboreal mammals detected in the patch**	**Class A1** Large or contiguous patch in good condition with arboreal mammals	**Class B2** Small patch in good condition with arboreal mammals	**NOT CONSISTENT with PCT 4058 (moderate)** PCT 4058 (moderate) does not have evidence of 4 or more species of arboreal mammals within the patch **NOT CONSISTENT with PCT 4058 (low)** PCT 4058 (low) does not contain ≥ 6 native species per sample plot or have evidence of 4 or more species of arboreal mammals
Good condition	**Class B3**	**Class C1**	**Class C1 is CONSISTENT with PCT 4058 (moderate)**

≥ 50% of its total perennial understorey is comprised of native species **AND** **Ground cover richness ≥ 6 native species per sample plot**	Large or contiguous patch in good condition	Small patch in good condition	PCT 4058 (moderate) meets the size threshold for Class C1, has ≥ 50% of its total perennial understorey comprised of native species, and contains ≥ 6 native species per sample plot **NOT CONSISTENT with PCT 4058 (low)** PCT 4058 (low) does not has ≥ 50% of its total perennial understorey comprised of native species and does not contain ≥ 6 native species per sample plot
Moderate condition **≥ 30% of its total perennial understorey is comprised of native species** **AND** **Ground cover richness ≥ 4 native species per sample plot**	**Class C2** Large or contiguous patch in moderate condition		**NOT CONSISTENT with PCT 4058 (moderate)** **NOT CONSISTENT with PCT 4058 (low)** PCT 4058 within the subject land does not meet the size threshold for moderate condition.

4.3.4 PCT 3176 – Sydney Enriched Sandstone Moist Forest

4.3.4.1 BioNet profile for PCT 3176

The BioNet profile data for PCT 3176 can be viewed below in Table 4-8:.

Table 4-8: Attribute information for PCT 3176 in the study area

Attribute	PCT 3176 in the subject land
Vegetation formation	KF_CH2B Wet Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	North Coast Wet Sclerophyll Forests
PCT name	Sydney Enriched Sandstone Moist Forest
PCT ID	3176
Conservation status	BC Act: Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion (CEEC)
Estimate of percent cleared	23.11%
Vegetation description (NSW DCCEEW, 2025b)	A very tall, occasionally extremely tall moist shrubby and ferny sclerophyll open forest found in enriched sandstone gullies of the Sydney coastal sandstone plateaus. The tree canopy very frequently includes a high cover of ***Angophora costata***, ***Syncarpia glomulifera*** and ***Eucalyptus pilularis*** with occasional *Eucalyptus piperita*. *Eucalyptus saligna* is rare however abundant on creek lines downslope of shale soils. Commonly there is a tall mid-stratum of *Allocasuarina torulosa*, less frequently *Allocasuarina littoralis*, with *Elaeocarpus reticulatus*, ***Pittosporum undulatum*** and *Notelaea longifolia*. A smaller shrub layer includes *Leucopogon lanceolatus* and *Polyscias sambucifolia*. Typically, the ground layer is ferny, very frequently with a high cover of *Calochlaena dubia*, *Pteridium esculentum* and occasionally *Blechnum cartilagineum*. A diversity of graminoids, small climbers and grasses adds to a high ground cover amongst the sandstone boulders. This PCT is most extensively distributed within the low elevation gullies that incise the shale rich landscapes of the north shore of Sydney where rainfall exceeds 1100 mm per annum. However, the degree of shale influence and sheltering also sustains the persistence of the PCT in lower rainfall outliers near Campbelltown and Menai. This community grades into PCT 3592 on exposed adjoining slopes and occasionally into rainforest PCT 3038 in narrow bands along creek lines.
Extent in subject land (ha)	0.00
Species used for PCT identification	*Angophora costata* (Sydney Red Gum), *Syncarpia glomulifera* (Turpentine), *Eucalyptus pilularis* (Blackbutt), *Elaeocarpus reticulatus* (Blueberry Ash), *Pittosporum undulatum* (Sweet Pittosporum)

4.3.4.2 PCT 3176 as observed within the study area

PCT 3176 does not occur within the subject land, but it does occur in Fred Robertson Park in Dundas within avoided land formerly considered for the connection to the NSOOS. The canopy of 3176 within the study area is strongly dominated by *Eucalyptus pilularis* (Blackbutt) with a subcanopy of *Pittosporum undulatum* (Sweet Pittosporum). The shrub layer includes such native species as *Acacia linifolia* (White Wattle), *Trema tomentosa* (Native Peach) and *Breynia oblongifolia* (Coffee Bush). Approximately half of the ground layer is infested with *Tradescantia fluminensis* (Trad)*, but numerous natives occur as well, including *Oplismenus aemulus* (Basket Grass), *D. caerulea*, *Einadia trigonos* (Fishweed) and *Commelina cyanea* (Commelina).

Because PCT 3176 does not occur in the subject land, PCT selection was based on the SVTM and informal assessment of the consistency of the vegetation with this mapping. Species used for PCT identification are listed in Table 4-8:. Alignment with TECs was not assessed for vegetation outside the subject land.

A photograph of PCT 3176 is in Plate 4-6.



Plate 4-6: PCT 3176: Sydney Enriched Sandstone Moist Forest

4.3.5 PCT 3320 – Cumberland Shale Plains Woodland

4.3.5.1 BioNet profile for PCT 3320

The BioNet profile data for PCT 3320 can be viewed below in Table 4-9:.

Table 4-9: Attribute information for PCT 3320 in the study area

Attribute	PCT 3320 in the subject land
Vegetation formation	KF_CH3 Grassy Woodlands
Vegetation class	Coastal Valley Grassy Woodlands
PCT name	Cumberland Shale Plains Woodland
PCT ID	3320
Conservation status	BC Act: Cumberland Plain Woodland in the Sydney Basin Bioregion (CEEC) BC Act: Shale Gravel Transition Forest in the Sydney Basin Bioregion (EEC) EPBC Act: Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CEEC)
Estimate of percent cleared	93.03%
Vegetation description (NSW DCCEEW, 2025b)	A tall sclerophyll open forest or woodland with a sparse mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover on the undulating Wianamatta Group shale plains of western Sydney. The canopy very frequently includes *Eucalyptus tereticornis* and *Eucalyptus moluccana*, with ironbarks (*Eucalyptus crebra* and *Eucalyptus fibrosa*) occasionally present and sometimes prominent in localised areas. The sparse shrub to small tree layer very frequently includes *Bursaria spinosa* and one or more species of Acacia, of which ***Acacia parramattensis***, *Acacia decurrens* and ***Acacia falcata*** are the most frequent and abundant. Presence of these Acacia species helps to distinguish this PCT from the related PCT 3319 on rises of the southern Cumberland Plain which typically includes *Acacia implexa*. The mid-dense ground layer typically includes grasses, forbs, twiners and hardy small ferns. *Microlaena stipoides* is almost always present and *Themeda triandra*, *Dichondra repens*, *Brunoniella australis*, *Cheilanthes sieberi* subsp. *sieberi*, *Desmodium varians*, *Aristida vagans* and *Glycine tabacina* are very frequent. This is the most widespread PCT on the Cumberland Plain, occupying much of the plain between Bankstown and the Hawkesbury and Nepean rivers. It typically occurs in a warm, moist climate below 120 metres asl however can occur up to 200 metres asl on the undulating terrain between Douglas Park and Campbelltown to the east of the Nepean River. A northern outlier occurs near Maroota on a small remnant on a narrow shale ridge. While widespread on the main part of the plain, this PCT primarily occurs in small, often disturbed patches within a rural or urban matrix. In the hilly country to the west of the Nepean River, this PCT is replaced by PCT 3319. On thinner shales above sandstone around the periphery of the Cumberland Plain, it grades into PCT 3321. Ironbarks are very frequent and *Eucalyptus punctata* is common in the canopy of PCT 3321, and *Eucalyptus moluccana* and *Eucalyptus tereticornis* are both rare.
Extent in subject land (ha)	0.00
Species used for PCT identification	*Acacia parramattensis* (Parramatta Wattle), *Acacia falcata* (Hickory Wattle)

4.3.5.2 PCT 3320 as observed within the study area

PCT 3176 does not occur within the subject land, but it does occur within avoided land formerly considered for a construction compound adjacent to the Great Western Motorway. The canopy of PCT 3320 in this area consists largely of large acacias *(Acacia parramattensis*, *Acacia falcata*) over an exotic understorey.

Because PCT 3320 does not occur in the subject land, PCT selection was based on the SVTM and informal assessment of the consistency of the vegetation with this mapping. Species used for PCT identification are listed in Table 4-9:. Alignment with TECs was not assessed for vegetation outside the subject land.

A photograph of PCT 3320 is in Plate 4-7.



Plate 4-7: PCT 3320: Cumberland Shale Plains Woodland

4.3.6 PCT 4091 – Grey Mangrove-River Mangrove Forest

4.3.6.1 BioNet profile for PCT 4091

The BioNet profile data for PCT 4091 can be viewed below in Table 4-10:.

Table 4-10: Attribute information for PCT 4091 in the study area

Attribute	PCT 4091 in the subject land
Vegetation formation	KF_CH10 Saline Wetlands
Vegetation class	Mangrove Swamps
PCT name	Grey Mangrove-River Mangrove Forest
PCT ID	4091
Conservation status	n/a
Estimate of percent cleared	52.96%
Vegetation description (NSW DCCEEW, 2025b)	A low, mid-high or tall mangrove open forest or woodland, sometimes including a saltmarsh ground layer, occurring on tidal flats of the NSW coast. The tree canopy is sparse, mid-dense or sometimes dense and is almost always dominated by grey mangrove ***Avicennia marina* subsp. *australasica***. River mangrove *Aegiceras corniculatum* is common, occurring at around half of the known locations, however usually with a more sparse projected foliage cover than *Avicennia marina* subsp. *australasica*. Other trees are rare, however may include a sparse cover of red mangrove *Rhizophora stylosa*, or on mangrove fringes ***Casuarina glauca***, *Melaleuca linariifolia* or *Ficus rubiginosa*. Salt-tolerant ground cover species make a significant contribution to the species richness of this PCT overall, however are not always present. Where present, the ground layer is sparse to mid-dense. *Sarcocornia quinqueflora* subsp. *quinqueflora* occasionally occurs with sparse cover, while *Sporobolus virginicus* or *Samolus repens* rarely occur however generally with higher projected foliage cover. Other rare species with variable cover include *Juncus kraussii* subsp. *australiensis*, *Tecticornia arbuscula*, *Sesuvium portulacastrum* and *Spergularia marina* amongst other salt-tolerant grasses, forbs and sedges. This PCT is weakly floristically related to the saltmarsh PCT 4097, however PCT 4097 has only sparse mangroves, a more consistent cover of saltmarsh species, and occurs at sites with less frequent or shorter periods of tidal inundation. PCT 4091 is the only community in the Mangrove Swamps vegetation class that extends along the length of the coast. Mangrove PCTs 4140 and 4090 are both restricted to the northern half of the North Coast botanical division.
Extent in subject land (ha)	0.00
Species used for PCT identification	*Avicennia marina* subsp. *australasica* (Grey Mangrove), *Casuarina glauca* (Swamp Oak)

4.3.6.2 PCT 4091 as observed within the study area

PCT 4092 does not occur within the subject land, but it does occur within avoided land above horizontally directionally drilled river crossings on the banks of the Duck River and the Parramatta River. Vegetation of PCT 4091 in this area consists almost entirely of *Avicennia marina* subsp. *australiasica* (Grey Mangrove) with only the occasional fringing *Casuarina glauca* (Swamp Oak).

Because PCT 4091 does not occur in the subject land, PCT selection was based on the SVTM and informal assessment of the consistency of the vegetation with this mapping. Species used for PCT identification are listed in Table 4-10:. Alignment with TECs was not assessed for vegetation outside the subject land.

A photograph of PCT 4091 is in Plate 4-8.



Plate 4-7: PCT 3320: Grey Mangrove-River Mangrove Forest

4.3.7 Planted native vegetation

Planted native vegetation occurs throughout the subject land in forms that cannot reasonably be assigned to a PCT. This planted native vegetation varies greatly from location to location, according to the planting palette that was used for that location and the type of green space in which the planted native vegetation occurs. To capture this diversity and to facilitate a reasonably complete, yet manageable description of the planted native vegetation over a large area, three vegetation zones have been established and mapped:

- Planted native vegetation (street trees)
- Planted native vegetation (suburban parks)
- Planted native vegetation (Sydney Olympic Park).

The following sections provide descriptions and photographs for each of these vegetation zones. Following those sections, an assessment is provided for each vegetation zone against the criteria for assessment of planted native vegetation set out within the BAM in Appendix D: Streamlined assessment module – Planted native vegetation.

4.3.7.1 Planted native vegetation (street trees)

Planted native vegetation (street trees) refers to native trees planted along the verges of suburban streets, pathways and railway lines. This vegetation zone is 2.20 ha in extent within the subject land. Although the vegetation zone varies greatly by location, generally, trees are planted at widely spaced intervals, above exotic, maintained lawn and without any association with a shrub layer or native groundcover. Trees tend to be moderate in size and recent plantings are common.

Descriptions of Planted native vegetation (street trees) are below. Example photographs are at Plates 4-5 and 4-6.

- The streets between construction compound C1 and construction compound C16 (Figure 4-12, Figure 4-13) are commonly planted with *Callistemon viminalis* (Weeping Bottlebrush). *Lophostemon confertus* (Brush Box) can be found along the railway line south of the Parramatta River. Other species found within this stretch of the subject land include *Eucalyptus microcorys* (Tallowwood), *Ficus rubiginosa* (Port Jackson Fig) and *Corymbia maculata* (Spotted Fig).
- The long stretch of river release pipeline between the eastern HDD pit for the Duck River and the HDD pit in Pierre de Coubertin Park (Figure 4-14) are dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark) on Carnarvon Street west of Silverwater Road, by *M. quinquenervia*, *L. confertus* and *C. viminalis* on Derby and Day Streets east of Silverwater Road.
- Street trees within the suburb of Newington on Fariola Street and Comaneci Avenue (Figure 4-14) are strongly dominated by *C. maculata*.
- Street trees in the small subject land extensions north of Meadow Crescent include *Banksia integrifolia* (Coast Banksia) and *L. confertus*.



Plate 4-5: Planted native vegetation (street trees), Rippon Avenue, Dundas



Plate 4-6: Planted native vegetation (street trees), Carnarvon Street, Silverwater

4.3.7.2 Planted native vegetation (suburban parks)

Planted native vegetation (suburban parks) refers to native trees planted within suburban parks, which are mostly to be used as construction compounds and will not generally have trenching or require vegetation clearing. This vegetation zone is 1.34 ha in extent within the subject land. Trees within suburban parks tend to be larger than street trees and encompass a wide variety of species, generally species native to western Sydney but also including some species from greater Sydney or areas outside the Sydney region altogether. Like street trees, planted native vegetation in suburban parks is usually above exotic, maintained lawn and without any association with a shrub layer or native groundcover. However, there are small areas within Hume Park in Silverwater and in Pierre de Coubertin Park in Newington where native shrubs and ground species have been planted, although these are mostly common native ornamentals and cultivars and do not resemble PCT vegetation.

Descriptions of Planted native vegetation (suburban parks) are below. Example photographs are at Plates 4-7 and 4-8.

- Hume Park in Silverwater (C22) is planted with *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box) along the fringes of the park, surrounding a large mown area with a basketball court. The understorey to the planted trees is primarily mown lawn. On the northwestern boundary of the park, the ground beneath the trees is mulched and a cultivar, *Grevillea 'moonlight'*, has been planted along with *Leptospermum polygafolium* (Tantoon), a commonly planted shrub or small tree.
- Deakin Park in Silverwater (C24) is planted with a wide variety of native and exotic trees, including *E, microcorys, Eucalyptus saligna* (Sydney Blue Gum), *Eucalyptus robusta* (Swamp Mahogany), *L. confertus*, *Ficus macrophylla* (Moreton Bay Fig), *Corymbia citriodora* (Lemon-scented Gum) and *C. camphora*. All trees surround a large mown dogpark and are above mown lawn with no understorey.
- Pierre de Coubertin Park in Newington (C25 and C26) is planted with *C. viminalis*, *Angophora costata* (Sydney Red Gum), *F. rubiginosa*, *C. anacardioides*, and *Brachychiton acerifolius* (Illawarra Flame Tree). Exotic tree species such as *Fraxinus* spp. (Ash) and *Citharexylum spinosum* (Fiddlewood) are also present. Mulched beds along the park margins include Grevillea cultivars, *D. caerulea*, *L. longifolia* and exotic species such as *Hedera helix* (English Ivy) and *Cenchrus setaceus* (Fountain Grass).
- Portions of the eastern side of Memorial Park in Meadowbank (C29) are planted native vegetation that does not conform to a PCT. Although most of the western two-thirds of the park is either remnant, revegetated or planted native vegetation that conforms to PCT 4058, the portions of the eastern third that are within the subject land contain a much wider planting palette that would not occur naturally. Species include *Eucalyptus grandis* (Flooded Gum), *L. confertus*, *Grevillea robusta* (Silky Oak), *E. robusta* (Swamp Mahogany), *F. rubiginosa*, *Syncarpia glomulifera* (Turpentine), *C. maculata*, and *Casuarina glauca* (Swamp Oak). These trees are planted above mown lawn and small mulched beds with *L. longifolia.*



Plate 4-7: Planted native vegetation (suburban parks), Deakin Park, Silverwater



Plate 4-8: Planted native vegetation (suburban parks), Memorial Park, Meadowbank

4.3.7.3 Planted native vegetation (Sydney Olympic Park)

Sydney Olympic Park is planted with a wide variety of native vegetation, from wetlands vegetation to a broad palette of eucalypt species. Within the subject land, which includes carparks and access roads surrounding UrbnSurf and street-side vegetation on the eastern side of Hill Road, planted native vegetation does not conform to any PCT. This vegetation zone is 1.23 ha in extent within the subject land. Although many native tree species in the Sydney Olympic Park planting palette can be found in western Sydney, they are planted in combinations that are rarely or never found in naturally occurring vegetation, alongside species that are not native to western Sydney or the Greater Sydney region, and without an understorey or in mulched beds planted with commonly cultivated native species.

Canopy species include *C. maculata*, *E. robusta*, *E. punctata*, *C. anacardiodes*, *M. quinquenervia*, *Melaleuca styphelioides* (Prickly-leaved Tea Trea), *E. tereticornis*, *Eucalyptus nubilis* (Blue-leaved Ironbark) and *Eucalyptus scoparia* (Wallangara White Gum). While most areas around Urbnsurf lack an understorey, there are a handful of planted species in mulched beds surrounding carparks and alongside Hill Road. Native species are largely limited to *Acacia longifolia* (Sydney Golden Wattle), *L. longifolia* and *D. caerulea*. These mulched beds also include a variety of exotic species such as *C. setaceus*, *Chloris gayana* (Rhodes Grass), *Briza minor* (Shivery Grass), *Sonchus oleraceus* (Common Sowthistle) and *Solanum nigrum* (Black-berry Nightshade).

Example photographs of Planted native vegetation (Sydney Olympic Park) are at Plates 4-9 and 4-10.



Plate 4-9: Planted native vegetation (Sydney Olympic Park), Hill Road



Plate 4-10: Planted native vegetation (Sydney Olympic Park), carpark

4.3.7.4 Planted native vegetation assessment

Appendix D: Streamlined assessment module – Planted native vegetation of the BAM sets out a framework for the assessment of planted native vegetation in the form of a decision-making key. Depending on the answers to a set of questions, planted native vegetation must either be allocated to the best-fit PCT for the vegetation and the BAM must be applied in full, or it can be assessed in a streamlined manner according to the Streamlined assessment module. The Streamlined assessment module can be applied to all vegetation in a BDAR or part of the vegetation where the BDAR covers both planted and naturally occurring native vegetation.

The Streamlined assessment module is summarised below and then applied to each of the Planted native vegetation zones assessed in this BDAR.

If any of the questions below can be answered 'yes', planted native vegetation must be allocated to the best-fit PCT for the vegetation and the BAM must be applied in full:

- Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can reasonably be assigned to a PCT known to occur in the same IBRA subregion as the proposal?
- Is the planted native vegetation planted under an existing conservation obligation listed in BAM Section 11.9(2) or its primary objective was to replace or regenerate a PCT or threatened plant species?
- Is the planted native vegetation individuals of a threatened species or planted for the purpose of providing threatened species habitat under a species recovery plan or other governmentally required program?

When the answers to the above questions are no, the planted native vegetation may be assessed in accordance with the Streamlined assessment module if the answer to any of the following questions is 'yes'.

- Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as windbreaks, roadside plantings (including street trees and median strips), landscaping in parks, gardens and sports fields/complexes, macadamia plantations or teatree farms?
- Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department?

Planted native vegetation (street trees)

The street trees occurring within the subject land cannot be described as occurring within a mosaic of planted and remnant native vegetation. They occur in residential and industrial neighbourhoods and lack any connection to remnant native vegetation. They consist of a variety of widely planted species, including species that are not native to greater Sydney, and cannot reasonably be assigned to a PCT.

Street trees within the subject land are typical Council street plantings, and there is no indication they have been planted primarily for conservation purposes under any formal, legally enforceable conservation obligation or threatened species recovery program. Rather, they are typical street trees planted for functional and aesthetic purposes.

For the reasons above, Planted native vegetation (street trees) is assessed in this BDAR in accordance with the Streamlined assessment module.

Planted native vegetation (suburban parks)

With two exceptions, discussed below, all native vegetation occurring within the Planted native vegetation (suburban parks) vegetation zone meets both conditions set out in the first test for assessment under the Planted native vegetation module: (1) it does not occur within an area that contains a mosaic of planted and remnant native vegetation, or (2) it cannot reasonably be assigned to a PCT known to occur in the same IBRA subregion as the project. Regarding the first condition, the suburban parks within the subject land in Silverwater and Newington are more than 1 km away from the nearest SVTM-mapped native vegetation,

which is wetland vegetation along the Duck River. The nearest terrestrial vegetation is nearly 2 km distant in Sydney Olympic Park. These parks are not part of a mosaic of planted and remnant vegetation. Regarding the second condition, plantings cannot reasonably be assigned to a PCT. Plantings generally consist of a variety of widely planted tree species, including species that are not native to greater Sydney or that rarely or never occur together in naturally occurring vegetation. Plantings also lack any understorey apart from widely cultivated species.

The exceptions mentioned above are:

- Hume Park (C22)
- Memorial Park in Meadowbank.

The planted native vegetation in Hume Park resembles a PCT known in the IBRA subregion but can be assessed under the Planted native vegetation streamlined assessment module because it does not occur in a mosaic of planted and remnant native vegetation. The tree species planted within Hume Park in Silverwater (C22), namely *E. tereticornis* and *E. moluccana*, are the two most frequently occurring trees in PCT 3320: Cumberland Shale Plains Woodland. Planted vegetation lacks an understorey typical of PCT 3320. Nevertheless, the planted native vegetation in Hume Park can reasonably be assigned to PCT 3320. Nevertheless, as discussed above, in neither park can the native vegetation be reasonably described as occurring in a mosaic of planted and remnant native vegetation.

The planted native vegetation in Memorial Park in Meadowbank occurs in a mosaic of planted and remnant native vegetation, being adjacent to mapped patches of PCT 4058, but can be assessed under the Planted native vegetation streamlined assessment module because it does not resemble a PCT. Planted native vegetation (suburban parks) within Memorial Park does not have a species composition that is typical of PCT 4058. The native species planted within the subject land include *E. grandis*, *L. confertus*, *G. robusta, E. robusta*, *F. rubiginosa*, *S. glomulifera*, *C. maculata*, and *C. glauca.* Several of these species do not occur within PCT 4058 at all (*E. grandis*, *L. confertus*, *G. robusta, E. robusta*, *F. rubiginosa*, *S. glomulifera*). Unlike the parts of Memorial Park mapped as PCT 4058, those portions mapped as Planted native vegetation (suburban parks) are not dominated by *E. tereticornis* and *A. floribunda*. In summary, planted native vegetation within the eastern portion of Memorial Park cannot reasonably be assigned to PCT 4058 or another PCT occurring within the Cumberland IBRA subregion.

Because all Planted native vegetation (suburban parks) meets at least one of the two conditions under the first test for assessment under the Planted native vegetation module it can be assessed under the Planted native vegetation module as long as it meets the remaining requirements for assessment under the streamlined module relating to conservation obligations, threatened species recovery, and functional, aesthetic, horticultural or plantation forestry. All areas mapped as Planted native vegetation (suburban parks) meet these requirements:

- There is no indication that the vegetation within these parks has been planted primarily for conservation purposes under any formal, legally enforceable conservation obligation or threatened species recovery program.
- The planted native species are typical suburban park species planted for functional and aesthetic purposes, namely, as landscaping in parks.

All areas mapped as Planted native vegetation (suburban parks) meet the requirements for assessment under the Planted native vegetation streamlined assessment module. Accordingly, it is assessed for suitability for use by threatened species in this BDAR in accordance with Section D.2 of the module (see Section 9.1.4).

Planted native vegetation (Sydney Olympic Park)

Planted native vegetation in Sydney Olympic Park can be described as occurring within a mosaic of planted and remnant native vegetation. The planted native vegetation in C27 is directly adjacent wetland vegetation along Haslam's Creek and in the Narawang and Nuri wetlands (Figure 4-16). Planted native vegetation along

Hill Road also connects with SVTM-mapped PCT 3262: Sydney Turpentine Ironbark Forest just west of Narawang Wetlands.

However, Planted native vegetation (Sydney Olympic Park) does not have a species composition that resembles any PCT in the Cumberland IBRA subregion. The native species planted within the subject land include *C. maculata*, *E. robusta*, *E. punctata*, *C. anacardiodes*, *M. quinquenervia*, *M. styphelioides* (Prickly-leaved Tea Trea), *E. tereticornis*, *E. nubilis* and *E. scoparia*. Several of these species, *E. nubilis* and *E. scoparia*, do not occur in greater Sydney. Although other planted species occur in western Sydney, the planting palette within the subject land is not typical of any PCT.

There is no indication that planted native vegetation within Sydney Olympic Park has been planted primarily for conservation purposes under any formal, legally enforceable conservation obligation or threatened species recovery program. Rather, applicable management plans and zoning indicate that plantings are for aesthetic purposes within a portion of the park devoted to public recreation. The Sydney Olympic Park *Parklands Plan of Management 2010* designates surrounding lands such as the Nuri and Narawang Wetlands as Nature Reserve and Wetlands and Waterways land categories and as Parklands Threatened Species Habitats, but the areas mapped as Planted native vegetation (Sydney Olympic Park) are designated for Sport and Recreation and are outside the mapped Parklands Threatened Species Habitats. In addition, under the *State Environmental Planning Policy (Precincts – Central River City) 2021* Sydney Olympic Park Land Zoning Map, the area mapped as Planted native vegetation (Sydney Olympic Park) is zoned as RE1 – Public recreation, while surrounding areas are mapped as C1 – National parks & nature reserves or C2 – Environmental conservation.

The vegetation classified as Planted native vegetation (Sydney Olympic Park) does occur within an area that contains a mosaic of planted and remnant native vegetation, but it does not contain vegetation which can reasonably be assigned to a PCT known to occur in the same IBRA subregion as the project. Vegetation classified as Planted native vegetation (Sydney Olympic Park) was planted for functional, aesthetic, horticultural or plantation forestry purposes, namely, as park landscaping. Therefore, the suitability of Planted native vegetation (Sydney Olympic Park) is assessed in this BDAR in accordance with Section D.2 of the Streamlined assessment module (see Section 9.1.4).

4.4 Threatened Ecological Communities

There are two BC Act TECs and one EPBC Act TECs within the subject land. Those TECs and their extent in the subject land are listed in Table 4-11:. The TECs are illustrated in Figure 4-21 and Figure 4-22.

Table 4-11: TECs within the subject land

TEC name	Associated vegetation zones within the subject land	BC Act status	EPBC Act status	Extent within the subject land (ha)
Swamp Oak Floodplain Forest	PCT 4028: Estuarine Swamp Oak Twig-rush Forest (low-Sydney Olympic Park)	EEC	Does not meet the criteria for inclusion in the EPBC Act EEC	0.06
Red Gum Riverflat Forest	PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (moderate)	EEC	CEEC	0.02
	PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (low)	EEC	Does not meet the criteria for inclusion in the EPBC Act CEEC	0.10

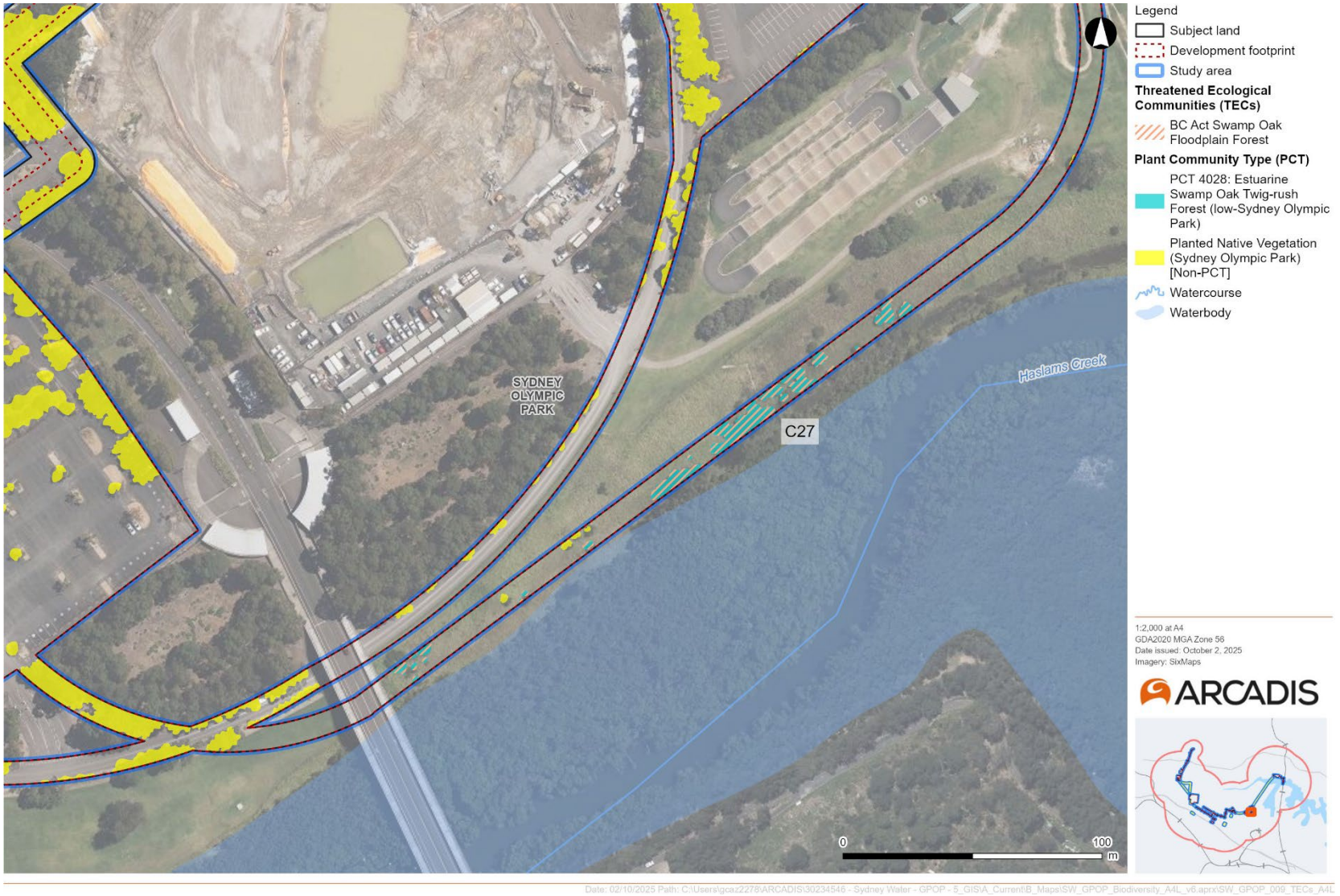


Figure 4-21: Swamp Oak Floodplain Forest at C27 (Sydney Olympic Park)



Figure 4-22: Red Gum Riverflat Forest in Memorial Park, Meadowbank

4.5 Vegetation integrity

The vegetation integrity score is a measure of the condition of native vegetation and is assessed for each vegetation zone by calculating the scores for the composition, structure and function attributes collected in plots within the vegetation zone against the benchmark values for the associated PCT.

4.5.1 Survey effort

Six vegetation integrity plots were used to sample the vegetation of the study area. Three of the plots were located within the subject land and are included within the final BAM Calculator in case number 00052103/BAAS21012/24/00052122. Three plots were located within native vegetation that was removed from the subject land to avoid impacts to biodiversity and are not within the BAM Calculator case; however, results are reported below for information.

Locations of the plots are shown in Figure 4-23 to Figure 4-26. The size of each vegetation zone within the subject land determines the sampling effort required, as outlined in Table 3.1 of the BAM. Table 4-12 below provides a summary of the vegetation zones present within the study area and the sampling effort that was applied.

Table 4-12: Comparison of number of transects/plots required and completed per vegetation zone

PCT	Vegetation zone	Vegetation zone area subject land (ha)	BAM plot requirements	Number of plots completed
PCT 3176: Sydney Enriched Sandstone Moist Forest	Avoided land	0.00	0	1
PCT 4028: Estuarine Swam Oak Twig-rush Forest	Low-Camellia (avoided land)	0.00	0	1
	Low-Sydney Olympic Park	0.06	1	1
PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	Moderate	0.02	1	1
	Low	0.10	1	1
	Avoided land	0.00	0	1
			Total	6



Figure 4-23: Plot 1, Fred Robertson Park, Dundas (avoided land)

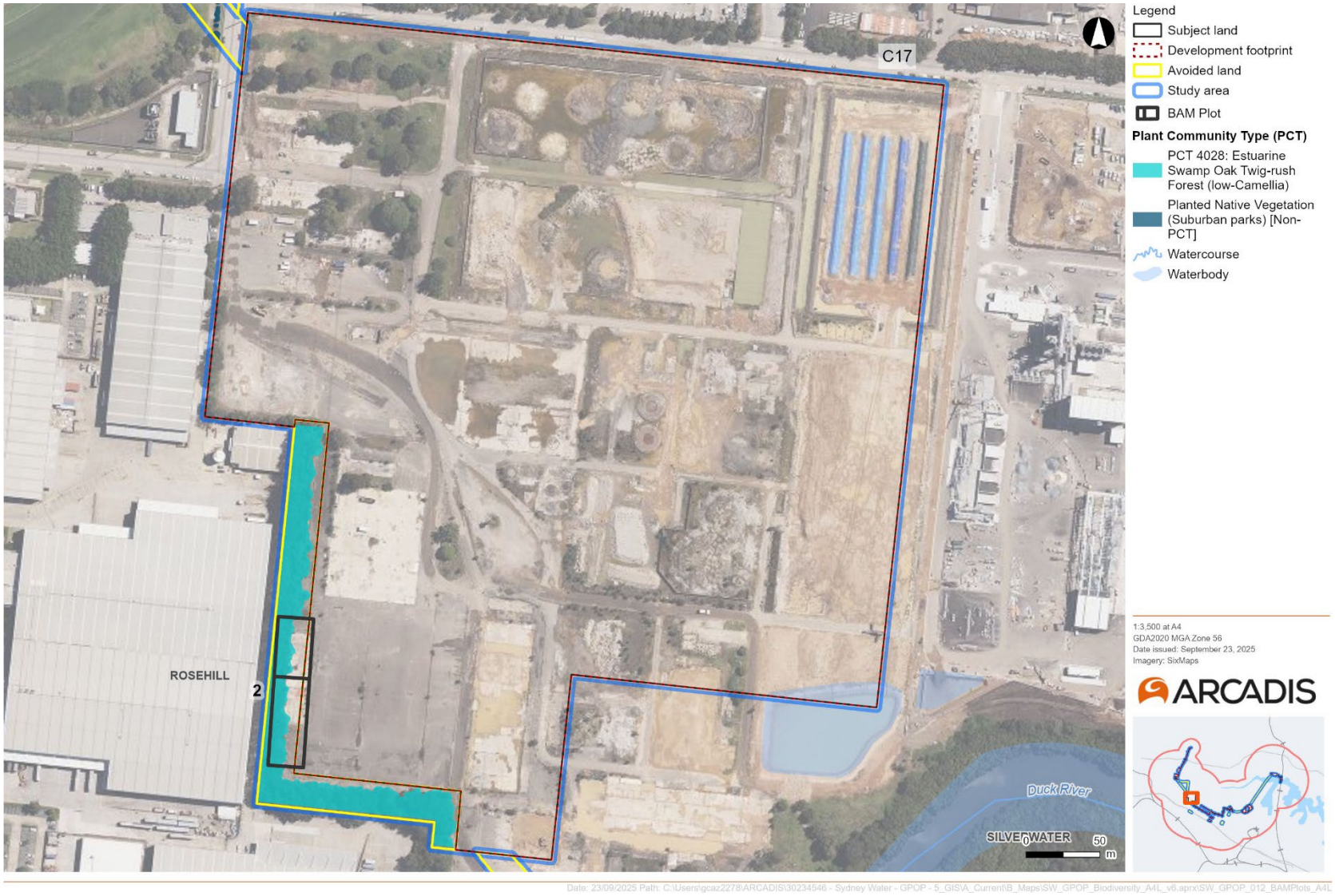


Figure 4-24: Plot 2, WRRF site, Camellia (avoided land)

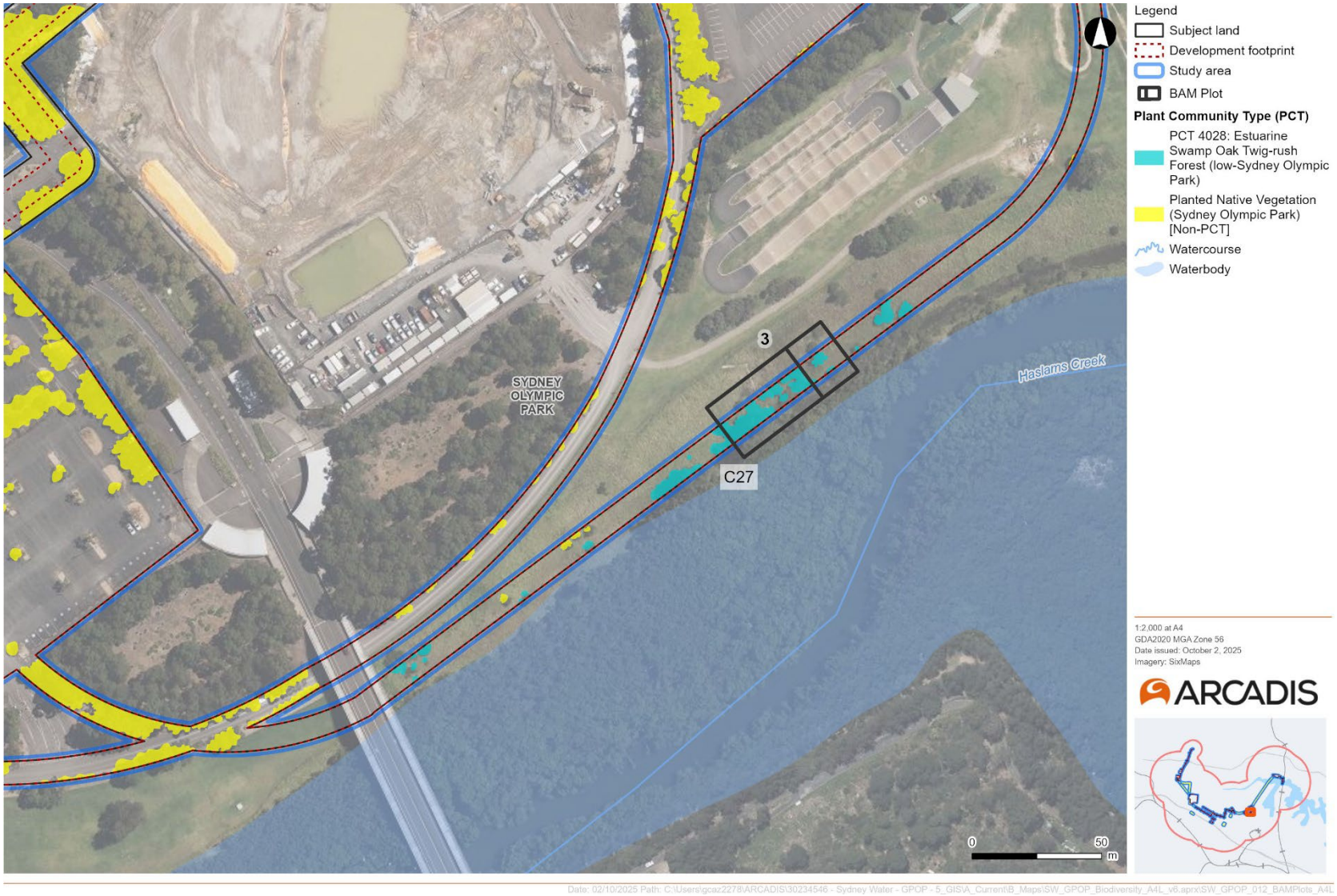


Figure 4-25: Plot 3, Sydney Olympic Park



Figure 4-26: Plot 4, Memorial Park, Meadowbank (Plot 6 in avoided land)

4.5.2 Scores

The vegetation plot data was entered into the BAM credit calculator to generate vegetation integrity scores. The results of the BAM credit calculator and composition, structure, function and vegetation integrity scores for each vegetation zone is shown in Table 4-13:. The list of species and coverages for each BAM plot can be viewed in Appendix G.

Table 4-13: Vegetation integrity scores

PCT	Vegetation zone	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
PCT 3176: Sydney Enriched Sandstone Moist Forest	Avoided land	40.3	58.9	93.9	60.6
PCT 4028: Estuarine Swamp Oak Twig-rush Forest	Low – Camellia (avoided land)	13.4	26	38.9	23.8
	Low – Sydney Olympic Park	3.0	18.2	43.3	13.3
PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	Moderate	39.5	24.9	100	46.2
	Low	16.6	32.5	62.8	32.4
	Avoided land	17.6	20.8	100	33.2

5 Threatened species

Under the BAM, threatened species are separated into two classes, ecosystem and species credit species. Those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which a targeted survey has a low probability of detection, are identified as ecosystem credit species. Targeted surveys are not required for ecosystem species and potential impacts to these species are assessed in conjunction with impacts to PCTs.

Threatened species where the likelihood of occurrence of a species or elements of suitable habitat for the species cannot be confidently predicted by vegetation surrogates and landscape features and can be reliably detected by survey are identified as species credit species. A targeted survey or an expert report is required to confirm the presence or absence of these species within the subject land.

Some threatened species are identified as both ecosystem and species credit species, with different aspects of the habitat and life cycle representing different credit types. Commonly, threatened fauna species may have foraging habitat as an ecosystem credit, while their breeding habitat represents a species credit.

The following sections outline the process for determining the habitat suitability for threatened species within the subject land and the results of the targeted surveys for candidate threatened species.

5.1 Identification of threatened species for assessment

Threatened species that require assessment within a BDAR are initially identified based upon the following criteria:

- The distribution of the species including the IBRA subregion in which the subject land occurs (Cumberland IBRA subregion),
- The species is associated with any of the PCTs identified within the subject land,
- The native vegetation cover within the assessment area is equal to or greater than the minimum required for the species,
- The patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species,
- The species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM calculator (BAM-C). The PCTs identified within the subject land and study area, patch size, and native vegetation cover, as outlined in Section 3 of the BAM, were entered into the BAM-C and a preliminary list of ecosystem and species credit species was tabulated. Some species identified by the BAM-C require further assessment of habitat constraints and/or geographic limitations before being confirmed as an ecosystem credit species or candidate species for assessment.

5.2 BAM-C results and habitat suitability assessment

This section outlines the species returned by the BAM-C. An assessment of these species in accordance with Section 5.2 of the BAM has been undertaken to identify species for further assessment.

5.2.1 Ecosystem credit species

The BAM credit calculator initially predicted 36 ecosystem credit species to occur. Six predicted ecosystem credit species required further assessment of habitat constraints or geographic limitation before being confirmed as an ecosystem credit species. After consideration of habitat constraints and geographic limitations, all ecosystem credit species identified in the BAM Calculator except for *Grantiella picta* (Painted Honeyeater) were considered to have the potential to occur within the subject land and have therefore been retained as predicted species within the BAM Calculator.

Confirmed ecosystem credit species, their associated habitat constraints, geographic limitations, and sensitivity to potential gain class are outlined below in Table 5-1:. As outlined above, targeted surveys are not required for these ecosystem species and impacts to these species are assessed in conjunction with impacts to PCTs.

Table 5-1: Ecosystem credit species

Scientific name	Common name	Habitat constraints / geographic limitations	Sensitivity to gain class	BC Act Status	EPBC Act Status	Retained for assessment?
Anthochaera phrygia	Regent Honeyeater (Foraging)	-	High	CE	CE	**Yes**
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	Moderate	V	-	**Yes**
Botaurus poiciloptulus	Australasian Bittern	Waterbodies; and brackish or freshwater wetlands	Moderate	E	E	**Yes**
Calidris ferruginea	Curlew Sandpiper (Foraging)		High	CE	CE	**Yes**
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	-	Moderate	V	E	**Yes**
Calyptorhynchus lathami lathami	Glossy Black-cockatoo (Foraging)	Presence of Allocasuarina and casuarina species	High	V	V	**Yes**
Chthonicola sagittata	Speckled Warbler	-	High	V	-	**Yes**
Circus assimilis	Spotted Harrier	-	Moderate	V	-	**Yes**
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-	High	V	-	**Yes**
Daphoenositta chrysoptera	Varied Sittella	-	Moderate	V	-	**Yes**
Dasyurus maculatus	Spotted-tailed Quoll	-	High	V	E	**Yes**
Ephippiorhynchus asiaticus	Black-necked Stork	Swamps; shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300 m of these swamps; waterbodies; shallow lakes, lake margins and estuaries within 300 m of these waterbodies	Moderate	E	-	**Yes**
Epthianaura albifrons	White-fronted Chat	-	Moderate	V	-	**Yes**
Falco subniger	Black Falcon	-	Moderate	V	-	**Yes**

Scientific name	Common name	Habitat constraints / geographic limitations	Sensitivity to gain class	BC Act Status	EPBC Act Status	Retained for assessment?
Falsistrellus tasmaniensis	Eastern False Pipistrelle	-	High	V	-	**Yes**
Glossopsitta pusilla	Little Lorikeet	-	High	V	-	**Yes**
Grantiella picta	Painted Honeyeater	Mistletoes present at a density of greater than five mistletoes per hectare	Moderate	V	V	**No.** No mistletoes were not recorded within the subject land.
Haliaeetus leucogaster	White-bellied Sea-eagle (Foraging)	Waterbodies; within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines	High	V	-	**Yes**
Hieraaetus morphnoides	Little Eagle (Foraging)	-	Moderate	V	-	**Yes**
Hirundapus caudacutus	White-throated Needletail	-	High	-	V	**Yes**
Lathamus discolor	Swift Parrot (Foraging)	-	Moderate	E	CE	**Yes**
Lophoictinia isura	Square-tailed Kite (Foraging)	-	Moderate	V	-	**Yes**
Melanodryas cucullata cucullata	South-eastern Hooded Robin	-	Moderate	E	E	**Yes**
Micronomus norfolkensis	Eastern Coastal Freed-tailed Bat	-	High	V	-	**Yes**
Miniopterus australis	Little Bent-winged Bat (Foraging)	-	High	V	-	**Yes**
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	-	High	V	-	**Yes**
Neophema pulchella	Turquoise Parrot	-	High	V	-	**Yes**
Pandion cristatus	Eastern Osprey (Foraging)	-	Moderate	V	-	**Yes**
Petaurus australis	Yellow-bellied Glider	-	High	V	V	**Yes**
Petroica boodang	Scarlet Robin	-	Moderate	V	-	**Yes**
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	-	High	V	V	**Yes**
Rostratula australis	Australian Painted Snipe	-	Moderate	E	E	**Yes**

Scientific name	Common name	Habitat constraints / geographic limitations	Sensitivity to gain class	BC Act Status	EPBC Act Status	Retained for assessment?
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	-	High	V	-	**Yes**
Scoteanax rueppellii	Greater Broad-nosed Bat	-	High	V	-	**Yes**
Stagonopleura guttata	Diamond Firetail	-	Moderate	V	-	**Yes**
Varanus rosenbergi	Rosenberg's Goanna	-	High	V	-	**Yes**

5.2.2 Species credit species

Species credit species represent those that cannot be readily predicted to occur within the subject land based on the PCTs present (i.e. suitable habitat cannot be confidently predicted by vegetation surrogates or landscape features) and must therefore be surveyed for where potential habitat is considered to be present.

An assessment of the species credit species returned by the BAM-C has been undertaken to determine whether they have the potential to occur based on the presence of necessary habitat components or habitat constraints, in accordance with BAM Section 5.2.2. *Limosa lapponica baueri* (Bar-tailed Godwit) was added as a candidate species because, although it was not returned by the BAM-C, Important Habitat Mapping for the species occurs within the Parramatta River. Table 5-2: provides the full list of candidate species credit species returned by the BAM-C and where relevant the justification for targeted surveys not being conducted.

Stick nest surveys were undertaken in October 2024 across the entire Subject Land. No stick nests were observed within the Subject Land, as such Species Credit Species with habitat constraints of nest trees, were excluded from further assessment/survey. Other bird species with alternative signs of breeding i.e. behaviour and/or breeding pairs being present for example, were retained for further assessment, discussed below.

Table 5-2: Species credit species

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Anthochaera phrygia **Regent Honeyeater (Breeding)**	As per Important Habitat Map	-	High	CE	CE	**No.** The subject land is not within the Important Habitat Area Map.
Burhinus grallarius **Bush Stone-curlew**	Fallen/standing dead timber including logs	-	High	CE	CE	**Yes.** Targeted surveys conducted.
Calidris ferruginea **Curlew Sandpiper (Breeding)**	As per Important Habitat Map	-	High	CE	CE	**Yes.** Targeted surveys were not conducted for this species as the subject land includes areas within the Important Habitat Map. Potential impacts to the Important Habitat Map area have been assessed as prescribed impacts in accordance with Section 6.1.c of the BAM.
Callocephalon fimbriatum **Gang-gang Cockatoo (Breeding)**	Hollow bearing trees; eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	-	High	E	E	**Yes.** Targeted surveys conducted.
Calyptorhynchus lathami lathami **Glossy Black-cockatoo (Breeding)**	Hollow bearing trees; living or dead tree with hollows greater than 15 cm diameter and higher than 8 m above ground	-	High	V	V	**Yes.** Targeted surveys conducted.
Cercartetus nanus	-	-	High	V	-	**No.** The Eastern Pygmy Possum prefers habitat with a rich shrub understorey and feeds largely on banksias. The shrub

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Eastern Pygmy Possum						understorey of native vegetation within the subject land was poor and no banksias were recorded within native vegetation communities. It is not reasonably likely that the species occurs within the subject land.
Deyeuxia appressa	-	-	High	E	E	**Yes.** Targeted surveys conducted.
Epthianura albifrons – endangered population **White-fronted Chat population in the Sydney Metropolitan Catchment Management Area**	-	-	High	EP	-	**Yes.** Targeted surveys conducted.
Eucalyptus benthamii **Camden White Gum**	-	-	High	CE	V	**Yes.** Targeted surveys conducted.
Eucalyptus glaucina **Slaty Red Gum**	-	-	High	V	V	**Yes.** Targeted surveys conducted.
Gyrostemon thesioides	Sandy, alluvial or colluvial soil within 50 m of a watercourse	-	Moderate	V	V	**Yes.** Targeted surveys conducted.
Haliaeetus leucogaster	Living or dead mature trees within suitable vegetation within 1 km of rivers, lakes, large dams or creeks, wetland and coastlines	-	High	V	-	**Yes.** Targeted surveys conducted.

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
White-bellied Sea-Eagle (Breeding)						
Heleioporus australiacus **Giant Burrowing Frog**	-	-	Moderate	V	V	**No.** The Giant Burrowing Frog is found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based, within 300 m of breeding areas. It breeds in soaks or pools of first and second order streams. The species is not associated with PCT 4028. This species is associated with PCT 4058. However, the occurrence of PCT 4058 within the subject land does not provide useable habitat. The only first or second-order streams within 300 m of PCT 4058 within the subject land are Charity Creek and Smalls Creek, which flow through deeply recessed concrete drains with no riparian vegetation, pools or soaks. It is not reasonably likely that the species occurs within PCT 4058 within the subject land.
Hieraaetus morphnoides **Little Eagle**	Nest trees – live (occasionally dead) large old trees within vegetation)	-	Moderate	V	-	**Yes.** Targeted surveys conducted.
Lathamus discolor **Swift Parrot (Breeding)**	As per Important Habitat Map	-	Moderate	E	CE	**No.** The subject land is not within Important Habitat Area Map

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Limosa lapponica baueri **Bar-tailed Godwit (Breeding)***	As per Important Habitat Map	-	High	V	E	***Added as Candidate species due to presence of IHM within Subject Land.** **Yes.** Targeted surveys were not conducted for this species as the subject land includes areas within the Important Habitat Map. Potential impacts to the Important Habitat Map area have been assessed as prescribed impacts in accordance with Section 6.1.c of the BAM.
Litorea aurea **Green and Golden Bell Frog**	Semi-permanent/ephemeral wet areas; within 1 km of wet areas/swamps; within 1 km of swamp/waterbodies/within 1 km of waterbody	-	High	E	V	**Yes for PCT 4028; No for PCT 4058.** The Green and Golden Bell Frog inhabits marshes, dams and streamsides, particularly those containing bulrushes (*Typha* spp.) The species has been assumed present within PCT 4028 and within planted native vegetation within Sydney Olympic Park. PCT 4028 and planted native vegetation within Sydney Olympic Park occur in an area with numerous Green and Golden Bell Frog Records. The species is also associated with PCT 4058. However, the occurrence of PCT 4058 within the subject land does not provide useable habitat. The only first or second-order streams within 300 m of PCT 4058 within the subject land are Charity Creek and Smalls Creek in Meadowbank, which flow through deeply recessed concrete drains with no riparian vegetation, pools or soaks. It is not

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
						reasonably likely that the species occurs within PCT 4058 within the subject land.
Lophoictinia isura **Square-tailed Kite** **(Breeding)**	Nest trees	-	Moderate	V	-	**No.** No stick nests recorded within Subject Land.
***Marsdenia viridiflora* subsp. *viridiflora* – endangered population**		Blacktown, Camden, Campbelltown, Canterbury-Bankstown, Cumberland, Fairfield, Liverpool and Penrith LGAs	Moderate	EP	-	**No.** The subject land is not within the listed LGAs.
Melaleuca biconvexa **Biconvex Paperbark**	-	-	High	V	V	**Yes.** Targeted surveys conducted.
Meridolum corneovirens **Cumberland Plain Land Snail**	-	-	High	E	-	**Yes.** Targeted surveys conducted.
Miniopterus australis **Little Bent-winged Bat** **(Breeding)**	Caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature	-	Very High	V	-	**No.** There are no cliffs, rocky areas, old mines or tunnels within the subject land
Miniopterus orianae oceanensis	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code	-	Very High	V	-	**No.** There are no cliffs, rocky areas, old mines or tunnels within the subject land

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Large Bent-winged Bat (Breeding)	"IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500					
Myotis macropus **Southern Myotis**	Waterbodies; waterbodies with permanent pools/stretches 3 m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200 m of the site	-	High	V	-	**Yes.** Targeted surveys conducted.
Ninox connivens **Barking Owl**	Hollow bearing trees; a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground	-	High	V	-	**Yes.** Targeted surveys conducted.
Ninox strenua **Powerful Owl**	Hollow bearing trees; a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground	-	High	V	-	**Yes.** Targeted surveys conducted.
Pandion cristatus **Eastern Osprey (Breeding)**	Presence of stick-nests in living and dead trees (>15 m) or artificial structures within 100 m of a floodplain for nesting	-	Moderate	V	-	**No.** No stick nests recorded within Subject Land.
Parameles nasuta **Long-nosed Bandicoot population in inner western Sydney**	-	Marrickville, Canada Bay, Canterbury, Ashfield and Leichhardt LGAs	High	EP	-	**No.** The subject land is not within the listed LGAs.
Persicaria eliator **Tall Knotweed**	Semi-permanent/ephemeral wet areas; or within 50 m; swamp; or within 50 m; waterbodies, including wetlands, or within 50 m	-	High	V	V	**Yes.** Targeted surveys conducted.
Petauroides volans	-	-	High	E	E	**Yes.** Targeted surveys conducted.

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Southern Greater Glider						
Petaurus norfolcensis **Squirrel Glider**	-	-	High	V	-	**Yes.** Targeted surveys conducted.
Phascolarctos cinereus **Koala**	Presence of koala use trees	-	High	E	E	**No.** The Koala is an arboreal mammal that feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species. There are koala use trees within native vegetation within the subject land. However, all native vegetation communities within the subject land are relatively small patches within a highly urbanised and partially industrialised landscape. The extensive areas of connected native vegetation and comparative lack of disturbance required for large arboreal animals to persist in these small patches are wholly absent. It is not reasonably likely that the species occurs within the subject land.
Pomaderris brunnea **Brown Pomaderris**	-	-	High	E	V	**Yes.** Targeted surveys conducted.
Pseudophryne australis **Red-crowned Toadlet**	-	-	Moderate	V	-	**No.** The Red-crowned Toadlet occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. It inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
						The Red-crowned Toadlet is not associated with PCT 4028. This species is associated with PCT 4058. However, the occurrence of PCT 4058 within the subject land does not provide useable habitat. The only first or second-order streams within 300 m of PCT 4058 within the subject land are Charity Creek and Smalls Creek, which flow through deeply recessed concrete drains with no riparian vegetation, pools or soaks, nor can these drains be describes as occurring on sandstone or below sandstone ridges. It is not reasonably likely that the species occurs within PCT 4058 within the subject land.
Pteropus poliocephalus **Grey-headed Flying-fox (Breeding)**	Breeding camps	-	High	V	V	**No.** There are no breeding camps in the subject land. The nearest Grey-headed Flying-fox camp to the subject land is in Clyde approximately 1.5 km upstream of the Duck River HDD crossing.
Rhodamnia rubescens **Scrub Turpentine**	-	-	Very High	CE	CE	**Yes.** Targeted surveys conducted.
Tyto novaehollandiae **Masked Owl**	Hollow bearing trees; a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground	-	High	V	-	**Yes.** Targeted surveys conducted.
Wilsonia backhousei	Beaches and rock platforms adjacent to beaches, or anywhere saline	-	High	V	-	**No.** *Wilsonia backhousei* is a species of the margins of salt marshes and salt lakes. There are no salt marshes or salt lakes within the subject land.

Species	Habitat constraint	Geographic limitations	Sensitivity to gain class	BC Act status	EPBC Act status	Retained for further assessment?
Narrow-leafed Wilsonia						
Zannichellia palustris	Waterbodies; freshwater or slightly brackish estuarine areas (10%)	-	High	E	V	**No.** *Zannichellia palustris* grows in fresh or slightly saline stationary or slowly flowing water. It is associated with PCT 4028, but not with PCT 4058. The Sydney Olympic Park occurrence of PCT 4028 does not contain freshwater or slightly brackish estuarine areas. PCT 4028 in Camellia contains a concrete-lined drain in which aquatic vegetation has established, namely, *Typha orientalis*, *Cyperus eragrostis* and *Sagittaria platyphylla*. However, that portion of the patch that is within the subject land is fully terrestrial, more than 5 m from the drain.
Zieria involucrata	-	-	High	E	V	**Yes.** Targeted surveys conducted.

5.3 Targeted threatened species surveys

5.3.1 Targeted threatened flora surveys

Targeted threatened flora surveys were undertaken over four days in October and December 2024 and February and March 2025, using the methods described in Section 2.3. Targeted flora surveys were completed for all threatened flora species considered likely to occur in the subject land that could be surveyed during this time period.

Threatened flora species and the survey effort undertaken are detailed in Table 5-3.

Because there is so little native vegetation within the subject land, consisting largely of edge habitat and overhang, survey effort was tailored to focus on areas of fully structured vegetation directly adjacent to the subject land (and including the subject land).

Locations of threatened flora surveys are displayed in Figure 5-1. For PCT 4028: Estuarine Swamp Oak Twig-rush Forest (low-Sydney Olympic Park), threatened flora surveys were not carried out separately from the BAM VI plot, as this plot encompassed all native vegetation within the vegetation zone apart from isolated shrubs within exotic grassland.

Table 5-3: Targeted threatened flora species survey details

Scientific name	BC Act status	EPBC Act status	Minimum survey requirements	Survey method	Seasonal survey requirements	Survey timing
Deyeuxia appressa	E	E	Parallel field traverses. For a forb in open vegetation the recommended maximum distance between field traverses is 10 metres.	Parallel field traverses at five and ten metres spacing	December	2 December 2024
Eucalyptus benthamii	V	V	Parallel field traverses. For a tree in open vegetation the recommended maximum distance between field traverses is 40 metres.	Parallel field traverses at five and ten metres spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025
Eucalyptus glaucina	V	V	Parallel field traverses. For a tree in open vegetation the recommended maximum distance between field traverses is 40 metres.	Parallel field traverses at five and ten metres spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025
Gyrostemon thesiodes	V	V	Parallel field traverses Parallel field traverses. For a forb in open vegetation the recommended maximum distance between field traverses is 10 metres.	Parallel field traverses at five and ten metres spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025
Melaleuca biconvexa	V	V	Parallel field traverses. For a tree in open vegetation the recommended maximum distance between field traverses is 40 metres.	Parallel field traverses at five and ten metres spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025
Persicaria eliator	V	V	Parallel field traverses For a forb in open vegetation the recommended maximum distance between field traverses is 10 metres.	Direct examination of small amount of native vegetation within subject land; binocular survey of more structured	December-May	2 December 2024; 12 February, 26 March 2025

Scientific name	BC Act status	EPBC Act status	Minimum survey requirements	Survey method	Seasonal survey requirements	Survey timing
				adjacent native vegetation		
Pomaderris brunnea	E	V	Parallel field traverses. For a shrub in open vegetation the recommended maximum distance between field traverses is 15 metres.	Parallel field traverses five and ten meter spacing	August-October	24 October 2024
Rhodamnia rubescens	CE	CE	Parallel field traverses. For a shrub in open vegetation the recommended maximum distance between field traverses is 15 metres.	Parallel field traverses five and ten meter spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025
Zieria involucrata	E	V	Parallel field traverses. For a shrub in open vegetation the recommended maximum distance between field traverses is 15 metres.	Parallel field traverses five and ten meter spacing	All year	24 October, 2 December 2024; 12 February, 26 March 2025

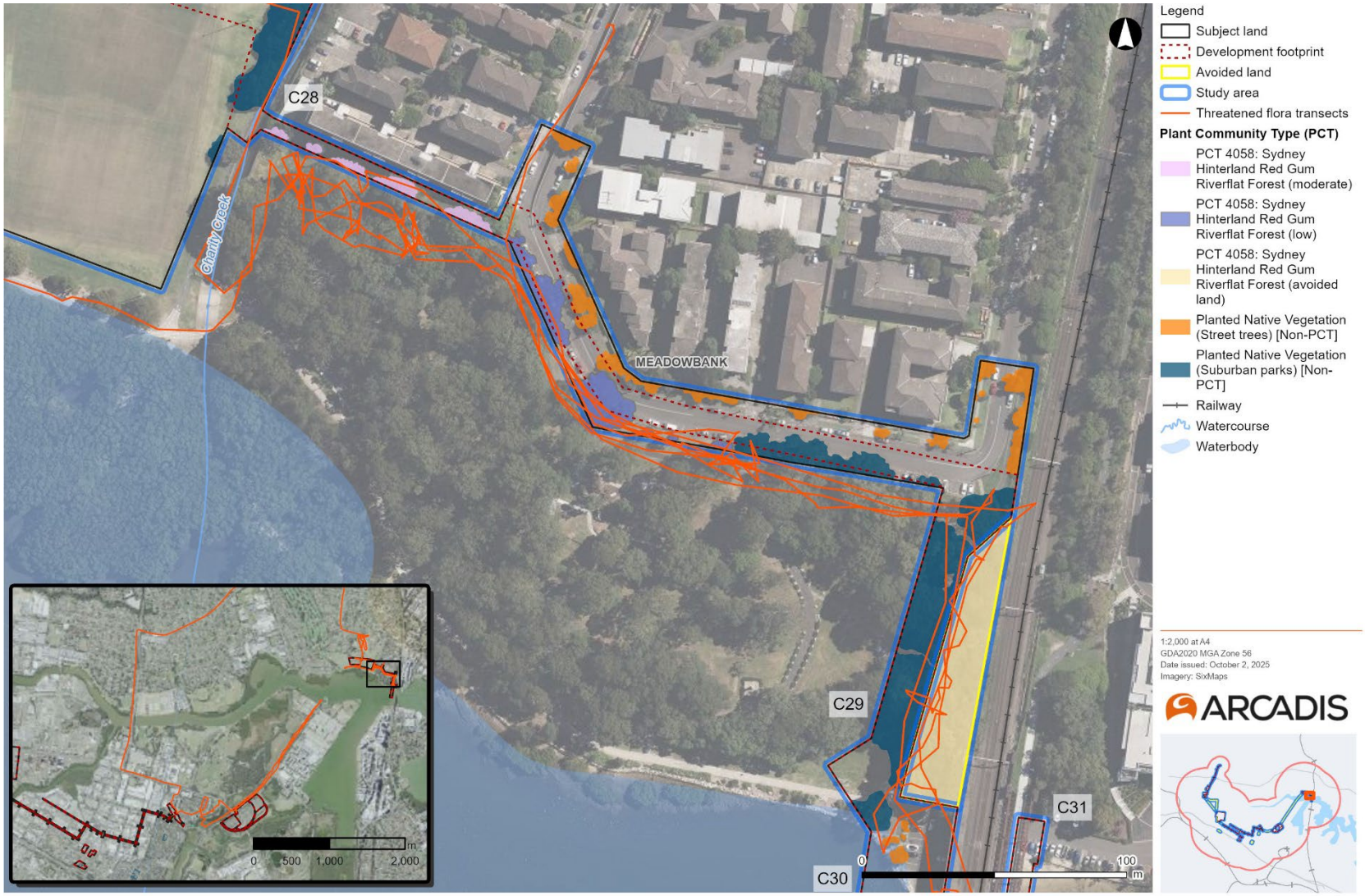


Figure 5-1: Threatened flora transects, PCT 4058

5.3.2 Targeted threatened fauna surveys

The methodologies applied for each targeted threatened fauna species within the subject land are described below. Specifically, survey effort and threatened fauna targeted during field surveys are summarised in Table 5-4. Table 5-3 and Table 5-4 also outline each species' reason for inclusion, that is, generated by the BAM-C and assessed in Section 5.2 as requiring survey, or determined through database searches as likely to occur in the subject land. Locations of threatened species surveys are displayed in Figure 5-2.

Table 5-4: Species credit threatened fauna species targeted in surveys

Scientific name	Common name	BC Act status	EPBC Act status	Minimum survey requirements	Seasonal survey requirements	Survey timing appropriate?	Adequacy against guidelines
Burhinus grallarius	Bush Stone-curlew	E	n/a	There are no prescribed survey requirements for Bush Stone-curlew; however, general survey methods for diurnal birds are considered appropriate: Area searches, transects or 20 min point surveys in areas of suitable habitat. Detection by sightings, calls and/or indirect evidence (e.g. foraging signs, moulted feathers). Avoid wet and windy weather (CoA, 2010a) (DEC, 2004).	All year	Yes	Adequate. See Section 5.3.2.1 for details.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	Area searches, transects or 20 min point surveys in areas of suitable habitat. Detection by sightings, calls and/or indirect evidence (e.g. foraging signs, moulted feathers). Avoid wet and windy weather (CoA, 2010a) (DEC, 2004).	October-January	Yes	Adequate. See Section 5.3.2.1 for details.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	n/a	Area searches, transects or 20 min point surveys in areas of suitable habitat. Detection by sightings, calls and/or indirect evidence (e.g. foraging signs, moulted feathers). Avoid wet and windy weather (CoA, 2010a) (DEC, 2004).	January-September	Yes	Adequate. See Section 5.3.2.1 for details.
Epthianura albifrons – endangered population	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	EP	n/a	There are no prescribed survey requirements for White-fronted Chat; however, general survey methods for diurnal birds are considered appropriate: Area searches, transects or 20 min point surveys in areas of suitable habitat. Detection by sightings, calls and/or indirect evidence (e.g. foraging signs, moulted	All year	Yes	Adequate. See Section 5.3.2.1 for details.

Scientific name	Common name	BC Act status	EPBC Act status	Minimum survey requirements	Seasonal survey requirements	Survey timing appropriate?	Adequacy against guidelines
				feathers). Avoid wet and windy weather (CoA, 2010a) (DEC, 2004).			
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	n/a	Stick nest survey and diurnal bird surveys	July-December	Yes	Adequate. See Section 5.3.2.1 for details.
Hieraaetus morphnoides	Little Eagle	V	n/a	Stick nest survey and diurnal bird surveys	August-October	Yes	Adequate See Section 5.3.2.1 for details.
Meridolum corneovirens	Cumberland Plain Land Snail	E	n/a	Diurnal and nocturnal surveys are required. Meandering transects across suitable habitat searching for empty shells. Nocturnal surveys to be undertaken between dusk and dawn, after rainfall and diurnal surveys in suitable habitat in any conditions.	All year	Yes	Adequate. See Section 5.3.2.1 for details.
Myotis macropus	Southern Myotis	V	n/a	Ultrasonic call detectors placed in suitable habitat. Detectors should be deployed for a minimum of four nights and amount to 16 trap nights survey effort or more. Surveys are to be conducted between October – March to maximise species detection (DPIE, 2021a).	October-March	Yes	Adequate. See Section 5.3.2.4 for details.
Ninox connivens	Barking Owl	V	n/a	Call playback and spotlighting surveys repeated for 6 nights. Required effort is one site every 1000 metres, up to 10 sites per 1000 hectares of habitat (NSW DCCEEW, 2025c)	All year	Yes	Adequate. See Section 5.3.2.2 for details.
Ninox strenua	Powerful Owl	V	n/a	Call playback and spotlighting surveys repeated for 6 nights. Required effort is one site every 1000 metres, up to 10 sites per 1000 hectares of habitat (NSW DCCEEW, 2025c)	All year	Yes	Adequate. See Section 5.3.2.2 for details.

Scientific name	Common name	BC Act status	EPBC Act status	Minimum survey requirements	Seasonal survey requirements	Survey timing appropriate?	Adequacy against guidelines
Petauroides volans	Southern Greater Glider	E	E	Spotlighting: Two 200 metre transects per 5-hectare site. Survey effort split between two separate nights where possible. Avoid wet and windy weather (DEC, 2004).	All year	Yes	Adequate. See Section 5.3.2.3 for details.
Petaurus norfolcensis	Squirrel Glider	V	n/a	Spotlighting: Two 200 metre transects per 5-hectare site. Survey effort split between two separate nights where possible. Avoid wet and windy weather (DEC, 2004).	All year	Yes	Adequate. See Section 5.3.2.3 for details.
Tyto novaehollandiae	Masked Owl	V	n/a	Call playback and spotlighting surveys repeated for 6 nights. Required effort is one site every 1000 metres, up to 10 sites per 1000 hectares of habitat (NSW DCCEEW, 2025c)	All year	Yes	Adequate. See Section 5.3.2.2 for details.

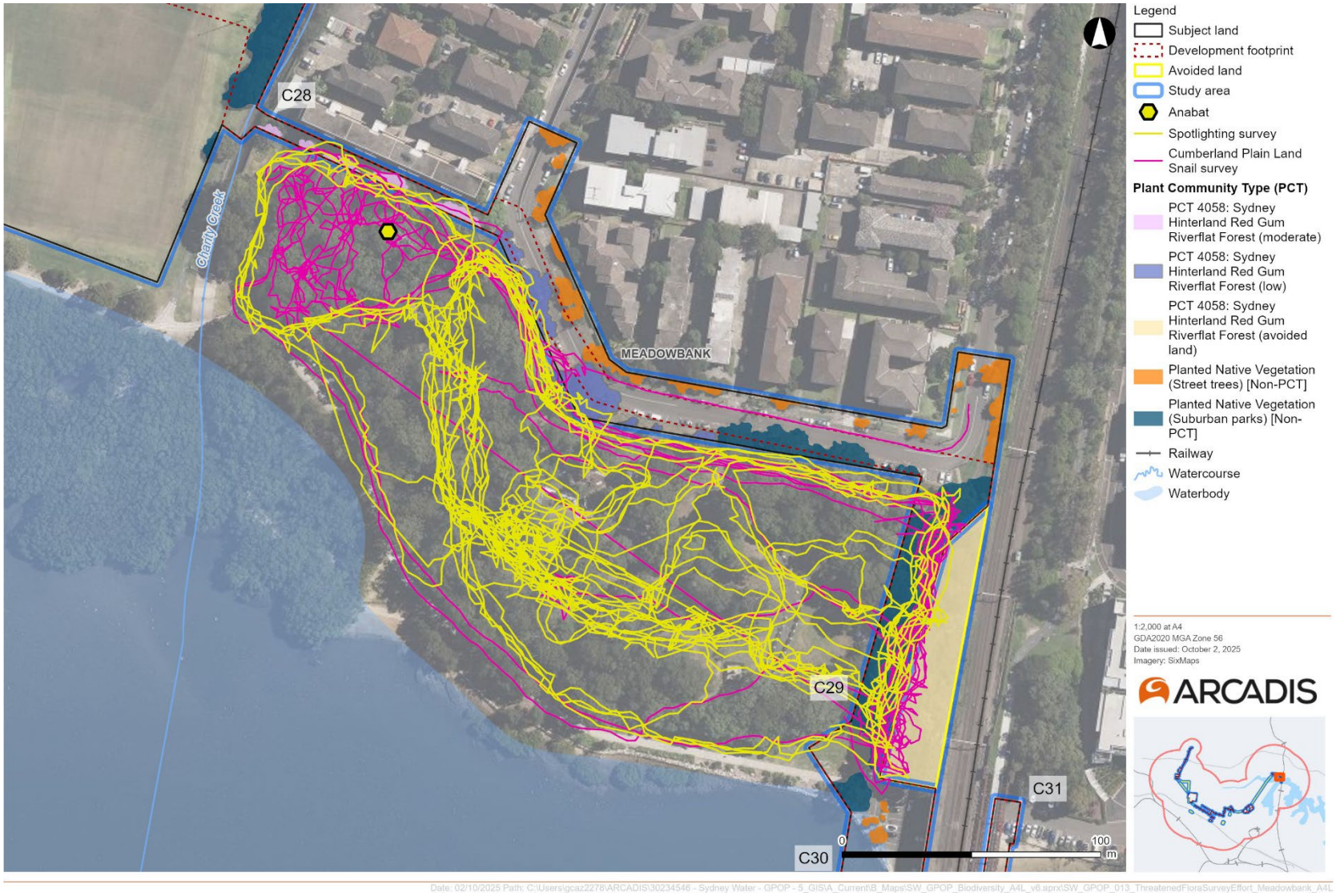


Figure 5-2: Threatened fauna survey effort

5.3.2.1 Diurnal bird and raptor surveys

Because the areas of PCT vegetation within the subject land were so small (0.18 ha total PCT vegetation), diurnal bird surveys were conducted within areas of native vegetation directly adjacent to the subject land as well as the subject land. Diurnal bird surveys involved area searches, detecting species by visual observation (e.g. through binoculars) and/or call. In addition, species opportunistically seen or heard were recorded while traversing the subject land. Dedicated hollow-bearing tree searches were carried out on 24 October and 2 December 2024, and on 11 March 2025 (three replicate surveys). Hollow watching for Glossy Black-cockatoo was carried out on 3 April and 29 August 2025.

The entire subject land was surveyed for large stick nests suitable for threatened raptors on 31 October 2024. No stick nests were recorded. Species Credit Species with habitat constraints of presence of stick nests were therefore excluded (Eastern Osprey and Square-tailed Kite) for further assessment. Other bird species with other identifiable signs of breeding i.e. breeding pairs or behaviour, namely White-bellied Sea-Eagle and Little Eagle, were retained for further assessment despite no stick nests being recorded within the Subject Land. Targeted surveys for diurnal birds were conducted in October concurrently with the surveys for stick nests. Additionally, opportunistic surveys for diurnal birds (conducted concurrently with other site surveys within the correct season) provide further supplementary survey effort for these species.

5.3.2.2 Owl surveys

A total of six evenings of call playback targeting Barking Owl, Masked Owl and Powerful Owl were conducted in the subject land between 17 February and 6 March 2024. As per the TBDC survey guidelines (NSW DCCEEW, 2025c), a single survey site was required based on the area of available habitat in the subject land. Call playback and spotlighting surveys were repeated at this site across six evenings.

Call playback surveys commenced at dusk (last light), targeting forest owls involved playing calls of the target species at 20% nature volume for 15 seconds, followed by a 30 second listening period. This cycle was repeated for 15 minutes, with the volume steadily increased up to 200% of the natural call volume. Fifteen minutes of spotlighting was undertaken following the call playback period to search for any owls that may have been attracted by the calls. Call playback was repeated for each target species, starting with Barking Owl, followed by Sooty Owl, Powerful Owl and finishing with Masked Owl considering the survey guidelines and owl behaviour. Spotlighting surveys included looking for prey species in addition to the target owls.

Spotlighting transects are shown in Figure 5-2.

5.3.2.3 Arboreal mammal surveys

Spotlighting for arboreal mammals (Squirrel Glider and Southern Greater Glider) was undertaken in conjunction with spotlighting for forest owls between 17 February and 6 March 2025. This was done over the same six evenings at the same single survey site as the forest owls.

Spotlighting transects are shown in Figure 5-2.

5.3.2.4 Microbat surveys and roosting habitat assessments

Ultrasonic call detector (Anabat) surveys were conducted at one location within the subject land (Figure 5-2). One ‘Anabat Chorus’ (Titley Pty Ltd) detector was deployed within an area of suitable habitat to target threatened microchiropteran (microbat) species.

The device was deployed between 18 December 2024 and 4 January 2025, a total of 18 detector nights) (Table 5-5:).

Table 5-5: Details of ultrasonic recorder (Anabat) deployments in the subject land

Site ID	Location description	Coordinates (GDA 2020)	Deployment Dates	Number trap nights
Anabat 1	Memorial Park, Meadowbank	-33.8189, 151.0866	18/12/24 – 04/01/25	18

On Thursday 5th June 2025, two ecologists conducted a microbat habitat survey of the John Whitton Bridge and an old bridge structure comprised of brick under the Parramatta Light rail line, Initially the underside of the John Whitton Bridge was inspected on foot using binoculars and a high-powered torch from the Memorial Park, Meadowbank side. A canoe was then used to inspect the structural elements over the Parramatta River. Searches were conducted for potential roosting features, including cracks, crevices, and wooden elements, as well as signs of microbat use such as droppings/guano and/or stains. Given the structure was comprised of predominantly open steel, habitat likelihood was considered low. The John Whitton Bridge structure comprised of predominantly smooth concrete, with no evidence of microbat use and/or likely roosting habitat found in either structure.

An old bridge structure comprised of brick under the Parramatta Light rail line, which was fenced off, was inspected from a distance using binoculars and a torch. Whilst no signs of microbat use were observed, several cracks and crevices were observed, which could constitute suitable microbat roosting habitat. The structures would be subject to consistent noise and vibration indirect impacts from the light rail use above. The proposal would not directly impact this structure, and indirect impacts associated would be negligible.

5.3.2.5 Snail surveys

Surveys for Cumberland Plain Land Snail consisted of diurnal and nocturnal searches in accordance with the TBDC (NSW DCCEEW, 2025c).

Diurnal searches for the species consisted of meandering transects across suitable habitat to locate empty shells. Nocturnal surveys similarly consisted of meandering transects across suitable habitat, spotlighting along the ground for live individuals. Meandering transects targeted “suitable habitat” within the study area, specifically targeting the subject land. These diurnal and nocturnal searches were replicated once a week over 3 consecutive weeks between 17 February and 6 of March 2024, during optimal survey conditions.

Survey locations and effort for the Cumberland Plain Land Snail can be viewed in Figure 5-2.

5.4 Threatened species survey results

A summary of the survey results for species credit species are provided in Table 5-6 below, with descriptions of the results and habitat present discussed in Section 5.4.1 and 5.4.2.

Table 5-6: Targeted threatened species credit species survey results

Scientific name	Common name	Presence (species credits)	Number/ area
Burhinus grallarius	Bush Stone-curlew	Not recorded	-
Calidris ferruginea	Curlew Sandpiper (Breeding)	n/a	Presence assumed within Important Habitat Map
Callocephalon fimbriatum	Gang-gang Cockatoo	Not recorded	-
Calyptorhynchus lathami	Glossy Black-Cockatoo	Not recorded	-
Deyeuxia appressa		Not recorded	-

Scientific name	Common name	Presence (species credits)	Number/ area
Epthianura albifrons – endangered population	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	Not recorded	-
Eucalyptus benthamii	Camden White Gum	Not recorded	-
Eucalyptus glaucina	Slaty Red Gum	Not recorded	-
Gyrostemon thesiodes		Not recorded	-
Haliaeetus leucogaster	White-bellied Sea-Eagle	Not recorded	-
Hieraaetus morphnoides	Little Eagle	Not recorded	-
Limosa lapponica baueri	Bar-tailed Godwit (Breeding)	n/a	Presence assumed within Important Habitat Map
Litoria aurea	Green and Golden Bell Frog	Presence assumed	Presence assumed within PCT 4028: Estuarine Swamp Oak Twig-rush Forest
Lophoictinia isura	Square-tailed Kite	Not recorded	-
Melaleuca biconvexa	Biconvex Paperbark	Not recorded	-
Meridolum corneovirens	Cumberland Plain Land Snail	Not recorded	-
Myotis macropus	Southern Myotis	Recorded	Species recorded within PCT 4058: Sydney Hinterland Red Gum Riverflat Forest Presence assumed within PCT 4028: Estuarine Swamp Oak Twig-rush Forest
Ninox connivens	Barking Owl	Not recorded	-
Ninox strenua	Powerful Owl	Recorded	One individual in PCT 4058: Sydney Hinterland Red Gum Riverflat Forest
Pandion cristatus	Eastern Osprey	Not recorded	-
Persicaria eliator	Tall Knotweed	Not recorded	-
Petauroides volans	Southern Greater Glider	Not recorded	-
Petaurus norfolkensis	Squirrel Glider	Not recorded	-
Pomaderris brunnea	Brown Pomaderris	Not recorded	-
Rhodamnia rubescens	Scrub Turpentine	Not recorded	-
Tyto novaehollandiae	Masked Owl	Not recorded	-

5.4.1 Threatened flora species polygons

All flora species credit species identified in Table 5-3 were surveyed in the subject land during their relevant survey requirements, as per the BAM-C and TBDC. No threatened flora species were recorded in the subject land. No threatened flora species polygons are required.

5.4.2 Threatened fauna species polygons

Three threatened species credit species were either recorded during field survey or presence was assumed:

- *Litoria aurea* (Green and Golden Bell Frog)
- *Myotis macropus* (Southern Myotis)
- *Ninox strenua* (Powerful Owl).

Three dual credit species were incidentally recorded during survey:

- *Miniopterus australis* (Little Bent-winged Bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

However, these are species credit species for breeding habitat only. There is no breeding habitat for any of the dual-credit species within the subject land.

One threatened ecosystem credit species was incidentally recorded: *Falsistrellus tasmaniensis* (Eastern False Pipistrelle).

Descriptions of the habitat for species recorded and for which presence was assumed and species polygons are in the sections that follow.

5.4.2.1 Green and Golden Bell Frog

The Green and Golden Bell Frog was not surveyed for or recorded. Rather, presence was assumed for the species within PCT 4028: Estuarine Swamp Oak Twig-rush Forest because of the large number of records within Sydney Olympic Park.

Associated PCTs for the Green and Golden Bell Frog within a 200m radius from the nearest waterbody's top bank were included in the species polygon. The total amount of habitat (PCT 4028) for the species within the species polygon is 0.06 ha. The species polygon is shown at Figure 5-3.

5.4.2.2 Powerful Owl

One Powerful Owl was recorded through call playback within PCT 4058: Sydney Hinterland Red Gum Forest in Memorial Park, Meadowbank on the evening of 6 March 2025. There are a number of hollow-bearing trees within PCT 4058 at Memorial Park, although the species was not recorded within any of these. The Powerful Owl was recorded on one of six nights of survey.

The species polygon for Powerful Owl incorporates PCTs with which the species is associated within 800 m from the location of a detected owl and containing a hollow-bearing tree with a hollow >20 cm diameter and > 4 m above the ground. The total amount of habitat for the species within the species polygon PCT 4058 is 0.12 ha. A species polygon is shown in Figure 5-4.

5.4.2.3 Southern Myotis

Ultrasonic recorders were deployed to detect microbat calls within PCT 4058 at Memorial Park Meadowbank between 18 December 2024 and 4 January 2025. The Southern Myotis was recorded as 'possibly present', meaning that calls like those of the species were recorded but could not be positively identified. Because the

species' presence cannot be ruled out, it is considered present within PCT 4058. Full results of the ultrasonic recorder deployment are at Appendix H.

The presence of Southern Myotis was also assumed for PCT 4028, as the vegetation zones in this community are both directly adjacent to waterbodies, which would be preferred habitat for the species.

The species polygon for Southern Myotis incorporates PCTs with which the species is associated within 200 m of the bank of any permanent creeks, rivers or other waterbodies. The total amount of habitat for the species within the species polygon PCT 4058 is 0.18 ha. The species polygons are shown in Figure 5-5 and Figure 5-6.

5.4.2.4 Bar-tailed Godwit and Curlew Sandpiper

The Parramatta River adjacent to Memorial Park in Meadowbank is mapped as Important Habitat Mapping (IHM) for the Bar-tailed Godwit and Curlew Sandpiper. The river release pipeline splits into eight parallel pipelines below ground and enter the Parramatta River to the west of the John Whitton Bridge, where they extend between 75 and 130 m into the river, on the riverbed. An area within the river has been designated as an indicative Parramatta River construction area for this portion of the project, 2.93 hectares of which lies within the IHM (Figure 5-7). Although this indicative area overlaps with the IHM in the Parramatta River it is not within any mapped vegetation zones within the subject land. The Bar-tailed Godwit and Curlew Sandpiper generally forage at low to mid-tide in shallow water along the water's edge, or occasionally on exposed algal mats in the case of the Curlew Sandpiper. There are no mapped species polygons for these species as the IHM does not occur within a mapped PCT.

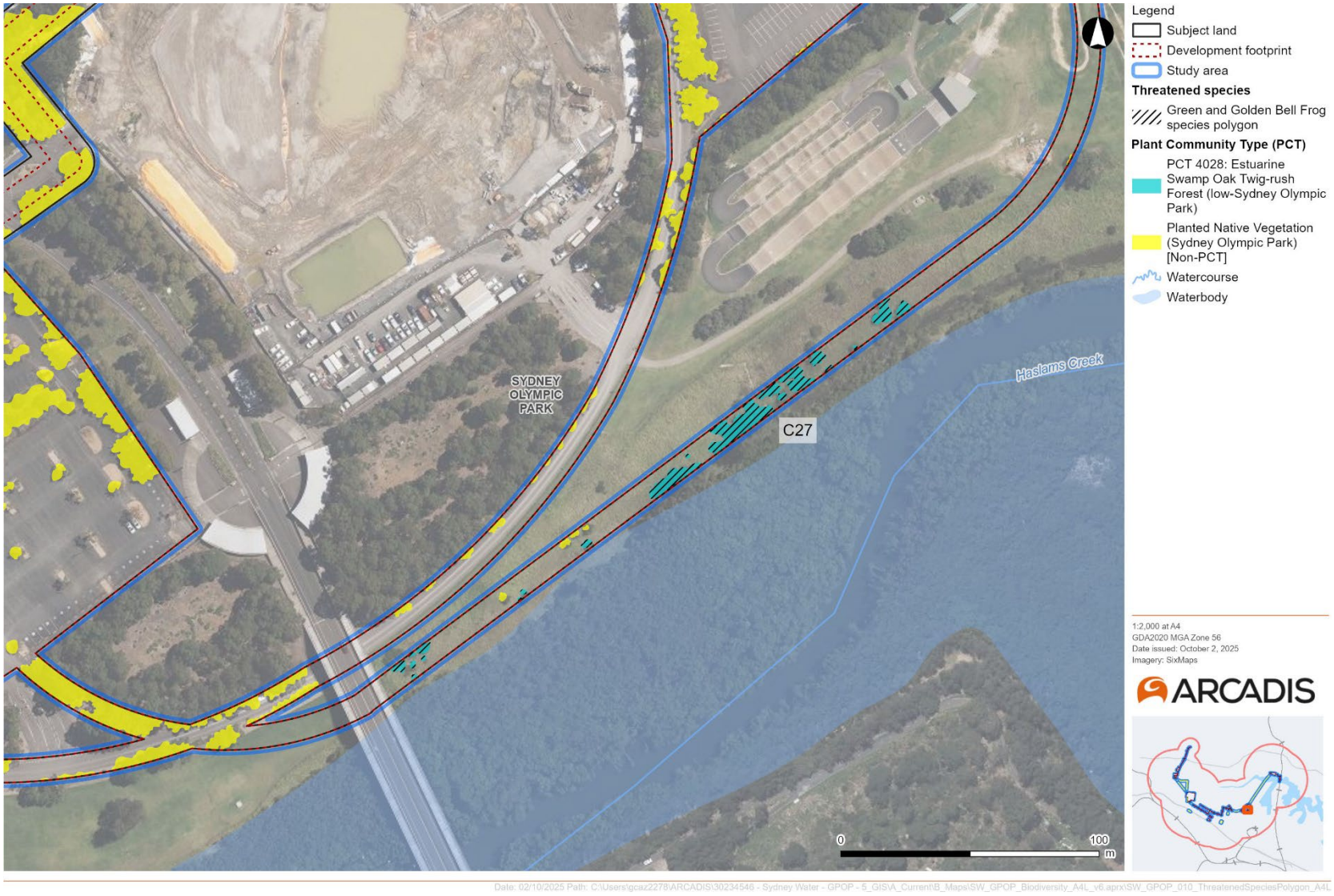


Figure 5-3: Species polygon, Green and Golden Bell Frog, PCT 4028: Estuarine Swamp Oak Twig-rush Forest (low – Sydney Olympic Park)



Figure 5-4: Species polygon, Powerful Owl, PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (low and moderate)

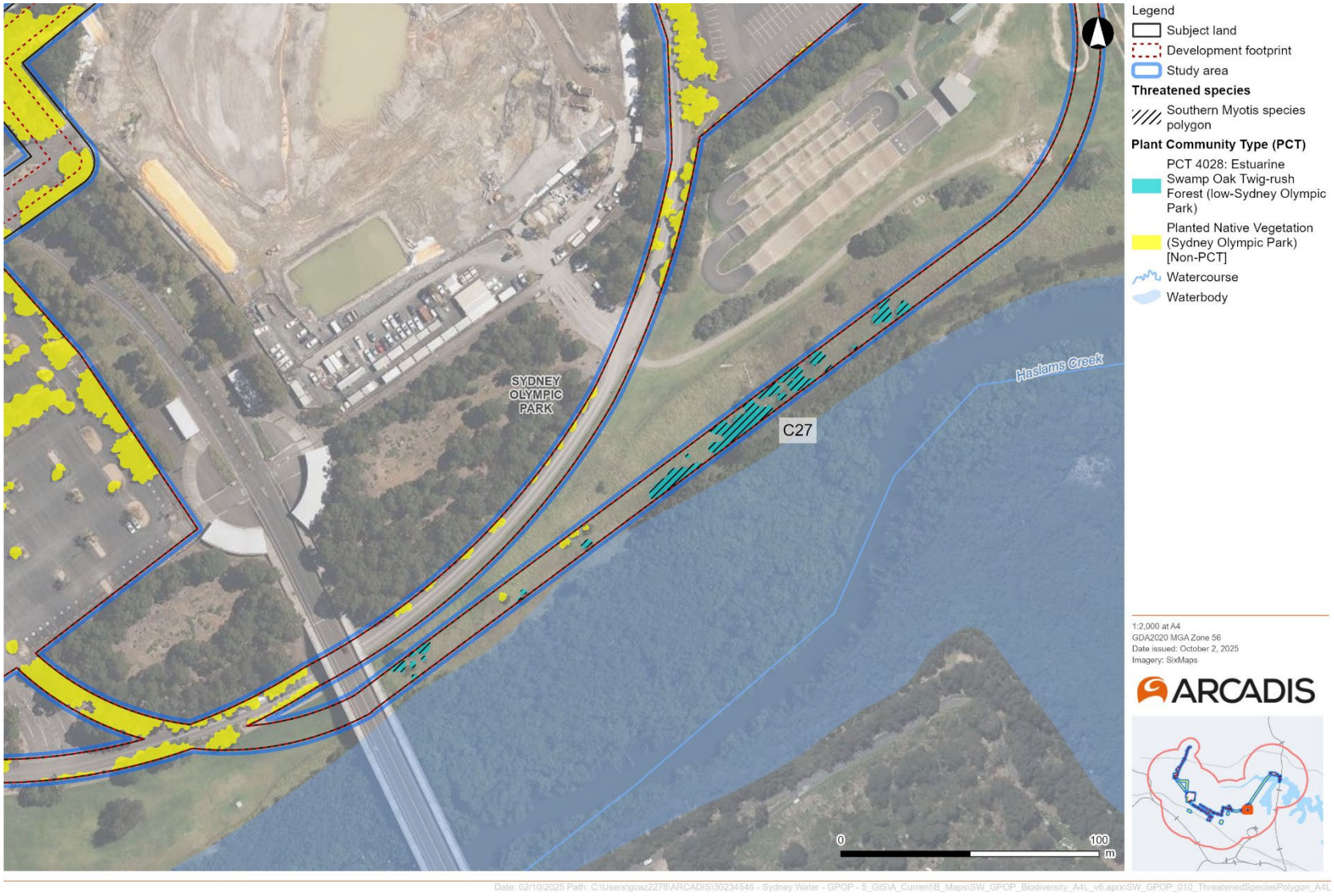


Figure 5-5: Species polygon, Southern Myotis (PCT 4028: Estuarine Swamp Oak Twig-rush Forest (low – Sydney Olympic Park)



Figure 5-6: Species polygon, Southern Myotis, PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (low and moderate)

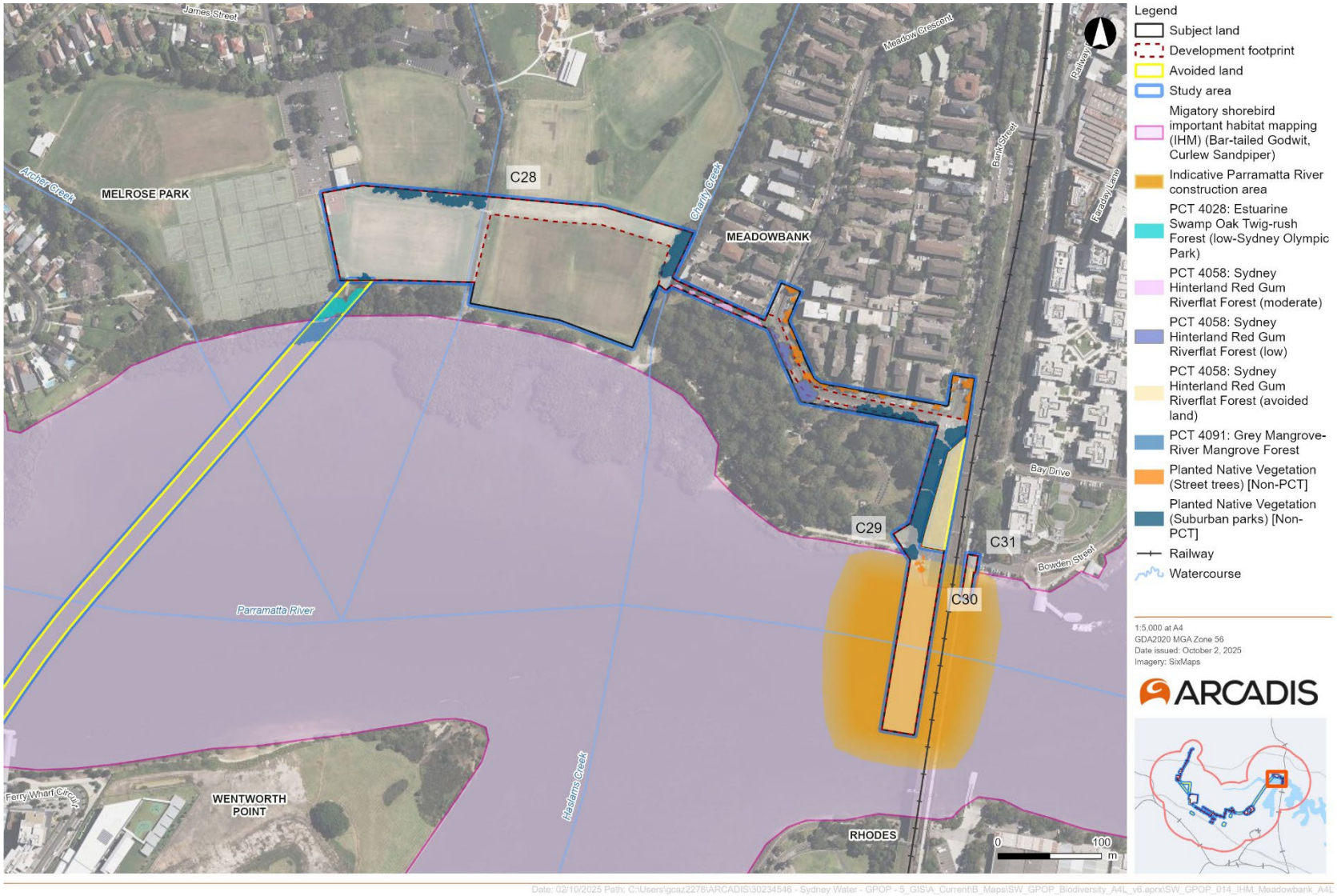


Figure 5-7: Important Habitat Mapping in the Parramatta River

6 Identifying prescribed impacts

Chapter 6 of the BAM (DPIE, 2020a) identifies the prescribed biodiversity impacts which must be assessed as part of the Biodiversity Offsets Scheme. These prescribed impacts and their relevance to the project are described below in Table 6-1. An assessment of the prescribed impacts relevant to the project is provided in Section 9.1.7.

Table 6-1: Prescribed impacts as identified in the BAM (DPIE, 2020a)

Prescribed impact	Relevance to the subject land
Impacts on the habitat of threatened entities including: **Karst, caves, crevices, cliffs and other geological features of significance**	There are no karst, caves, crevices, cliffs or other geological features of significance within the subject land.
Human-made structures	The subject land passes through residential and industrial neighbourhoods with a variety of human-made structures ranging from houses to industrial facilities to Western Sydney University. Within the subject land itself, however, the primary human-made structures are roads and carparks. It is unlikely that threatened species use these as habitat. Within suburban parks that serve as construction compounds, there are playgrounds and other recreational facilities such as basketball courts. These too are unlikely to serve as threatened species habitat. Sydney Water's Camellia pumping station Camellia pumping station (C14) will be upgraded as part of the project. The site of Camellia pumping station is unlikely to be threatened species habitat. The brine pipeline alignment traverses the Parramatta River via a dedicated pipe bridge adjacent to the Parramatta Light Rail line. The river release pipelines will be installed in the Parramatta River adjacent to John Whitton Bridge. These structures have potential to serve as microbat roosting habitat and were examined on 5 June 2025. No signs of microbat use were observed.
Non-native vegetation	There is non-native vegetation across the highly urbanised subject land in the form of non-native trees and exotic lawn. However, all threatened species that would potentially utilise non-native vegetation within the subject land would also utilise native vegetation, in most cases preferentially, and have therefore been considered elsewhere in this report.
Impacts on areas connecting threatened species habitat, such as movement corridors	The subject land is in a highly urbanised setting. The small fragments of native vegetation that exist in the subject land currently have very poor connectivity to other patches of native vegetation. This connectivity will not be meaningfully affected by the project. The project could potentially have had connectivity impacts on riparian corridors where pipelines cross the Parramatta River, the Duck River and the Narawang and Nuri wetlands. However, impacts to connectivity will be avoided by using the existing dedicated pipe bridge and pipeline adjacent to the Parramatta Light Rail line (brine pipeline), and underboring Duck River, Parramatta River, Narawang Wetlands and Nuri Wetlands (river release pipeline). These avoided prescribed impacts are discussed in detail in Section 8.

Prescribed impact	Relevance to the subject land
Impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)	The pipeline alignments, WRRF, construction compounds and the river release all potentially have impacts that could affect water quality, water bodies and hydrological processes that sustain threatened entities. The brine pipeline alignment crosses Parramatta River and Vineyard Creek on the WSU Campus using an existing pipeline that will be accessed from maintenance holes either side of the creek. The WRRF is adjacent to a vegetated drain that flows into the Duck River. The river release pipeline alignment within Sydney Olympic Park, and associated construction compounds, are adjacent to the Narawang Wetlands, the Nuri Wetlands and Haslam's Creek. The river release pipeline will release advanced quality treated water to the Parramatta River. All these elements of the project have potential for impacts to water quality, water bodies and hydrological processes. The project could potentially have had impacts on water quality, water bodies and hydrological processes where pipelines cross the Parramatta River, the Duck River and the Narawang and Nuri wetlands. However, the pipeline alignment will use existing pipes attached to a railway crossing of the Parramatta River, and the Duck River, Narawang Wetlands and Nuri Wetlands crossing will be horizontally directionally drilled, thereby avoiding impacts to these water bodies.
Impacts on threatened and protected animals from turbine strikes from a wind farm	Not applicable.
Impacts on threatened species or fauna that are part of a TEC from vehicle strikes	The project is not likely to increase traffic on a long-term basis. There may be some minor potential for vehicle strikes from construction vehicles, but this is unlikely to be significantly greater than for typical urban traffic in the project area.

7 Matters of National Environmental Significance

Matters of National Environmental Significance (MNES) are environmental values that are protected under the Commonwealth EPBC Act. An action requires approval from the Commonwealth Minister for the Environment if the action may have a significant impact on one or more of these values. There are nine MNES categories listed under the EPBC Act:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Listed migratory species protected under international agreements
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- water resources, in relation to unconventional gas development and large coal mining development.

The MNES relevant to the project are:

- Listed threatened species
- Listed migratory species
- Listed threatened ecological communities.

Other MNES, including World heritage places, National heritages places and Wetlands of international importance (declared Ramsar wetlands) are not relevant to the project.

A search of the EPBC Protected Matters Search Tool (PMST) was undertaken to identify any MNES within 10 km of the subject land. The search identified 14 TECs with potential to occur within the subject land, 89 threatened species and 55 migratory species.

7.1 Threatened Ecological Communities

Field survey identified two potential EPBC-listed TECs within the subject land:

- Coast Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC (Swamp Oak Floodplain Forest)
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria CEEC (Red Gum Riverflat Forest).

Both TECs were assessed against condition thresholds for inclusion in the listed community. Native vegetation mapped as PCT 4028 (low-Sydney Olympic Park) did not meet the condition threshold for the EPBC-listed Swamp Oak Floodplain Forest EEC (Section 4.3.2.6). Native vegetation mapped as PCT 4058 (moderate) but not vegetation within PCT 4058 (low) met the condition threshold for the EPBC-listed Red Gum Riverflat CEEC (Section 4.3.3.6).

Potential impacts to the Red Gum Riverflat CEEC are outlined in Section 9.1.8. Assessments of significance of the impacts to this TEC are in Appendix B.

7.2 Threatened and migratory species

PMST searches of EPBC Act listed threatened fauna and flora predicted to occur within 10 kilometres of the subject land identified 89 threatened flora and fauna species and 55 migratory species.

The 89 threatened flora and fauna species were refined to 25 species considered reasonably likely to occur within the subject land during desktop research based on available information on the PCTs present and other habitat information.

Of the 25 species initially considered reasonably likely to occur, four have been recorded or assumed to be present. One EPBC-listed threatened species was detected during surveys in the subject land – Grey-headed Flying-fox (*Pteropus poliocephalus*). One EPBC-listed threatened species was assumed to occur in the subject land – Green and Golden Bell Frog (*Litoria aurea*). Two EPBC-listed threatened species have important habitat mapped within the subject land – *Calidris ferruginea* (Curlew Sandpiper) and *Limosa lapponica baueri* (Bar-tailed Godwit). Assessments of Significance have been prepared for these four species.

The following eight (8) species are classified as ecosystem species under the BAM and therefore were technically not the subject of targeted survey.

- *Anthochaera phrygia* (Regent Honeyeater)
- *Botaurus poiciloptus* (Australian Bittern)
- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Grantiella picta* (Brown Treecreeper)
- *Hirundapus caudacutus* (White-throated Needletail)
- *Lathamus discolor* (Swift Parrot)
- *Melanodryas cucullata cucullata* (South-eastern Hooded Robin)
- *Rostratula australis* (Australian Painted Snipe).

Extensive surveys were carried out for species credit diurnal birds, and spotlighting was undertaken for species credit mammals, such that most of the above species are considered unlikely to occur. However, the surveys conducted, which did not target ecosystem credit species, are not considered adequate to discount the presence of Swift Parrot, White-throated Needletail, Australian Painted Snipe and Australian Bittern. Swift Parrots are migratory and breed in Tasmania over the summer months, and White-throated Needletail, Australian Painted Snipe and Australian Bittern are known to occur in Sydney Olympic Park. Because these four species have potential to occur within the subject land, Assessments of Significance have been prepared (Appendix B).

The following 13 species were considered to have potential to occur, but were surveyed and not recorded:

- *Burhinus grallarius* (Bush Stone-curlew)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Calyptorhynchus lathami lathami* (Glossy Black-cockatoo)
- *Deyeuxia appressa*
- *Eucalyptus benthamii* (Camden White Gum)
- *Eucalyptus glaucina* (Slaty Red Gum)
- *Gyrostemon thesioides*
- *Melaleuca biconvexa* (Biconvex Paperbark)
- *Persicaria eliator* (Tall Knotweed)
- *Eucalyptus benthamii* (Camden White Gum)
- *Pomaderris brunnea* (Brown Pomaderris)
- *Rhodamnia rubescens* (Scrub Turpentine)

- *Zieria involucrate*.

Assessments of Significance were not prepared for these species which were surveyed and not recorded.

There was a total of 55 migratory species identified by the PMST as having the potential to occur in the subject land. This number was refined to the 25 wetlands species that are known or likely to occur in the area. One Assessment of Significance was prepared for these species as potential impacts to habitat are similar for these species.

Stage 2: Impact Assessment (biodiversity values and prescribed impacts)

8 Avoid and minimise impacts

The BC Act establishes a hierarchy for addressing the potential impacts of development on biodiversity values. In the first instance, the proponent must take appropriate and sufficient steps to avoid impacts to biodiversity values when planning the project. Measures to offset or compensate for residual impacts on biodiversity values may be undertaken only after steps are taken to avoid and minimise impacts.

Section 7 of the BAM provides that actions taken to avoid and minimise impacts must be documented and justified in the BDAR. The BAM identifies two key areas of project planning to avoid and minimise direct, indirect and prescribed impacts:

- Proposal location – locating the development away from the highest biodiversity values
- Proposal design – retaining biodiversity values through design features that limit vegetation clearing or reduce the amount of development within the footprint.

In addition, Section 7 of the BAM sets out a set of specific principles to be considered that are related to avoiding and minimising impacts through locating and designing the project, avoiding and minimising prescribing impacts, and considering alternative technologies, routes, locations and project designs to avoid and minimise impacts.

This section of the BDAR first outlines the overarching strategy for the project to avoid and minimise impacts to biodiversity values. It then addresses each of the principles for avoiding and minimising impacts set out in Section 7 of the BAM.

8.1 Overview of strategy to avoid and minimise impacts

The overall strategy to avoid and minimise impacts to biodiversity values is embedded within the nature of the project itself, which is to provide an integrated water management approach to support a sustainable, resilient and productive Sydney, including by keeping water in local waterways and avoiding and minimising overall impacts to biodiversity values. The first step was to select a wastewater services strategy to support projected development and growth in the GPOP corridor from among several alternatives. Once a feasible project alternative had been chosen, an indicative alignment was chosen from several alternative potential alignments. The third step was to optimise the design of the chosen alignment to avoid community and biodiversity impacts by underboring the pipeline alignment beneath sensitive areas and repurposing existing infrastructure. Adjustments to project boundaries were made following field survey to avoid remaining biodiversity impacts where feasible. Finally, during construction, every effort will be made to avoid impacts on native vegetation and other biodiversity values that may occur within the project development footprint. These areas are assumed to be impacted for the purpose of calculating biodiversity credits but may be able to be avoided though employing minimum impact construction techniques. The implementation of this strategy is outlined below and described in detail in the following sections.

8.1.1 Selection of a project alternative

The project is needed to service growth in the northern suburbs and GPOP growth area, which is currently serviced by the Northern Suburbs Ocean Outfall Sewer (NSOOS), a pipeline transferring wastewater to North Head WRRF. The NSOOS is projected to reach capacity by 2031-32, necessitating an alternative mechanism for servicing the growth.

Investigations considered a base case for providing wastewater services to the GPOP corridor similar to existing wastewater strategies plus alternatives (Sydney Water, 2024). The base case was to continue transfers to the North Head WRRF for treatment and ocean discharge. The base case would have

required upgrade of the North Head WRRF and duplication of the NSOOS by 2032. This would have required duplication of a 28 km long and 3 m diameter pipeline traversing heavily populated and intermittently vegetated areas from Blacktown to Manly. After initial review the base case was not considered further because of the substantial economic, social and environmental costs associated with upgrades and duplication. Selection of the preferred alternative was then made after a multi-criteria and cost benefit analysis was performed to assess direct cost, avoidable costs, social liveability benefits and quantifiable environmental impacts of each alternative (Sydney Water, 2024).

The selected alternative is likely to have significantly lesser impacts on biodiversity values than the base case of upgrading the NSOOS. The NSOOS is nearly three times the length of the project alignment and traverses several areas of native vegetation including the Lane Cove catchment. Environmental values were incorporated into the multi-criteria analysis underpinning final project selection. Selection of this project, and the nature of the project as a wastewater strategy incorporating infrastructure minimisation and reuse of treated water for river release, constitutes a significant avoidance and minimisation measure in its own right.

8.1.2 Initial establishment of project boundaries

The study area for the project, which encompasses both the subject land and areas of avoided vegetation, is dominated by residential and industrial neighbourhoods containing a mixture of street trees, planted vegetation in suburban parks, and small patches of native vegetation along river corridors and within larger parks. Project boundaries, including brine, wastewater transfer and river release pipeline alignments and the WRRF, were established considering environmental, social and financial impacts. Pipeline alignments were generally chosen along the shorter feasible routes, and the WRRF location was selected in part to avoid sites with key ecological constraints (Sydney Water, 2024).

Perhaps the most important decisions relating to project boundaries and avoiding impacts to biodiversity values, however, were to horizontally directionally drill pipeline alignments beneath the Duck River and the Parramatta River and the Narawang and Nuri Wetlands in Sydney Olympic Park. These measures avoided surface impacts of up to 0.92 ha of native vegetation, including most of the high-quality, fully structured and well-connected native vegetation in the project area. They also avoided impacts to up to 1.62 ha of planted native vegetation adjacent to Rosehill Gardens Racecourse.

8.1.3 Further refinement of project boundaries

The study area assessed in this BDAR has largely remained constant over the course of the assessment. However, the areas of impact within the study area have been optimised to further avoid and minimise biodiversity values. Prior to full biodiversity assessment, the portions of the study area under consideration for development included areas of native PCT vegetation that have since been excluded from the development footprint in Fred Robertson Park in Dundas, adjacent to the WRRF site in Camellia, at a Sydney Water property adjacent to the Western Motorway, and within Memorial Park in Meadowbank. These refinements of project boundaries have avoided impacts of up to 1.22 ha of native vegetation and 0.95 ha of planted native vegetation.

8.1.4 Minimising impacts within the project boundaries

Following final establishment of the project boundaries, Sydney Water has taken and will take additional steps to further minimise biodiversity impacts. Although total clearing has been assumed within subject land boundaries to account for uncertainties in on-ground construction requirements, Sydney Water has designated a smaller project development footprint within which impacts are anticipated to be limited. Native PCT vegetation within the development footprint is 0.13 ha in extent as compared to the 0.18 ha mapped within the subject land and for which credit calculations for offsets have been made. Although Sydney Water retains operational flexibility as necessary within subject land boundaries to impact

native vegetation outside the development footprint, the smaller 0.13 ha figure is likely a more representative calculation of true impact.

In addition, Sydney Water has taken and will take further measures to limit impacts even within the development footprint. Sydney Water is repurposing an existing pipeline along the brine pipeline alignment, allowing for digging and trenching along Rippon Avenue in Dundas, Parramatta and Camellia to be minimised. The pipeline crossing of the Parramatta River south of the Western Sydney University campus will be relined only, using access from maintenance holes either side of the bridge, meaning access and work on the bridge is unlikely to be required and minimising impacts to adjacent vegetation. Within the development footprint, Sydney Water will minimise vegetation impacts wherever possible, trimming branches rather than removing entire plants and protecting trees in accordance with applicable tree protection standards, in line with Sydney Water's standard environmental mitigation measures.

8.1.5 Summary of avoidance and minimisation strategy

The cumulative effect of the measures described above is that impacts to biodiversity values have been appropriately and sufficiently avoided and minimised. Locating the project around the largest, highest-quality patches of native vegetation avoids impact to the highest biodiversity values within the study area. Revising project boundaries in response to field survey further minimises impacts. Limiting vegetation impacts to trimming where possible retains native vegetation and urban amenity trees consistent with project construction requirements. Overall impacts to biodiversity values within the subject land have been substantially avoided and minimised as a result.

8.2 Avoiding and minimising impacts through project location

Section 7.1 of the BAM outlines a set of principles to be considered during planning for the location of the Proposal. Measures taken to address those principles are summarised in Table 8-1: and described in more detail in the sections that follow.

Table 8-1: Avoidance and minimisation measures implemented during project location

BAM principles	How addressed
(a) Locating the project in areas lacking in biodiversity values	The subject land has been located in an area comprising residential and industrial neighbourhoods. The landscape is dominated by built assets including buildings, roads, railways, bridges and other urban infrastructure. In locating the project, Sydney Water sited project components at progressively more granular scales. Initial selection of pipeline alignments was made considering environmental, social and financial impacts. Pipeline alignments were generally chosen along the shorter feasible routes and were routed along urban streets that lack native PCT vegetation. The WRRF location was selected in part to avoid sites with key ecological constraints. Where the pipeline alignment would have otherwise traversed patches of native vegetation, HDD will be employed to underbore patches of native vegetation and watercourse and thereby avoid biodiversity impacts. Once the outer boundaries of the subject land had been established to avoid the largest, most intact areas of native vegetation, field survey was undertaken to identify and assess biodiversity values within the subject land, and project components were located to avoid and minimise these.

BAM principles	How addressed
(b) Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a low vegetation integrity score)	By locating the project to avoid impacts to native vegetation through HDD and boundary adjustments, the project also avoids areas where native vegetation and threatened species habitat is in the poorest condition. In addition, by locating most built infrastructure and trenched pipeline alignments along urban streets and in residential and industrial areas, most affected native vegetation is planted vegetation that can readily be replaced as needed rather than remnant vegetation. Native PCT vegetation zones for which VI scores have been calculated total only 0.18 ha within the subject land, while non-PCT planted native vegetation communities for which VI scores are not calculated total 4.78 ha, more than 25 times the area of PCT vegetation. Avoiding impacts to PCT vegetation also has the effect of avoiding impacts to the best threatened and non-threatened species habitat within the subject land. While threatened species likely make use of street trees and suburban park vegetation, particularly mobile species such as avifauna, microbats and the Grey-headed Flying-fox, non-flying fauna species and flora species are much less likely to occur within the planted vegetation impacted by the project than in remnant native vegetation where impacts are minimised.
(c) Locating the project in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT.	Because the project avoids impacts to most of the native vegetation that is within the subject land, it also avoids impacts to TECs and mapped threatened species habitat. Three patches of native vegetation that have been avoided by boundary adjustments are within PCTs associated with TECs listed under the BC Act. Avoiding these TECs also avoids what is likely some of the best threatened species habitat within the subject land.
(d) Locating the project outside of the buffer area around breeding habitat features such as nest trees or caves.	Hollow-bearing trees are located within the subject land. It is not feasible to avoid all impacts to these trees. Pipeline alignments are anticipated to run through grassed areas and streets adjacent to patches of native vegetation including hollow-bearing trees. Alignments have been located away from these patches to the extent practical, but some minor trimming of branches to accommodate construction equipment may be required. It is not anticipated that removal of any hollow-bearing trees will be required.

8.2.1 Locating the project in areas lacking biodiversity values

The subject land has been located in an area comprising residential and industrial neighbourhoods. The landscape is dominated by built assets including buildings, roads, railways, bridges and other urban infrastructure. Vegetation is typical of highly developed, highly urbanised areas, containing mixture of street trees, planted vegetation in suburban parks, and small patches of native vegetation along river corridors and within larger parks (see Section 4).

In locating the project, Sydney Water sited project components at progressively more granular scales. Initial selection of pipeline alignments was made considering environmental, social and financial impacts. Pipeline alignments were generally chosen along the shorter feasible routes and were routed along urban streets that lack native PCT vegetation. The WRRF location was selected in part to avoid sites with key ecological constraints. The WRRF is located in the Camellia-Rosehill industrial precinct, which comprises large parcels of land with heavy industrial zoning and limited biodiversity values. Selecting a site outside this heavy industrial area would have potentially had significantly greater impacts on biodiversity values. The project makes use of existing pump station Camellia pumping

station, which will be upgraded for the project with negligible impacts on biodiversity values. Through selecting pipeline alignments along urban streets and a WRRF site within a heavy industrial area and upgrading existing infrastructure to be fit for new purposes, the project minimises its impacts so that most fall within areas of limited biodiversity values.

Over the length of a 10 km water servicing project, however, pipeline alignments were required to cross areas of native vegetation along watercourses, namely, the Duck River, the Narawang and Nuri Wetlands within Sydney Olympic Park, and the Parramatta River. Where the pipeline alignment would have otherwise traversed patches of native vegetation, HDD will be employed to underbore patches of native vegetation and watercourse and thereby avoid biodiversity impacts. HDD alignments will avoid impacts to a total of 0.92 ha of native PCT vegetation and an additional 1.62 ha of planted native vegetation. Avoided impacts by vegetation zone are shown in Table 8-2.

Table 8-2: Native vegetation impacts avoided by HDD

PCT ID	PCT name	Vegetation zone	Extent in avoided land (ha)
4028	Estuarine Swamp Oak Twig-rush Forest	Low-Sydney Olympic Park	0.14
4091	Grey Mangrove-River Mangrove Forest	n/a	0.78
		Total avoided PCT vegetation	0.92
n/a	Planted native vegetation	(Sydney Olympic Park)	0.31
n/a	Planted native vegetation	(suburban parks)	1.31
		Total avoided planted native vegetation	1.62
		Total	1.54

Once the outer boundaries of the subject land had been established to avoid the largest, most intact areas of native vegetation, field survey was undertaken to identify and assess biodiversity values within the subject land, and project components were located to avoid and minimise these. In particular, the following adjustments to the subject land boundaries were made to avoid and minimise impacts to biodiversity values.

- The connection of the brine pipeline to the NSOOS was moved from the north of Kissing Point Road, directly adjacent to Fred Robertson Park, to south of Kissing Point Road (see avoided land in Figure 4-12. This had the effect of avoiding impacts to 0.08 ha of PCT 3176: Sydney Enriched Sandstone Moist Forest.
- A pipe string that was to be laid within native vegetation adjacent to the WRRF was relocated to avoid the vegetation (see avoided land in Figure 4-15). This had the effect of avoiding impacts to up to 0.70 ha of PCT 4028: Estuarine Swamp Oak Twig-rush Forest.
- A construction compound on Sydney Water land adjacent to the Western Motorway was removed from consideration to avoid native vegetation identified from field survey (see avoided land in Figure 4-15, labelled as C32). This had the effect of avoiding impacts to up to 0.27 ha of PCT 3320: Cumberland Shale Plains Woodland.
- Two construction compounds in Newington were removed from consideration (see avoided land in Figure 4-16 and Figure 4-17, labelled as C33 and C34, respectively). This had the effect of avoiding impacts to up to 0.95 ha of Planted native vegetation (suburban parks).
- The final leg of the river release pipeline alignment, reaching from Meadow Crescent to the Parramatta River, was moved westward from a patch of remnant native vegetation with a mixed native/exotic understorey to planted native vegetation within Memorial Park with a mown

understorey. This had the effect of avoiding impact to 0.18 ha of PCT 4058: Sydney Hinterland Red Gum Riverflat Forest.

A summary of impacts avoided by boundary changes following field survey is in avoid impacts to a total of 1.23 ha of native PCT vegetation and an additional 0.95 ha of planted native vegetation.

Table 8-3: Native vegetation impacts avoided by boundary adjustments

PCT ID	PCT name	Vegetation zone	Extent in avoided land (ha)
3176	Sydney Enriched Sandstone Moist Forest	n/a	0.08
3320	Cumberland Shale Plains Woodland	n/a	0.27
4028	Estuarine Swamp Oak Twig-rush Forest	Low-Camellia Park	0.70
4058	Sydney Hinterland Red Gum Riverflat Forest	Avoided land	0.18
		Total avoided PCT vegetation	1.23
n/a	Planted native vegetation	Suburban parks	0.95
		Total avoided planted native vegetation	0.95
		Total	2.18

8.2.2 Locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition

By locating the project to avoid impacts to native vegetation through HDD and boundary adjustments, the project also avoids areas where native vegetation and threatened species habitat is in the poorest condition. In addition, by locating most built infrastructure and trenched pipeline alignments along urban streets and in residential and industrial areas, most affected native vegetation is planted vegetation that can readily be replaced as needed rather than remnant vegetation. This is illustrated by a comparison of planted native vegetation affected by the project with remnant vegetation. As shown in Table 8-4, native PCT vegetation zones for which VI scores have been calculated total only 0.18 ha within the subject land, while non-PCT planted native vegetation communities for which VI scores are not calculated total 4.78 ha, more than 25 times the area of PCT vegetation.

Table 8-4: Comparison of PCT and non-PCT native vegetation impacted by the project

PCT ID	PCT name	Vegetation zone	Vegetation integrity score	Extent in the subject land (ha)
4028	Estuarine Swamp Oak Twig-rush Forest	Low-Sydney Olympic Park	13.3	0.06
4058	Sydney Hinterland Red Gum Riverflat Forest	Moderate	46.2	0.02
		Low	32.4	0.10
			Subtotal – PCT native vegetation communities	**0.18**
Planted native vegetation		Street trees	n/a	2.20
		Suburban parks	n/a	1.34

	Sydney Olympic Park	n/a	1.23
		Subtotal – Planted native vegetation	**4.78**

Avoiding impacts to PCT vegetation also has the effect of avoiding impacts to the best threatened and non-threatened species habitat within the subject land. While threatened species likely make use of street trees and suburban park vegetation, particularly mobile species such as avifauna, microbats and the Grey-headed Flying-fox, non-flying fauna species and flora species are much less likely to occur within the planted vegetation impacted by the project than in remnant native vegetation where impacts are minimised.

8.2.3 Locating the project in areas that avoid species habitat or native vegetation that is a TEC

Because the project avoids impacts to most of the native vegetation that is within the subject land, it also avoids impacts to TECs and mapped threatened species habitat.

Three patches of native vegetation that have been avoided by boundary adjustments are within PCTs associated with TECs listed under the BC Act. These patches are:

- PCT 3320: Cumberland Plains Shale Woodland, associated with the Cumberland Plain Woodland in the Sydney Basin Bioregion CEEC) (0.27 ha)
- PCT 4028: Estuarine Swamp Oak Twig-rush Forest, associated with the Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC (0.70 ha)
- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest associated with the NSW River-Flat Eucalypt Forest on Coastal Floodplains EEC where it occurs within the stated elevation range (0.27 ha).

These areas of avoided land were not assessed to determine whether they meet condition thresholds for inclusion in relevant EPBC Act TECs because they did not occur in the subject land.

Avoiding these TECs also avoids what is likely some of the best threatened species' habitat within the subject land. Threatened species surveys were not conducted for lands outside the subject land, but presence of the Green and Golden Bell Frog and Southern Myotis would have been assumed for the area of avoided PCT 4028 (0.70 ha) on the basis of nearby records in the case of the Green and Golden Bell Frog and detection of the species elsewhere in the subject land in the case of the Southern Myotis (see Section 5.4.2).

8.2.4 Locating the project outside of the buffer area around breeding habitat features such as nest trees or caves.

Hollow-bearing trees are located within the subject land in two vegetation zones: PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (moderate) and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest (low). No threatened fauna were recorded directly utilising these habitat features, although a Powerful Owl was recorded within the same general vicinity as hollow-bearing trees. These hollow-bearing trees are located within vegetation fringing the river release pipeline as it traverses a grassy area between an apartment block and the northern edges of Memorial Park in Meadowbank and Meadow Crescent to the north of Memorial Park (Figure 4-20).

It is not feasible to avoid all impacts to these trees. Pipeline alignments are anticipated to run through grassed areas and streets adjacent to patches of native vegetation including hollow-bearing trees and have been located away from these patches to the extent practical, but some minor trimming of

branches to accommodate construction equipment may be required. It is not anticipated that removal of any hollow-bearing trees will be required.

8.3 Avoiding and minimising impacts through project design

As stated in Section 7.1 of the BAM, project design (including the location of temporary and permanent ancillary construction and maintenance facilities) should avoid and minimise clearing of native vegetation and threatened species habitat. Measures taken to address those principles are summarised in Table 8-5: and described in more detail in the sections that follow.

Table 8-5: Avoidance and minimisation measures implemented during project design

BAM principles	How addressed
(a) Reducing the clearing footprint of the project by minimising the number and type of facilities	The project has reduced its clearing footprint by employing advanced water treatment technology suitable for release into the Parramatta River, employing horizontal direction drilling to avoid surface impacts from pipeline alignments, reusing existing facilities for project purposes, locating the project components requiring the most intensive development in areas of low biodiversity value, and designing project facilities efficiently to minimise the space required.
(b) Locating ancillary facilities in areas where there are no biodiversity values	Construction compounds and other ancillary are generally located in three types of areas: at intersections or along side streets to the pipeline alignments where there is little to no vegetation, in car parks or other large paved areas, and in suburban parks where there are extensive mown areas. These areas are existing open spaces where staff facilities, tunnelling pits and laydown areas can be located without permanent impacts to native vegetation.
(c) locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)	
(d) locating ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAII)	
(e) actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.	The project includes two key elements that provide the basis for enhancement of biodiversity values within the study area: (1) retaining the native vegetation through HDD, repurposing existing infrastructure and adjusting project boundaries, and (2) maintaining current vegetation within those parts of the subject land that are not required to be cleared.

8.3.1 Reducing the clearing footprint

The project has reduced its clearing footprint by employing advanced water treatment technology suitable for release into the Parramatta River, employing horizontal direction drilling to avoid surface impacts from pipeline alignments, reusing existing facilities for project purposes, locating the project components requiring the most intensive development in areas of low biodiversity value, and designing project facilities efficiently to minimise the space required.

As discussed in detail in Section 8.1, the nature of the project itself constitutes a measure to reduce the clearing footprint required for wastewater servicing to meet projected growth in the GPOP corridor. Constructing a WRRF capable of producing advanced treated water suitable for release into the Parramatta River reduces the extensive impacts that would result from upgrading the NSOOS over its 28 km length to a set of pipeline alignments roughly 10 km in length.

The clearing footprint required for the project has been further reduced by the use of horizontal directional drilling to avoid areas with high biodiversity values within the study area. As discussed in more detail in Section 8.2.1, HDD reduces clearing of native PCT vegetation by 0.92 ha and planted native vegetation by 1.62 ha. HDD avoids impacts to the Narawang and Nuri Wetlands, areas of high biodiversity value managed for conservation within Sydney Olympic Park that serve as habitat for the threatened Green and Golden Bell Frog and Black-backed Bittern.

Reuse and upgrading of existing infrastructure for GPOP has enabled an additional reduction in the clearing footprint. The brine pipeline between the Camellia pumping station and the NSOOS consists of a repurposed wastewater pipeline within which a new structural liner will be installed, enabling installation of the brine pipeline through excavation of several pits along the alignment rather than a trenched pipeline over its length. The brine pipeline crossing of the Parramatta River will consist of relining existing pipes using access to maintenance holes either side of the bridge. Upgrades to the Camellia pumping station enables the existing pump station to be used for new purposes with minimal impact to vegetation.

Site selection for the one non-linear major built infrastructure, the WRRF, was carried out in the Camellia industrial area where there are minimal biodiversity values. The area selected for the WRRF requires no new clearing of native vegetation.

8.3.2 Locating ancillary facilities in areas lacking biodiversity values, where native vegetation or threatened species habitat is in the poorest condition, and avoiding impacts on habitat for species and vegetation communities with a high threat status

The main ancillary facilities for the project are the 31 construction compounds, which include office buildings, staff amenities and stockpiling sites. The types of construction compounds are summarised in Table 8-6.

Table 8-6: Types of construction compounds

Compound type	Key activities and description	Duration
Main	Large compounds that would be active for the entire construction of the project. Temporary buildings such as offices and meeting rooms, amenities and first aid facilities. Stockpiling and sorting of waste material prior to disposal or reuse.	Entire construction periods of the project

Compound type	Key activities and description	Duration
	Storage of site equipment, including bunded storage for any chemicals such as fuel.	
Satellite	Smaller compounds that may be required for the entire construction of the project. They would have similar activities to main compounds.	About 3-12 months at a time
Tunnelling	Only identified for larger tunnelling locations where an increased construction presence would be required. Include the launch and receival pits for sections of pipeline constructed by tunnelling. Accommodate activities associated with drilling such as the drill rig, spoil management and pipe placement. Only required during tunnelling.	About 3-12 months at a time
Laydown	Small rolling compounds located at pipeline construction sites. These would only be required for short periods of time and would move along the pipeline alignments as construction progresses.	Entire duration of pipeline construction

The construction compounds are generally located in three types of areas: at intersections or along side streets to the pipeline alignments where there is little to no vegetation, in car parks or other large paved areas, and in suburban parks where there are extensive mown areas. The common denominator among these areas is that they are existing open spaces where staff facilities, tunnelling pits and laydown areas can be located without permanent impacts to native vegetation. Although the suburban parks include extensive areas of planted native vegetation, there is no intention to clear park trees within the construction compounds. The Construction Flora and Fauna Management Plan (CFFMP) for the project will specify that significant treed areas within suburban parks serving as construction compounds will be protected according to requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites and their perimeters will be marked as no-go zones.

No areas within construction compounds or other ancillary facilities contain native PCT vegetation, TECs or threatened species habitat associated with PCT vegetation.

8.3.3 Actions to provide for rehabilitation, ecological restoration and ongoing maintenance of retained areas of native vegetation, threatened ecological communities and their habitat values

The project includes three key elements that provide the basis for enhancement of biodiversity values within the study area:

1. Retaining the native vegetation through HDD and adjusting project boundaries
2. Maintaining current vegetation within those parts of the subject land that are not required to be cleared.
3. Replacement of trees removed as a mitigation measure

As discussed in Section 8.2.1, a total of 2.15 ha of native PCT vegetation and 2.80 ha of planted native vegetation within the study area is outside the boundaries of the subject land and will be avoided by the project. This includes the Narawang and Nuri Wetlands in Sydney Olympic Park that are specifically managed for conservation purposes (Sydney Olympic Park *Parklands Plan of Management 2010*). Avoiding these areas provides a basis for their continued maintenance as conservation areas.

Important native trees that occur within the subject land and have been assumed to be cleared for the purpose of calculating biodiversity credits, will be trimmed to the minimum extent possible and preserved wherever feasible. These actions will provide for their continued presence within suburban park and their ongoing value as native fauna habitat.

Finally, Sydney Water has committed to restore impact areas to pre-existing condition as much as practical. It will also replace removed trees with same species, or species agreed to with relevant Council. Where trees cannot be replanted at the same location, Sydney Water will work with stakeholders to agree to an alternative location, which could include the WRRF if appropriate. These commitments form part of the mitigation measures for the project (Section 10).

8.4 Avoid and minimise prescribed impacts

Table 8-7: Avoidance and minimisation measures relevant to prescribed impacts

Prescribed impact	Relevance to the subject land
Impacts on the habitat of threatened entities including: **Karst, caves, crevices, cliffs and other geological features of significance**	There are no karst, caves, crevices, cliffs or other geological features of significance within the subject land.
Human-made structures	The subject land passes through residential and industrial neighbourhoods with a variety of human-made structures ranging from houses to industrial facilities to Western Sydney University. Within the subject land itself, however, the primary human-made structures are roads and carparks. It is unlikely that threatened species use these as habitat. Within suburban parks that serve as construction compounds, there are playgrounds and other recreational facilities such as basketball courts. These too are unlikely to serve as threatened species habitat. Sydney Water's Camellia pumping station Camellia pumping station (C14) will be upgraded as part of the project. The site of Camellia pumping station is unlikely to be threatened species habitat. The brine pipeline alignment traverses the Parramatta River using an dedicated pipe bridge adjacent to the Parramatta Light Rail line. The river release pipelines will be installed in the Parramatta River adjacent to John Whitton Bridge. These structures have potential to serve as microbat roosting habitat and were examined on 5 June 2025. No signs of microbat use were observed. Nevertheless, measures have been taken to avoid and minimise impacts to these structures. The brine pipeline crossing of Parramatta River will reline existing pipelines, using access from maintenance holes either side of the bridge. The river release installation adjacent to the John Whitton Bridge will take place within the river away from the bridge, with disruption to any potential microbat habitat limited to indirect noise impacts that are temporary and unlikely to substantially exceed that from overpassing rail traffic and underpassing river traffic.
Non-native vegetation	There is non-native vegetation across the highly urbanised subject land in the form of non-native trees and exotic lawn. However, all threatened species that would potentially utilise non-native vegetation within the subject land would also utilise native vegetation, in most cases preferentially, and have therefore been considered elsewhere in this report. Notwithstanding this, every effort will be made to minimise impacts on all vegetation, native and non-native, during construction.

Prescribed impact	Relevance to the subject land
Impacts on areas connecting threatened species habitat, such as movement corridors	The subject land is in a highly urbanised setting. The small fragments of native vegetation that exist in the subject land currently have very poor connectivity to other patches of native vegetation. This connectivity will not be meaningfully affected by the project. The project could potentially have had connectivity impacts on riparian corridors where pipelines cross the Parramatta River, the Duck River and the Narawang and Nuri wetlands. However, the brine pipeline alignment will use existing pipes for the crossing of the Parramatta River, and the Duck River, Narawang Wetlands and Nuri Wetlands crossing will be horizontally directionally drilled, thereby avoiding impacts to connectivity. These avoided prescribed impacts are discussed in detail in Sections 8.2 and 8.3.
Impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)	The pipeline alignments, WRRF, construction compounds and the river release all potentially have impacts that could affect water quality, water bodies and hydrological processes that sustain threatened entities. The brine pipeline alignment crosses Parramatta River and Vineyard Creek on the WSU Campus. However, both sections avoid impacts by relining the existing pipeline with no direct impacts to the waterways. The WRRF is adjacent to a vegetated drain that flows into the Duck River, however the project boundary was adjusted to avoid direct impacts on vegetation adjacent to this drain. The river release pipeline alignment within Sydney Olympic Park, and associated construction compounds, are adjacent to the Narawang Wetlands, the Nuri Wetlands and Haslam's Creek. The river release pipeline also crosses Parramatta River. The river release pipeline will be HDD beneath these waterways and wetlands, again avoiding direct impacts. The river release pipeline will release high quality advanced treated water to the Parramatta River. The area of release has general aquatic ecology biodiversity value and also is included in Important Habitat Mapping for the Bar-tailed Godwit and Curlew Sandpiper. Potential impacts to water quality have been minimised by incorporating a very high level of treatment at the WRRF. The river release diffuser will also generate initial mixing and dilution of the releases. Aquatic ecology impacts are discussed in detail in (Stantec, 2025). Impacts to Important Habitat Mapping are discussed in Sections 9.1.5, 9.1.7 and 11.
Impacts on threatened and protected animals from turbine strikes from a wind farm	Not applicable.
Impacts on threatened species or fauna that are part of a TEC from vehicle strikes	The project is not likely to increase traffic on a long-term basis. There may be some minor potential for vehicle strikes from construction vehicles, but this is unlikely to be significantly greater than for typical urban traffic in the project area.

8.5 Alternatives considered

The BAM states that when selecting a proposal's location, alternatives must be considered. The consideration of alternative locations and alternative designs are summarised in Table 8-8: and described in more detail in the sections that follow.

Table 8-8: Alternatives considered in determining the project's location

BAM principles	How addressed
(a) alternative modes or technologies that would avoid or minimise impacts on biodiversity values	Alternatives to developing the project have been considered, but the alternative modes and technologies considered would either fail to meet the objectives the project is designed to meet, were not technically feasible, or have similar or greater biodiversity impacts than the project.
(b) alternative routes that would avoid or minimise impacts on biodiversity values	Several options were considered for the route of the pipeline alignments. Each of the alternatives would have had similar or greater impacts to the alternative chosen.
(c) alternative locations that would avoid or minimise impacts on biodiversity values	Alternative locations for the WRRF and the point of river releases were considered. The selected alternatives presented the best combination of feasibility, risk management and minimisation of biodiversity impacts.
(d) alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.	The project was designed to avoid areas of native vegetation where the highest biodiversity values within the study area are located. Within the area designated for development, impact areas were expressly designed to avoid and minimise impacts to biodiversity values. Any alternative site within the property or alternative design of the project would be likely to have greater biodiversity impacts.

8.5.1 Alternative modes or technologies to avoid and minimise impacts on biodiversity values

Alternatives to developing the project have been considered, but the alternative modes and technologies considered would either fail to meet the objectives the project is designed to meet, or have similar or greater biodiversity impacts than the project, or both. These alternatives were described and assessed in the scoping report for the project (Sydney Water, 2024).

A 'do nothing' scenario was considered, under which existing infrastructure would be relied on for wastewater servicing in the GPOP corridor. This was considered not feasible as it would jeopardise growth in the GPOP precinct and other areas along the NSOOS and would place Sydney Water in breach of its operating licence.

A base case was considered that would continue wastewater transfers to North Head WRRF for treatment and ocean discharge through an upgraded North Head NSOOS and duplicated NSOOS. The NSOOS is a 28 km long and about 3 m diameter pipeline traversing heavily populated residential areas between the western suburb of Blacktown to the eastern suburb of Manly. This alternative was not considered further because of substantial costs economically, socially, and environmentally associated with upgrades and duplication. Upgrade and expansion of North Head WRRF was also considered with duplication of the NSOOS, but the North Head WRRF is surrounded by National Park and biodiversity values and this option would have had a greater impact. In either version of the base case, duplicating the NSOOS is likely to have had substantially greater biodiversity impacts.

Several alternatives were considered that rely on varying combinations of a new WRRF, or full or partial recycled water facility for non-drinking or future drinking purposes. These alternatives are likely to have had similar biodiversity impacts to the selected alternatives but were not selected for economic reasons or because they unduly constrained future servicing options.

8.5.2 Alternative routes to avoid and minimise impacts on biodiversity values

Several options were considered for the route of the pipeline alignments. The alternatives were described and assessed in the scoping report for the project (Sydney Water, 2024).

Selection of the brine pipeline route reviewed the shortest feasible route north of the Camellia pumping station to a connection point into the NSOOS. Three alignment options for the transfer and brine pipeline alignments from Camellia pumping station to the WRRF were reviewed. All routes would have predominantly traversed the industrial area of Camellia-Rosehill. The preferred alignment, being the shorter route, was selected.

Several pipeline routes for the river release pipeline were considered; the selected alternative used HDD to avoid impacts to wetlands. Alternative routes would have had similar or greater impacts to the alternative chosen.

Finally, routes for pipe stringing, such as those utilising existing roads in Sydney Olympic Park construction compound C27, were chosen over alternative routes that would have had greater impacts.

8.5.3 Alternative locations that would avoid or minimise impacts on biodiversity values

Alternative locations for the WRRF and the point of river releases were described and assessed in the scoping report for the project (Sydney Water, 2024).

All locations considered for the WRRF were in the Camellia-Rosehill industrial precinct. Sites with key ecological constraints were avoided.

Three alternative locations for river release were considered, at Bedlam Point, Pulpit Point and Wentworth Point (Sydney Water, 2024). The Bedlam Point, Pulpit Point and Wentworth Point had potential for impacts to native vegetation that would have been challenging. The Wentworth Point location was the closest location to the WRRF considered and had least cost in environmental, social and financial impacts; however, there were also potential environmental risks in construction and interruption to ferry services for this option and became technically unfeasible. The selected alternative presented the best combination of feasibility, risk management and minimisation of biodiversity impacts.

8.5.4 Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values

The project was designed to avoid areas of native vegetation where the highest biodiversity values within the study area are located. Within the area designated for development, impact areas were expressly designed to avoid and minimise impacts to biodiversity values. Any alternative site within the property or alternative design of the project would be likely to have greater biodiversity impacts. See Sections 8.1.5 and 8.3 for details.

9 Impact assessment

9.1 Assessment of impacts under the BAM

9.1.1 Direct impacts to native vegetation within PCTs

Clearing and management of native vegetation within PCTs is required for the project.

For the purpose of this assessment, it is assumed that all native vegetation that is classified as PCT vegetation will be cleared due to the small area of vegetation affected (0.18 ha total) and the difficulty of determining in advance whether specific individual trees or branches, or associated groundcover, are truly required to be cleared. However, it is likely that this assumption overstates the amount of clearing that will eventuate. Specific examples of where PCT vegetation has been mapped within the subject land, but total clearing is likely to be avoided, include the following:

- In Sydney Olympic Park, small patches of PCT 4028: Estuarine Swamp Oak Twig-rush Forest have been mapped within a construction area that is to be used to connect the pipeline segments above ground 'pipe stringing' before it is to be horizontally directionally drilled (Figure 4-15). The groundcover within these patches is almost entirely exotic. It is likely that pipeline will be laid around native trees and shrubs, that no 'clearing' will be required, and that there will be minimal if any long-term impact to native vegetation.
- In Memorial Park in Meadowbank between Charity Creek and Meadow Crescent, the river release pipeline alignment runs through a grassed area between an apartment block and a patch of PCT 4058 (Figure 4-16). Although some minor trimming and clearing may be required, much of the vegetation mapped is overhang. It is unlikely that mapped vegetation will be totally cleared.
- Along Meadow Crescent, the river release pipeline will be trenched within the street. While it cannot be guaranteed that no native vegetation will be impacted, most of the mapped native vegetation in this segment is overhang. Sydney Water will make every effort to avoid removing trees within Memorial Park and will endeavour to minimise trimming necessary to carry out works.

The areas of vegetation zones and the consequent VI reductions are shown in Table 9-1.

Table 9-1: Direct impacts to native vegetation within the subject land

PCT	Vegetation zone	VI score before development	VI score after development	VI change	Area (ha)
PCT 4028: Estuarine Swamp Oak Twig-rush Forest	Low – Sydney Olympic Park	13.3	0	-13.3	0.06
PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	Moderate – Memorial Park	46.2	0	-46.2	0.02
	Low – Meadow Crescent	32.4	0	-32.4	0.10

9.1.2 Direct impacts to planted native vegetation

The project will have impacts to planted native vegetation, including street trees, planted native vegetation in suburban parks and planted native vegetation within Sydney Olympic Park.

Because the BAM does not require the calculation of ecosystem credits to offset impacts to planted native vegetation, it has not been assumed that all planted native vegetation within the subject land will be cleared. Instead, impacts are generally likely to be as follows:

- Impacts to most Planted native vegetation (street trees) are likely to be limited to trimming of branches where needed for access and for equipment to pass. Where trenched, the pipeline alignments will generally be within paved surfaces. Sydney Water will make every effort to avoid removing street trees and will endeavour to minimise trimming necessary to carry out works.
- Impacts to Planted native vegetation (suburban parks) within construction compounds C22 (Hume Park), C24 (Deakin Park) and C25/C26 (Pierre de Coubertin Park) are likely to be minimal. These areas are to be used as ancillary facilities for equipment storage and worker facilities. It is not intended to clear native trees within the parks or to negatively impact ornamental plantings. Sydney Water will make every effort to avoid removing park trees and will endeavour to minimise trimming necessary to carry out works.
- Impacts to the Planted native vegetation (Sydney Olympic Park) within construction compound C27 (carpark P5 surrounding UrbnSurf) are likely to be minimal. There will be an HDD receival pit in this area with minimal impacts on planted native vegetation; otherwise, these areas are to be used as ancillary facilities for equipment storage and worker facilities. Similarly, the areas for placing pipe stringing to the south of carpark P5 are likely to have minimal impacts to planted native vegetation. The pipe stringing will be placed temporarily along the looping access road to carpark P5 and in exotic lawn to the south of the access road (excepting the small patches of PCT 4028, described in Section 9.1.1). Sydney Water will make every effort to avoid removing trees within carpark P5 and will endeavour to minimise trimming necessary to carry out works.
- Clearing will be required for Planted native vegetation (Sydney Olympic Park) along Hill Road as the river release pipeline alignment will be trenched here. However, this clearing is a comparatively small amount of the planted native vegetation within the subject land, totalling approximately 0.4 ha of the total 4.78 ha of planted native vegetation within the subject land.
- Some vegetation modification, possibly including removal of trees within Planted native vegetation (suburban parks), will be required where the river release pipeline alignment runs from Meadow Crescent to the release structure in the Parramatta River. However, this alignment, which runs mostly through mown lawn, was chosen in preference to an initial alignment within structured vegetation directly to the east. Within the chosen alignment, it may be possible to minimise impacts by avoiding tree stems. Within this section Sydney Water will make every effort to minimise tree removal and trimming necessary to carry out works.
- As a mitigation measure, where it is not possible to avoid tree removal, Sydney Water will replace removed trees with same species, or species agreed to with relevant Council (Section 10). Where trees cannot be replanted at the same location, Sydney Water will work with stakeholders to agree to an alternative location, which could include the WRRF if appropriate.

9.1.3 Direct impacts to threatened species within PCTs

Direct impacts to threatened species with habitat within PCTs are offset through ecosystem credits and species credits. Removal of vegetation includes the loss of important habitat features such as bush rock, foraging resources (e.g. blossoms), and woody debris. The proposed area of impact for each PCT is listed in Table 9-1.

Thirty-six ecosystem species that may be impacted by the project were identified by the BAM Calculator and are listed in Table 5-1:, with one excluded due to a lack of habitat constraints. Impacts to ecosystem credit species are accounted for through impacts to associated native vegetation community.

Three species credit species were recorded during field survey or assumed to be present within the subject land:

- *Litoria aurea* (Green and Golden Bell Frog)
- *Myotis macropus* (Southern Myotis)
- *Ninox strenua* (Powerful Owl).

Impacts to all these species credit species are assessed by area based on the species polygon. Species polygons for each species are at Figure 5-3 to Figure 5-6. Areas of impact are listed in Table 9-2.

Table 9-2: Direct impacts to species credit species within the subject land

Scientific name	Common name	Vegetation zone	Area/Count
Litorea aurea	Green and Golden Bell Frog	PCT 4028 (low-Sydney Olympic Park)	0.06
Myotis macropus	Southern Myotis	PCT 4028 (low-Sydney Olympic Park)	0.06
		PCT 4058 (moderate)	0.02
		PCT 4058 (low)	0.10
Ninox strenua	Powerful Owl	PCT 4058 (moderate)	0.02
		PCT 4058 (low)	0.10

Three dual credit species were incidentally recorded during survey:

- *Miniopterus australis* (Little Bent-winged Bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

Species credit habitat for these species was not recorded for these species. Their impacts are assessed as ecosystem credit species.

No flora species credit species were identified within the subject land.

9.1.4 Direct impacts to threatened species within planted native vegetation

Planted native vegetation is extensive throughout the subject land and includes moderately sized street trees, eucalypts ranging from recent plantings to large individuals (>50 cm diameter at breast heights) in suburban parks, and planted native trees, limited shrubs, and native groundcover (*Lomandra longifolia*) in Sydney Olympic Park. Appendix D of the BAM requires that this planted native vegetation be assessed for its suitability for use by threatened species and record any evidence of threatened species credit species using the planted native vegetation.

No threatened species were recorded making use of planted native vegetation during field survey, nor was any direct evidence identified that threatened species do make such use.

Planted native vegetation within the subject land undoubtedly serves as habitat for native species common to urban areas, many of which were observed and recorded during field survey, such as *Trichosurus vulpecula* (Brushtail Possum), *Pseudocheirus peregrinus* (Ringtail Possum), *Cacatua galerita* (Sulphur-crested Cockatoo) and *Trichoglossus moluccanus* (Rainbow Lorikeet).

It is less likely that planted native vegetation in the subject land serves as habitat for a substantial number of threatened species. Many threatened species are sensitive to habitat fragmentation or require high-quality, fully structured native vegetation as habitat. The planted native vegetation within

the subject land generally occurs in a highly fragmented urban environment and with only a few exceptions, consists of planted native trees with no shrub layer or native groundcover.

Notwithstanding this, it is likely that several threatened species do make use of the planted native vegetation within the subject land. For example, *Pteropus poliocephalus* (Grey-headed Flying Fox) was observed within the subject land. Although the observation took place within PCT vegetation in Memorial Park and not within planted native vegetation, undoubtedly the Grey-headed Flying-fox forages within the native figs and eucalypts that are present within planted native vegetation in the subject land. Similarly, *Ninox strenua* (Powerful Owl) was recorded within PCT vegetation in Memorial Park, but within less than 100 m there are suitable trees within planted native vegetation that could be used for roosting or hunting.

Within Sydney Olympic Park, there are records of Green and Golden Bell Frog within areas of planted native vegetation, and it is likely that this species moves through and rests within planted native vegetation during wet times. Similarly, there are records of *Botaurus poiciloptulus* (Australasian Bittern) and *Rostratula australis* (Australian Painted Snipe) within Sydney Olympic Park, and individuals of these wetland species may traverse the subject land, although it is likely that they forage within avoided wetland habitat. Finally, it is likely that microbats, such as *Miniopterus australis* (Little Bent-winged Bat), *Minopterus orianae oceanensis* (Large Bent-winged Bat) and *Myotis macropus* (Southern Myotis), all of which were recorded near PCT vegetation in the subject land, also forage along planted native vegetation in streetscapes, suburban parks and Sydney Olympic Park.

Appendix D of the BAM requires that steps must be taken to manage and mitigate impacts to any threatened species where there is evidence that they are using impacted planted native vegetation as habitat. While there is no direct evidence of such use in the form of recorded sightings, nevertheless Sydney Water has taken extensive measures to avoid and minimise impacts to non-PCT planted native vegetation. As discussed in Section 9.1.2, most planted native vegetation along pipeline alignments and within suburban parks will be avoided altogether, as pipeline alignments are generally to be located underneath paved surfaces and ancillary activities within suburban parks are not anticipated to require vegetation clearing. Some native trees along Hill Road within Sydney Olympic Park will unavoidably be removed, but these will be kept to a minimum. Throughout the subject land, Sydney Water will make every effort to minimise tree removal and trimming necessary to carry out works and by extension, protect potential threatened species habitat.

All areas impacted by pipeline construction would be restored upon completion of works. Where possible, impacted areas would be restored to their pre-construction condition. However, this is not always possible when mature vegetation has been removed as Sydney Water needs to ensure that plants over the pipeline would not develop root systems that could damage the pipeline. Sydney Water would consult with relevant landowners and local councils in planning for restoration after pipeline construction.

9.1.5 Direct impacts to threatened species within areas mapped as Important Habitat

Approximately 2.93 ha of IHM for the Bar-tailed Godwit and Curlew Sandpiper will be directly impacted by the project. The project will construct a river release pipeline, which will split into eight smaller pipes below ground at Memorial Park. These eights pipes will enter the Parramatta River west of the rail bridge and extend 75 to 130 metres into the river. The shoreline will be temporarily impacted to facilitate the construction of the river release structure, with the sandstone wall being reconstructed when the project is completed. There is also a small construction compound on the eastern side of the John Whitton Bridge that overlaps with the IHM. Although impacts to species within IHM areas are assumed, the IHM within the Parramatta River does not overlap with any native PCT vegetation zones. Therefore,

impacts are described below and as prescribed impacts in Section 9.1.7. This approach has been endorsed by NSW DCCEEW, Conservation Programs, Heritage and Regulation via email dated 17 June 2025 (Appendix I).

Potential impacts to the migratory shorebirds likely to inhabit the subject land, Bar-tailed Godwit and Curlew Sandpiper, are likely limited to the shoreline either side of the rail bridge. Although the Parramatta River provides potential dispersal habitat for these species; the current use of the river is dominated by ferry and other maritime traffic, with ferries departing every 20 minutes from Meadowbank Wharf. Given this, the potential for these species to utilise the internal areas of the river for dispersal is unlikely.

The potential shoreline habitat is limited, consisting of a small beach and exposed rocky shoreline with limited riparian vegetation between the rail bridge and Meadowbank Wharf. This area is consistent with the definition of potential foraging habitat for these species, however there will be no direct impact to this habitat as construction will be restricted to the western side of the rail bridge. Potential indirect impacts could occur via wave action from construction activities within the Parramatta River or noise and vibration impacts from the adjacent construction compound C30; however, this is unlikely to be substantially greater than the wave activity already generated by ferries using the adjacent wharf or existing uses of C30 as an urban car park. The western side of the rail bridge consists of sandstone walls with no riparian vegetation and is unlikely to be utilised by these species for foraging. Regardless, the sandstone walls will be restored to their current state upon project completion.

Regarding these species in the BAM-C, Bar-tailed Godwit was added as an additional Species Credit Species due to the presence of IHM within the subject land and wasn't generated as an automatic Candidate Species. Both the Curlew Sandpiper and Bar-tailed Godwit have been retained as species requiring further assessment due to the presence of IHM under BAM-C Tab 5: Habitat Suitability: Candidate. As the species polygon is determined by the presence of IHM, no targeted surveys were conducted. Further, as the IHM only intersects areas that have no mapped PCT, no species polygon has been assigned to either species. As per above, impacts have been assessed through prescribed impacts in Section 9.1.7. which was an approach endorsed by NSW DCCEEW, Conservation Programs, Heritage and Regulation via email dated 17 June 2025 (Appendix I). As the species were retained in Tab 5 (BAM-C), there are mandatory fields required in Tab 6: Habitat Survey. The BAM-C allows five selectable options for the 'Species presence' column for either species, which all are technically incorrect for the above approach. 'Yes', with any selected method cannot be selected as it requires a species polygon entry of >0.00, which would be incorrect as per above and would falsely generate species credits. 'No', therefore should be selected, however the reasoning (either 'surveyed' or 'expert report') would still be incorrect. Selecting 'No (surveyed)' requires selection of months surveyed. Selecting 'No (Expert Report)' does not require further/additional entries. For the purpose of removing errors in the BAM-C and allowing the case to be finalised, 'No (Expert Report)' was selected in Tab 6 (BAM-C) for Curlew Sandpiper and Bar-tailed Godwit, despite no expert report being conducted.

9.1.6 Indirect impacts

The BAM (Section 8.2.2) identifies 16 potential indirect impacts that must be considered as a part of a BDAR. Table 9-3 provides consideration of the indirect impacts of the project on native vegetation, TECs, threatened species and their habitat.

Table 9-3: Potential indirect impacts of the project

Indirect impact type	Nature	Extent	Frequency	Duration	Timing
Impacts of the project on TECs/PCTs and/or threatened species and their habitat beyond the Construction area, including but not limited to: **(a) Inadvertent impacts on adjacent habitat or vegetation**	As with any construction project, there is a risk of inadvertent impacts to adjacent habitat and vegetation through overstepping vegetation clearing boundaries. However, areas of native vegetation which interface with the construction area are limited because, for the most part, the pipeline alignments and associated facilities such as the WRRF are located within cleared areas in suburban and industrial neighbourhoods. The risk to the limited native vegetation that occurs within the subject land can be mitigated through good environmental management and strict controls for identifying and adhering to clearing boundaries. It is expected that through preparation and implementation of a Construction Flora and Fauna Management Plan (CFFMP), the risk of inadvertent impacts can be reduced to an acceptable level.	Adjacent vegetation	Ongoing during construction activities	Throughout the construction period	Potentially permanent
(b) Reduced viability of adjacent habitat due to edge effects	Habitat within native vegetation within PCTs directly adjacent to the construction footprint is limited to the small patches of PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest that are adjacent to fairly small patches of native vegetation. The small patches within and adjacent to the subject land are already subject to high levels of edge effects. Construction and operational activities from the project are not likely to exacerbate these edge effects and reduce the viability of these adjacent areas of habitat.	Adjacent vegetation	Ongoing during construction and operation	Throughout the construction period and during operation	Potentially permanent
(c) Reduced viability of adjacent habitat due to noise, dust or light spill	The project would result in minor increases to noise, dust and light spill due to construction and operational activities. However, the project is located in suburban and industrial areas that are currently subject to levels of noise, dust and light spill associated with highly urbanised environments. Any increases to noise, dust and light spill are expected to be negligible and would not reduce the viability of adjacent habitat.	Adjacent vegetation	Ongoing during construction and to a lesser extent, during operation	Throughout the construction period	Temporary
(d) Transport of weeds and pathogens from the site to adjacent vegetation	The areas of construction and areas of adjacent vegetation are currently abundant in weeds. However, an increase in the movement of people, vehicles, machinery, vegetation waste and soil during and following construction may facilitate the introduction or spread of weeds and pathogens that currently occur within the subject land into adjacent vegetation. It is anticipated that the spread of weeds to adjacent vegetation can be adequately managed as a part of a CFFMP.	Adjacent vegetation	Ongoing during construction	Throughout the construction period	Potentially permanent

Indirect impact type	Nature	Extent	Frequency	Duration	Timing
(e) Increased risk of starvation, exposure and loss of shade or shelter	The project is not expected to result in any indirect impacts resulting in an increased risk of starvation, exposure and loss of shade or shelter.	n/a	n/a	n/a	n/a
(f) Loss of breeding habitat	The project is not expected to result in any indirect impacts resulting in the loss of breeding habitats.	n/a	n/a	n/a	n/a
(g) Trampling of threatened flora species	All threatened flora species with potential to occur within the subject land were surveyed for, and no threatened species were identified. Much of the adjacent native vegetation was also surveyed. It is unlikely that threatened flora occurs in adjacent areas. In the unlikely event there is threatened flora adjacent to the subject land, it is expected that through preparation and implementation of a CFFMP the risk of trampling of threatened flora species can be reduced to an acceptable level.	Adjacent vegetation	Ongoing during construction and operation	Throughout the construction period and during operation	Potentially permanent
(h) Inhibition of nitrogen fixation and increased soil salinity	The project is not expected to result in any inhibition of nitrogen fixation or increased soil salinity.	n/a	n/a	n/a	n/a
(i) Fertiliser drift	The project is not expected to result in any fertiliser drift.	n/a	n/a	n/a	n/a
(j) Rubbish dumping	The project is not expected to result in any additional rubbish dumping as the streetscapes and urban parks where infrastructure will be installed will continue to be managed as currently.	n/a	n/a	n/a	n/a
(k) Wood collection	The project is not expected to result in any wood collection.	n/a	n/a	n/a	n/a
(l) Removal and disturbance of rocks, including bush rock	The project occurs in urban and suburban areas without substantial bush rock resources. The project is not expected to result in any disturbance of rocks.	n/a	n/a	n/a	n/a
(m) Increase in predators	The project is unlikely to result in any material increase in predatory species populations.	n/a	n/a	n/a	n/a
(n) Increase in pest animal populations	The project is not expected to materially increase pest animal populations in the locality.	n/a	n/a	n/a	n/a

Indirect impact type	Nature	Extent	Frequency	Duration	Timing
(o) Changed fire regimes	The project is not expected to result in any changed fire regimes.	n/a	n/a	n/a	n/a
(p) Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	The project is not expected to result in any disturbance to specialist breeding and foraging habitat.	n/a	n/a	n/a	n/a
Other indirect impacts identified for the project: **Impacts to aquatic habitats.** **Noise impacts**	The project has the potential to result in minor indirect impacts to the first-order watercourses in the subject land and study area through sedimentation and run off from construction activities. However, these watercourses, namely Charity Creek and the drain adjacent to the WRRF, are concrete-lined channel within limited and degraded habitat. It is unlikely that construction activities adjacent to streams within the subject land would adversely affect habitat within these drains. Indirect impacts to the first-order watercourse within the subject land are anticipated to be minor and of low risk if managed under a CFFMP. The brine pipeline alignment also crosses the Parramatta River via an existing pipe bridge adjacent to the Parramatta Light Rail bridge . Measures have been taken to avoid and minimise impacts to these structures. The existing pipelines that will be relined, using access from maintenance holes either side of the bridge. The river release installation adjacent to the John Whitton Bridge will take place within the river away from the bridge, with disruption to any potential microbat habitat limited to indirect noise and lighting impacts that are temporary and unlikely to substantially exceed that from overpassing rail traffic and underpassing river traffic.	First-order watercourses and adjacent vegetation; noise impacts	Ongoing during construction	Throughout the construction period	Potentially permanent

9.1.7 Prescribed impacts

Chapter 6 of the BAM (DPIE, 2020a) identifies the prescribed biodiversity impacts which must be assessed as part of the Biodiversity Offsets Scheme. These prescribed impacts and their relevance to the project are described below in Table 9-4.

Table 9-4: Prescribed impacts as identified in the BAM (DPIE, 2020a)

Prescribed impact	Relevance to the subject land
Impacts on the habitat of threatened entities including: **Karst, caves, crevices, cliffs and other geological features of significance**	There are no karst, caves, crevices, cliffs or other geological features of significance within the subject land.
Human-made structures	The subject land passes through residential and industrial neighbourhoods with a variety of human-made structures ranging from houses to industrial facilities to Western Sydney University. Within the subject land itself, however, the primary human-made structures are roads and carparks. It is unlikely that threatened species use these as habitat. Within suburban parks that serve as construction compounds, there are playgrounds and other recreational facilities such as basketball courts. These too are unlikely to serve as threatened species habitat. Sydney Water's Camellia pumping station (C14) will be upgraded as part of the project. The pumping station site is unlikely to provide threatened species habitat. The project is unlikely to have impacts on the very limited habitat values that may exist in these structures. Although the Camellia pumping station is to be upgraded internally, it is a heritage-listed structure and any habitat values that could potentially be present are unlikely to be permanently altered. The roads that may be altered by the project lack habitat value. Playground equipment within construction compounds also lacks habitat values; in any event, it will not be impacted by the use of the surrounding parklands for ancillary facilities. The brine pipeline alignment traverses the Parramatta River using an existing support structure adjacent to the Parramatta Light Rail line. The river release pipelines will be installed in the Parramatta River adjacent to John Whitton Bridge. These structures have potential to serve as microbat roosting habitat and were examined on 5 June 2025. No signs of microbat use were observed. Measures have been taken to avoid and minimise impacts to these structures. The brine pipeline crossing of Parramatta River will reline existing pipelines, using access from maintenance holes either side of the bridge. The river release installation adjacent to the John Whitton Bridge will take place within the river away from the bridge, with disruption to any potential microbat habitat limited to indirect noise and light impacts that are temporary and unlikely to substantially exceed that from overpassing rail traffic and underpassing river traffic.
Non-native vegetation	There is non-native vegetation across the highly urbanised subject land in the form of non-native trees and exotic lawn. However, all threatened species that would potentially utilise non-native vegetation within the subject land would also utilise native vegetation, in most cases preferentially, and have therefore been considered elsewhere in this report.

Prescribed impact	Relevance to the subject land
Impacts on areas connecting threatened species habitat, such as movement corridors	The subject land is in a highly urbanised setting. The small fragments of native vegetation that exist in the subject land currently have very poor connectivity to other patches of native vegetation. This connectivity will not be meaningfully affected by the project. The project could potentially have had connectivity impacts on riparian corridors where pipelines cross the Parramatta River, the Duck River and the Narawang and Nuri wetlands. However, the brine pipeline alignment will use the existing pipe bridge across Parramatta River, and the river release pipeline will be horizontally directionally drilled beneath the Duck River, Narawang Wetlands, Nuri Wetlands and Parramatta River, thereby avoiding impacts to connectivity. These avoided prescribed impacts are discussed in detail in Section 8.
Impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)	The pipeline alignments, WRRF, construction compounds and the river release all potentially have impacts that could affect water quality, water bodies and hydrological processes that sustain threatened entities. The brine pipeline alignment crosses Parramatta River and Vineyard Creek on the WSU Campus using an existing pipeline that will be accessed from maintenance holes either side of the creek. The WRRF is adjacent to a vegetated drain that flows into the Duck River. The river release pipeline alignment within Sydney Olympic Park, and associated construction compounds, are adjacent to the Narawang Wetlands, the Nuri Wetlands and Haslam's Creek. The river release pipeline will release high quality advanced treated water to the Parramatta River. All these elements of the project have potential for impacts to water quality, water bodies and hydrological processes. These impacts are discussed in detail in (Sydney Water, 2025) and (Jacobs, 2025), which concluded impacts are likely to be predominantly positive or minimal. The project could potentially have had impacts on water quality, water bodies and hydrological processes where pipelines cross the Vineyard Creek, the Parramatta River, the Duck River and the Narawang and Nuri wetlands. However, the brine pipeline alignment that crosses Vineyard Creek on the WSU Campus reuses existing pipe to be accessed by maintenance holes either side of the creek. The brine pipeline alignment will repurpose an existing pipe attached to a railway crossing of the Parramatta River. The river release pipeline will cross the Duck River, Narawang Wetlands and Nuri Wetlands through a horizontally directionally drilled method, thereby avoiding impacts to these water bodies. The river release pipeline into the Parramatta River at Memorial Park will impact on areas of Important Habitat Mapping (IHM) for migratory shorebirds. The Bar-tailed Godwit and Curlew Sandpiper are two migratory species which may potentially utilise habitat within the subject land. These species forage in exposed shoreline areas at low to mid-tide. Potential foraging habitat exists on the eastern side of the rail bridge, as a small beach and exposed rocky habitat, however this will be avoided by the project. The western side of the rail bridge does not contain suitable foraging habitat for these species, as it consists of sandstone walls only. Remaining areas of IHM impacted are within the Parramatta River, which is unlikely to be utilised as dispersal habitat for these species due to the near constant ferry traffic along the river.
Impacts on threatened and protected animals from	Not applicable.

Prescribed impact	Relevance to the subject land
turbine strikes from a wind farm	
Impacts on threatened species or fauna that are part of a TEC from vehicle strikes	The project is not likely to increase traffic on a long-term basis. There may be some minor potential for vehicle strikes from construction vehicles, but this is unlikely to be significantly greater than for typical urban traffic in the project area.

9.1.8 Uncertain impacts

Uncertain impacts are those impacts – typically indirect and prescribed – that are infrequent or difficult to measure prior to development (BAM Section 8.5). Examples of uncertain impacts include:

- wind turbine strike on protected bird and bat species
- collision (powerline strike), electrocution, and exposure to electrical and magnetic fields of threatened birds and bats due to installation of powerlines
- changes to vegetation structure and/or floristic composition resulting from modifications to the hydrological regime that impact on a threatened entity
- disruption of threatened fauna breeding cycles from noise and vibration
- increased predation caused by changed environmental conditions (e.g. tracks increasing fox and cat access to threatened fauna habitat, powerline corridors providing nesting and hunting habitats for raptors).

The project is unlikely to have more than minimal impacts of the examples above. The greatest area of uncertainty for the project is in the extent of native vegetation clearing required, which this BDAR likely overstates as a precautionary measure. In this BDAR, it is assumed that native PCT vegetation within the subject land will be cleared for the purpose of calculating credits, whereas Sydney Water intends to minimise total clearing to the extent feasible and is more likely to trim branches or work in areas surrounding native vegetation without wholly removing trees or understorey vegetation. However, this cannot be assessed prior to construction at a sufficiently granular level to ensure that native vegetation within the subject land will not be impacted. Therefore, this uncertainty has been addressed by assuming impacts for the purpose of calculating credits.

9.1.9 Cumulative impacts

The main potential for cumulative terrestrial biodiversity impacts relates to the combined impacts of the project with current and future development projects in the study area. The various projects that are underway and proposed would result in the removal of mainly planted vegetation within existing disturbed and developed areas. Cumulatively, these projects would result in a minimal loss of biodiversity values. The main potential cumulative impact would be the further loss of habitat from an already modified environment with limited natural biodiversity values.

Three projects were identified with the potential to result in cumulative impacts to PCTs, TECs and threatened fauna also impacted by this project. Impacts are summarised in Table 9-5. There is also potential for cumulative impacts from the Duck River Nature Trail (Stage 2 and 3), however no information about potential impacts was available at the time of EIS preparation.

Table 9-5: Summary of cumulative terrestrial biodiversity impacts

	Parramatta Light Rail Stage 2 (SSI-10035) (ha)	Hill Road Project (Transport for NSW) (ha)	Mixed Use Development with In-fill Affordable Housing - Melrose Park South – East (SSD-71558962) (ha)	This project (ha)	Cumulative impact (ha)
Plant Community Type					
PCT 4028 Estuarine Swamp Oak Twig-rush Forest	-	-	0.04	0.06	0.10
Threatened ecological community (BC Act)					
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC	0.47	-	0.04	0.06	0.57
Threatened fauna (species credit species)					
Calidris ferruginea Curlew Sandpiper (Breeding)	0.58	-	-	2.93	3.51
Limosa lapponica Bar-tailed Godwit	0.58	-	-	2.93	3.51
Litoria aurea Green and Golden Bell Frog	1.49	-	-	0.06	1.55
Myotis macropus Southern Myotis	2.27	0.67	-	0.18	3.12

9.1.10 Key threatening processes

Schedule 4 of the BC Act lists key threatening processes that may adversely impact native flora and fauna including threatened species and ecological communities.

The primary key threatening process associated with the project is ‘clearing of native vegetation’. Approximately 0.18 ha of native vegetation will be cleared for the project, including 0.12 ha of PCT 4058:

Sydney Hinterland Red Gum Riverflat Forest, which will be offset, and 0.06 ha of PCT 4028: Estuarine Swamp Oak Twig-rush Forest, which does not require offset due to a low vegetation integrity score. The clearing of native vegetation associated with the project will impact on habitat for each of the 35 ecosystem credit species associated with identified PCTs and the three species credit species recorded or assumed to be present within the subject land. However, impacts are anticipated to be low due to the small amount of clearing required and efforts to minimise impacts from that clearing (see Section 9.1.1).

Two key threatening processes related to clearing of native vegetation also have the potential to be associated with the project:

- Loss of hollow-bearing trees
- Removal of dead wood and dead trees.

Several hollow-bearing trees were identified within the subject land and have been accounted for in credit calculations (Section 13.1). However, it is anticipated that impacts to these trees will largely be limited to branch trimming, and every effort will be made to avoid removal of hollow-bearing trees. Some dead trees and small amounts of dead wood will be impacted as part of native vegetation clearing. Dead and down wood will be relocated to adjacent native vegetation where possible, and efforts will be made to minimise removal of dead wood as part of minimising native vegetation clearing. Loss of hollow-bearing trees and removal of dead wood and dead trees would potentially impact on species dependent on those habitat features, such as the Powerful Owl and ecosystem credit bird species that may occasionally use these features. As mentioned, such impacts are anticipated to be low due to the small amount of native vegetation cleared and efforts to minimise impacts.

Additional key threatening processes are or may be currently impacting threatened species within the subject land. For example, small woodland birds are likely to be impacted by the 'aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala*'. The Green and Golden Bell Frog is likely to be impacted by 'infection of frogs by amphibian chytrid causing the disease chytridiomycosis'. Although such key threatening processes will continue to impact threatened species during construction and operation of the project, the project is not anticipated to increase the impact of these key threatening processes.

9.2 Impacts to MNES

The process for determining MNES likely to occur within the subject land is discussed in Section 7.

9.2.1 Impacts to threatened ecological communities

PCT 4028: Estuarine Swamp Oak Twig-rush Forest (low-Sydney Olympic Park) and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest were assessed against condition thresholds for inclusion in their associated EPBC-listed communities. PCT 4028 did not meet the threshold for inclusion within the Coast Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland EEC (Swamp Oak Floodplain Forest). PCT 4058 did meet the threshold for inclusion within the River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria CEEC (Red Gum Riverflat Forest) within the moderate-good condition class occurring within the subject land.

Potential impacts to this TEC are outlined in Table 9-6.

Table 9-6: Impacts to EPBC TECs

PCT	Vegetation zone	EPBC TEC	Area (ha)
PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	Moderate – Memorial Park	Red Gum Riverflat Forest CEEC	0.02

9.2.2 Impacts to threatened and migratory species

After assessing the likelihood of occurrence of EPBC-listed species as described in Section 7.2, eight listed threatened fauna species were considered likely to occur within the subject land:

- *Botaurus poiciloptus* (Australian Bittern)
- *Calidris ferruginea* (Curlew Sandpiper)
- *Hirundapus caudacutus* (White-throated Needletail)
- *Lathamus discolor* (Swift Parrot)
- *Limosa lapponica* (Bar-tailed Godwit)
- *Litoria aurea* (Green and Golden Bell Frog)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Rostratula australis* (Australian Painted Snipe).

Twenty-five listed migratory wetland species are known or likely to occur in the area.

Of the threatened species considered likely to occur, all but Green and Golden Bell Frog are ecosystem credit species. Impacts to these species are offset under the BOS in conjunction with the native vegetation communities in which they occur.

The Green and Golden Bell Frog is classified as a species credit species, and impacts are offset under the BOS. Impacts to Green and Golden Bell Frog are summarised in Table 9-7.

Table 9-7: Impacts to EPBC-listed Green and Golden Bell Frog

Scientific name	Common name	Vegetation zone	EPBC TEC	Area/Count
Litorea aurea	Green and Golden Bell Frog	PCT 4028 (low-Sydney Olympic Park)	Red Gum Riverflat Forest CEEC	0.06

Impacts to migratory species are not assessed under the BOS unless they are listed as threatened species. EPBC significant impact assessments to migratory species are summarised in Table 9-8: and provided in full in Appendix B.

9.2.3 Significant impact assessments

Significant Impact Assessments using the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Significant Impact Guidelines (DEWHA, 2013) were undertaken for all listed species and communities, including migratory species, considered likely to occur. The impact assessments are provided in Appendix B. A summary of the impact assessments is provided in Table 9-8:.

Table 9-8: Summary of Significant Impact Criteria (EPBC Act)

EPBC Act Significant impact criteria[1]										
EPBC Act listed TEC	**i**	**ii**	**iii**	**iv**	**v**	**vi**	**vii**	**viii**	**ix**	**Likely significant impact?**
River-flat Eucalypt Forest	N	N	N	N	N	N	N	N	N	No
EPBC Act listed threatened species										
Australian Bittern	N	N	N	N	N	N	N	N	N	No
Curlew Sandpiper	N	N	N	N	N	N	N	N	N	No
White-throated Needletail	N	N	N	N	N	N	N	N	N	No

Swift Parrot	N	N	N	N	N	N	N	N	N	No
Bar-tailed Godwit	N	N	N	N	N	N	N	N	N	No
Green and Golden Bell Frog	N	N	N	N	N	N	N	N	N	No
Grey-headed Flying-fox	N	N	N	N	N	N	N	N	N	No
Australian Painted Snipe	N	N	N	N	N	N	N	N	N	No
EPBC listed migratory species										
Common Sandpiper	N	N	N	N	N	N	N	N	N	No
Ruddy Turnstone	N	N	N	N	N	N	N	N	N	No
Sharp-tailed Sandpiper	N	N	N	N	N	N	N	N	N	No
Red Knot	N	N	N	N	N	N	N	N	N	No
Curlew Sandpiper	N	N	N	N	N	N	N	N	N	No
Pectoral Sandpiper	N	N	N	N	N	N	N	N	N	No
Ruff	N	N	N	N	N	N	N	N	N	No
Red-necked Stint	N	N	N	N	N	N	N	N	N	No
Great Knot	N	N	N	N	N	N	N	N	N	No
Double-banded plover	N	N	N	N	N	N	N	N	N	No
Greater Sand Plover	N	N	N	N	N	N	N	N	N	No
Siberian Sand Plover	N	N	N	N	N	N	N	N	N	No
Latham's Snipe	N	N	N	N	N	N	N	N	N	No
Swinhoe's Snipe	N	N	N	N	N	N	N	N	N	No
Pin-tailed Snipe	N	N	N	N	N	N	N	N	N	No
Bar-tailed Godwit	N	N	N	N	N	N	N	N	N	No
Black-tailed Godwit	N	N	N	N	N	N	N	N	N	No
Eastern Curlew	N	N	N	N	N	N	N	N	N	No
Little Curlew	N	N	N	N	N	N	N	N	N	No
Eurasian Whimbrel	N	N	N	N	N	N	N	N	N	No
Osprey	N	N	N	N	N	N	N	N	N	No
Pacific Golden Plover	N	N	N	N	N	N	N	N	N	No
Grey-tailed Tattler	N	N	N	N	N	N	N	N	N	No
Common Greenshank	N	N	N	N	N	N	N	N	N	No
Marsh Sandpiper	N	N	N	N	N	N	N	N	N	No

1. Significant impact criteria as set out in the EPBC Act (species):
    a. An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
        i. Lead to a long-term decrease in the size of an important population of a species
        ii. Reduce the area of occupancy of an important population
        iii. Fragment an existing important population into two or more populations

iv. Adversely affect habitat critical to the survival of a species
v. Disrupt the breeding cycle of an important population
vi. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
vii. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
viii. Introduce disease that may cause the species to decline, or
ix. Interfere with the recovery of the species

2. Significant impact criteria as set out in the EPBC Act (TEC):
   a. Criteria if there is a real chance or possibility that the action (the proposed works) will:
      i. Reduce the extent of an ecological community
      ii. Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
      iii. Adversely affect habitat critical to the survival of an ecological community
      iv. Modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
      v. Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
      vi. Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to:
      vii. Assisting invasive species, that are harmful to the listed ecological community, to become established, or
      viii. Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
      ix. Interfere with the recovery of an ecological community

The results of the significant impact criteria assessments determined that the project would not significantly impact on any of the listed species assessed. In relation to each of the MNES assessed, the small amount of native vegetation and/or habitat impacted by the project does not constitute a significant impact. As such the project does not require referral to the Commonwealth Minister for the Environment for impacts to MNES.

10 Mitigation of impacts

Some biodiversity impacts cannot be avoided for several aspects of the project. A set of mitigation measures have been developed and tailored to this project to minimise impacts where possible (Table 10-1).

Table 10-1: Measures to be implemented to minimise impacts on biodiversity

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
General flora and fauna impacts	• A Construction Flora and Fauna Management Plan (CFFMP) would be prepared. Clearing of native vegetation and threatened species habitat within the subject land would not occur until the CFFMP is approved. This CFFMP would include the following: ○ Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas ○ Pre-clearing survey requirements ○ Procedures for unexpected threatened species finds and fauna handling ○ Protocols to manage weeds and pathogens.	Pre-construction and construction	Sydney Water Construction contractor	The extent of the removal of native vegetation and habitats for the project is low for a project of this scale. Suggested mitigation measures will ensure ongoing efforts are made to further reduce impacts to biodiversity during construction phase of the project. Mitigation measures will also ensure that impacts are kept within the parameters of what is deemed acceptable by the approval authority.
Minimise impacts on native vegetation and native species habitat	• Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants. Make particular effort to avoid impacts to PCT and TEC vegetation in Memorial Park and Sydney Olympic Park.	Pre-construction and construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
	• Where possible, ay pipeline strings to avoid impacts to native trees and shrubs, in particular through PCT 4028 in construction compound C27. • During detailed design, adjust methodology (e.g. avoid area) to protect sensitive areas where possible (such as mature trees, known threatened species, populations or ecological communities). • Avoid removing hollow-bearing trees unless less impactful construction methods such as trimming are not feasible. • locate material stockpiles away from native vegetation (including planted native vegetation) and physically delineate native vegetation to avoid unintentional trampling, accidental damage and other impacts. • Protect trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites where trees are not required to be removed. • For significant native trees in Memorial Park, with a DBHgreater than 15 cm where the impact area intersects the Tree Protection Zone, and where removal may not be required, engage a qualified arborist to determine if trees can be retained. The assessment would consider ongoing viability of the tree and safety risk. • Retain dead tree trunks, bush rock or logs in-situ unless they are in the disturbance corridor and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. If native fauna is likely to be present, a licenced ecologist should conduct a pre-clearance inspection and undertake fauna relocation • Maximise reuse of native vegetation and other habitat features that have been approved for removal. If reuse is not possible on site, consult with relevant stakeholders to determine if the following features could be used by others in habitat enhancement and rehabilitation activities, before pursuing other disposal options:			likelihood and severity.

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
	• hollows, tree trunks (greater than 25-30 cm in diameter and 2-3 m in length), mulch, bush rock and root balls salvaged from native vegetation impacted by the project; and • collected plant material, seeds and/or propagated plants from native vegetation impacted by the project			
Minimise impacts on significant vegetation and threatened species	• Site inductions for construction staff will include a briefing on the potential presence of threatened species and their habitat adjacent to the development site, their significance and locations and extents of no-go zones, and the importance of avoiding impacts to Nuri and Narawang wetlands adjacent to Sydney Olympic Park and the riparian areas of the Parramatta River and the Duck River. • To the extent possible and consistent with construction requirements, minimise works and intensity of works within Important Habitat Map for the Bar-tailed Godwit and Curlew Sandpiper.	Pre-construction and construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.
Prevent impacts from accidental clearing	• Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing. • If any damage occurs to vegetation outside of the disturbance corridor (as shown in the CFFMP), notify the Sydney Water Project Manager and Environmental Representative so that appropriate remediation strategies can be developed	Pre-construction and construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.
Minimise fauna mortality and injury	• Consider biodiversity as sensitive receivers in noise and vibration management plan. Minimise the amount of time that noise, light and vibration impacts are occurring, including by training workers in ways to minimise noise by avoiding the use of radios or stereos outdoors, avoiding shouting or slamming vehicles doors, and turning off plant and equipment when not in use. • Minimise the amount of time that light impacts are occurring. Lighting for temporary construction camps, and where required for construction activities, will be designed	Pre-construction and construction	Sydney Water Construction contractor Project ecologist	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
	in general accordance with Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting. • Pre-clearing surveys would be undertaken to identify any breeding or nesting activities by native fauna in hollow-bearing trees and native vegetation or where there is potential to minimise impacts to threatened species. No breeding sites or active nests should be disrupted, as far as practical. • If any pits/trenches are to remain open overnight adjacent to native vegetation, they would be securely covered, if possible. Alternatively, fauna ramps (logs or wooden planks) would be installed to provide an escape for trapped fauna. • If native fauna is encountered on site, stop work and allow the fauna to move away un-harassed. Engage WIRES or a licenced ecologist if assistance is required to move fauna. • If any threatened species (flora or fauna) is discovered during the works, stop work immediately and notify the Sydney Water Project Manager. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided. • Where fauna species are identified in vegetation to be cleared, animals would be removed and relocated to adjacent bushland prior to felling. If this is not possible, the tree would be sectionally dismantled or soft felled under the supervision of an ecologist or wildlife carer, before relocating the animal. • Undertake a two-stage approach to clearing for hollow-bearing trees, if removal is necessary: ○ In the event there is no alternative to removing a hollow-bearing tree, remove surrounding non hollow-bearing trees at least 48 hours before habitat trees are removed. ○ Hollow-bearing trees are to be knocked with an excavator bucket or other machinery to			

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
	encourage fauna to evacuate the tree immediately prior to felling ○ Felled trees must be left for a short period of time on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees ○ Felled hollow-bearing trees must be inspected by an ecologist as soon as possible (no longer than two hours after felling). • A pre-startup check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials would be undertaken.			
Prevent the spread of exotic species	• Manage biosecurity in accordance with: • *Biosecurity Act 2015* (see NSW Weedwise), including reporting of high risk weed infestations or invasive pests ○ Contemporary bush regeneration practices, including disposal of sealed bagged weeds to a licenced waste disposal facility. • Record Pesticides and Herbicides use in accordance with SWEMS0017. • To prevent spread of weeds, wrap straw bales in geofabric to prevent seed spread. Bag all plant parts and excavated topsoil that may be infested with weed propagules and dispose at a licensed waste disposal facility.	During construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.
Protect waterways	• Appropriate sediment, erosion and chemical pollution controls would be installed prior to the commencement of earthworks and construction, around the impact area, to reduce run-off into adjoining vegetation and riparian areas, where applicable. • Where possible, earthworks would be undertaken during dry weather conditions. Clearing of vegetation should be avoided during overland flow events.	Pre-construction and construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.

Residual impact	Mitigation measure	Timing	Responsibility	Effectiveness of mitigation
	• For works in marine/estuarine areas, do not place anchors on or drag them across *marine vegetation.* • Ensure treated water outflows occur within specified parameters assessed as part of technical studies carried out for the project.			
Rehabilitate impacts	• Restore impact areas to pre-existing condition as much as practical. • Replace removed trees with same species, or species agreed to with relevant Council. Where trees cannot be replanted at the same location, Sydney Water will work with stakeholders to agree to an alternative location, which could include the WRRF if appropriate.	Post-construction	Sydney Water	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.
Address uncertain impacts in the extent of clearing required	• Although it is very unlikely that all or even most native vegetation within the subject land will require clearing, total clearing has been assumed for the purpose of calculating ecosystem credits (Section 9.1.8). • Clearing impacts will be adaptively managed within the subject land through the measures adopted for the project to minimise impacts on native vegetation, including avoiding total tree removal where possible, obtaining arborist services as necessary to minimise tree removal, and replacing native trees where removal is unavoidable.	Pre-construction and construction	Sydney Water Construction contractor	Implementation of the mitigation measures will ensure residual impacts are considered of a low likelihood and severity.

11 Serious and Irreversible Impacts (SAII)

11.1 Assessment for Serious and Irreversible Impacts on biodiversity values

One entity at risk of Serious and Irreversible Impacts (SAII), *Calidris ferruginea* (Curlew Sandpiper), is likely to occur within the subject land and must be assessed for SAII as per Section 9.1 of the BAM 2020.

Table 11-1: Entities at risk of SAII

Common name	Scientific name	Reason for inclusion in assessment
Curlew Sandpiper	*Calidris ferruginea*	This species is considered at risk of SAII when important mapped habitat is impacted. The species is listed as SAII under Principal 1 – species under rapid decline.

11.1.1 Additional impact assessment provisions for threatened species at risk of an SAII

11.1.1.1 Curlew Sandpiper (*Calidris ferruginea*)

1. Actions to avoid and minimise direct and indirect impacts

Actions taken to avoid and minimise impacts to species at risk of SAII are detailed in Section 8.4. Overall, the project has generally avoided the highest quality, although limited, habitat for the Curlew Sandpiper on a small stretch of sand (~50 m in length) on the eastern side of the rail bridge at Meadowbank. Although this stretch of sand is within the indicative Parramatta River construction area, all pipelines and the river release will be located on the western side of the rail bridge, and within the Parramatta River. Impacts to the small stretch of sand will largely be due to proximity to a construction compound located in the existing car park above the sand.

In addition, the Parramatta River crossing of the river release pipeline is an HDD section that would otherwise cross IHM for the species were the pipeline not below ground.

2. Current status

The Curlew Sandpiper is a small migratory shorebird which predominantly occurs along the Australian coastline. The species breeds in Siberia and migrates to Australia for the non-breeding season between August and April. It generally occupies littoral and estuarine habitats as well as intertidal mudflats of sheltered coasts. It forages at the edge of shallow water or on exposed algal mats and beach-cast seaweed banks. The Curlew Sandpiper roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores.

Curlew Sandpiper was not detected during surveys targeting other threatened birds in the subject land. The species is considered at risk of SAII when areas of Important Habitat Mapping (IHM) is to be impacted. A total of 2.93 ha of IHM will be temporarily impacted by the project during construction of the river release structure.

The following tables (Table 11-2: to Table 11-4:) detail the current status, impact assessment and additional information to support decision makers as required under the Subsection 9.1.2 of the BAM.

Table 11-2: Current status – Curlew Sandpiper *(Calidris ferruginea)*

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Evidence of rapid decline (Principle 1)			
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate)	There has been a 53% decline in the maximum annual counts of the NSW population between 1982 and 2012. This is equivalent to a decline of 89% over three generations	Final determination for the Curlew Sandpiper (NSW TSSC, 2024)	N/A
Evidence of small population size (Principle 2)			
Current population size in NSW	Not required as not considered under Principle 2.		
Decline in species' population size in 3 years or one generation			
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations			
Evidence of limited geographic range (Principle 3)			
Extent of occurrence (ha)	Not required as not considered under Principle 3.		
Area of occupancy (ha)			
Number of threat-defined locations			
Whether the species' population is likely to under extreme fluctuations			
Evidence that entity is unlikely to respond to management (Principle 4)			
Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible	Not required as not considered under Principle 4.		
Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat at, a stewardship site.			

3. Impact assessment

No Curlew Sandpiper have been recorded within the impact area for the project, and it is unlikely that the species uses the impact area other than on a very temporary basis, if that. However, because there will be temporary impacts within open water designated as IHM, and impacts, mostly indirect, to a small strip of sand to the east of John Whitton Bridge, impacts are assumed. IHM is shown in Figure 5-7. Impacts to IHM are described in Section 9.1.5. The total area of IHM is 2.93 ha.

All impacts to IHM will be temporary. Construction in this area will involve removal of a wall west of the John Whitton Bridge, construction of a coffer dam and installation of river release pipes. The wall will be reinstated following installation of pipes. None of the construction involving installation of the river release pipes will directly impact the small strip of sand to the east of John Whitton Bridge.

There will be barges and other marine equipment during construction which may take several weekends within the water and approximate 12 months on land. However, as has been noted (Section 9.1.5), the current use of the river is dominated by ferry and other maritime traffic, and existing potential for the Curlew Sandpiper to utilise the internal areas of the river for dispersal is unlikely.

Table 11-3: Impact assessment – Curlew Sandpiper

Impact	Data/ information	Data sources
Number of individuals (mature and immature) present in the subpopulation on the subject land	There is a total of 347 records for Curlew Sandpiper within 10 kilometres of the subject land. No individuals were observed incidentally during surveys.	BioNet
Number of individuals (mature and immature) present as a percentage of total NSW population (%)	The NSW population is thought to have fewer than 2,500 individuals. No individuals were observed to be present in the subject land. No individuals within the total NSW population are likely to be present at any given time. As the habitat affected is open water, which the species uses only intermittently, it is unlikely that individuals are present on any basis other than temporarily.	Final determination for the Curlew Sandpiper (NSW TSSC, 2011 (superseded)). The 2024 Final determination did not provide an estimate for NSW.
Number of individuals (mature and immature) to be impacted by the project	While there is a total of 347 records for Curlew Sandpiper within 10 kilometres of the subject land, no individuals were observed incidentally during surveys. No individuals are likely to be impacted by the project.	BioNet
Individuals (mature and immature) to be impacted by the project as percentage of total NSW population (%)	As no individuals were observed as present in the subject land during surveys, no individuals are likely to be impacted by the project. No individuals within the total NSW population are likely to be present at any given time. As the habitat affected is open water, which the species uses only intermittently, it is unlikely that individuals are present on any basis other than temporarily.	BioNet Final determination for the Curlew Sandpiper (NSW TSSC, 2024)
Area of habitat to be impacted (ha) (for species measured by area only)	A total of 2.93 ha of mapped potential Curlew Sandpiper habitat may be impacted by the project. This habitat is limited to potential dispersal habitat in the Parramatta River, which is unlikely to be utilised by this species due to the heavy maritime traffic in the river.	N/A
Area of the species' geographic range to be impacted by the project	The extent of occurrence (EOO) is estimated at 10,900,000 km^2 while the area of occupancy (AOO) is approximately 8,000 km^2. Approximately 0.0021 km^2 of the	Final determination for the Curlew Sandpiper (NSW TSSC, 2024)

Impact	Data/ information	Data sources
	species geographic range has the potential to be impacted by the project during the construction period.	
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%)	The extent of occurrence (EOO) is estimated at 10,900,000 km^2 while the area of occupancy (AOO) is approximately 8,000 km^2. For both the EOO and AOO, the area with the potential to be impacted is less than 0.001%.	Final determination for the Curlew Sandpiper (NSW TSSC, 2024)
Individuals impacted	No individuals were observed as present in the subject land during surveys. No individuals within the total NSW population are likely to be present at any given time. As the habitat affected is open water, which the species uses only intermittently, it is unlikely that individuals are present on any basis other than temporarily.	N/A
Viability of a fragment population	No individuals were observed as present in the subject land during surveys. Additionally, the Curlew Sandpiper is considered one population. Therefore, the population will not be fragmented.	Final determination for the Curlew Sandpiper (NSW TSSC, 2024)

4. Additional information for decision makers

Table 11-4: Additional information for decision makers – Curlew Sandpiper

Additional assessment	Results
a. The action and measures taken to avoid the direct and indirect impact on the potential entity for a Serious and Irreversible Impact	Of the areas of IHM in the indicative construction footprint, the area of potential foraging habitat on the eastern side of the rail bridge will largely be avoided by the project. Impacts to the shoreline will be restricted to the western side of the rail bridge, which consists of a sandstone wall and does not offer any potential foraging habitat for this species.
b. The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification.	The Curlew Sandpiper exists as a single population. While there are 347 BioNet records for Curlew Sandpiper within 10 km of the subject land, no individuals were observed during the surveys. Although 2.93 ha of mapped IHM will be impacted by the project, no individuals of the population are expected to be directly or indirectly impacted.
c. The extent to which the impact exceeds any threshold for the potential entity	There are no identified thresholds for the Curlew Sandpiper. However, areas mapped as important habitat are to be identified as a potential SAII. The project may have temporary impacts to 2.93 ha of mapped important habitat for the species.
d. The likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to: **i. an estimate of the change in habitat available to the local population as a result of the proposed development** **ii. the proposed loss, modification, destruction or isolation of the available habitat used by the local population** **iii. modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.**	There may be temporary impacts to 2.93 ha of IHM for the Curlew Sandpiper. However most of this mapping is within the Parramatta River, which is unlikely to be utilised for foraging or dispersal by this species. What areas of potential foraging habitat exists along the shoreline will be avoided by the project. The Parramatta River crossing of the river release pipeline is an HDD section below the IHM for the species. While there are 347 records of Curlew Sandpiper within 10 km of the subject land, no individuals were identified as occurring or using resources within the subject land. Additionally, no breeding habitat will be impacted by the project. As such, direct impacts to the species will be limited. The river release pipeline will release high quality advanced treated water to the Parramatta River, which has potential to impact water quality in the IHM. These impacts are discussed in detail in (Sydney Water, 2025), which concluded impacts are likely to be predominantly positive or minimal. Potential indirect impacts to the Curlew Sandpiper if they were present in the subject land include disturbance from noise, vibration, light spill and/or dust. This would occur for the duration of the construction works in the subject land. This may impact any individuals foraging in proximity, however there is high availability

Additional assessment	Results
	of intact potential habitat further afield that would provide suitable alternative refuge for any affected individuals. Additional impacts could be from wave action due to construction in the river; however, this is unlikely to be greater than the wave action that is already generated from ferry traffic that currently occurs. Impacts would be intermittent and temporary in nature and are unlikely to inhibit genetic diversity and long-term evolutionary development of the species, if present.
e. The likely impact on the ecology of the local population including - **Breeding** - **Foraging** - **Roosting** - **Dispersal or movement pathways**	No breeding habitat for this species would be impacted. A total of 2.93 ha of IHM may be temporarily impacted, which constitutes potential dispersal habitat, with minor potential foraging habitat existing on the eastern side of the rail bridge. This foraging habitat will be avoided by the project. As this species is highly mobile, temporary impacts to 2.93 ha of habitat is unlikely to impact on dispersal or movement pathways.
f. A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development.	No individuals were observed in the subject land, however 2.93 ha of IHM may be temporarily impacted by the project. As this species is highly mobile, and unlikely to utilise the limited potential habitat being impacted it is unlikely that a local population would become fragmented or isolated.
g. The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range.	The Curlew Sandpiper exist as a single population. This species breeds in Siberia before migrating to Australia, as well as Africa and Asia. Temporary impacts to 2.93 ha of IHM is unlikely to impact breeding, dispersal or genetic viability/diversity of this population due to limited dispersal and foraging habitat available. No breeding habitat is available within the subject land. Additionally, the subject land is not at the limit of the species' range.
h. The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population.	The potential foraging and dispersal habitat is already subject to disturbance from human development removing shoreline habitat, maritime traffic in the Parramatta River limiting potential dispersal habitat, and other threatening processes such as climate change, and pollution from terrestrial run-off. The project will temporarily increase disturbance to potential habitat during construction, however all areas of shoreline impacted by construction will be restored to their current condition on project completion.
i. An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion.	Curlew Sandpiper exist as a single population. There is limited data on the number of individuals in the NSW reserve system, IBRA region or IBRA subregion. The total population in NSW is estimated to be around 2,500 individuals. According to BioNet Atlas, there are 1,719 BioNet records of Curlew Sandpiper for the Sydney Basin IBRA region while there are 57 records for the Cumberland IBRA subregion and 391 for the Pittwater IBRA subregion.
j. The measure/s proposed to contribute to the recovery of the species in the IBRA subregion.	The Curlew Sandpiper does not have an Adopted Recovery Plan. Conservation and recovery actions listed in the approved conservation advice (DCCEEW, 2023) identify the following primary conservation objectives: - Minimise further loss of habitat critical to the survival of Curlew Sandpiper throughout Australia - Prevent further declines in Curlew Sandpiper populations by working with relevant Range States to address threats in the East Asian-Australasian Flyway While the project may have temporary impacts to 2.93 ha of IHM, it is unlikely that this impact will disrupt the recovery of the species in the Cumberland and Pittwater IBRA subregions.

12 Impact summary

12.1 Determine an offset requirement for impacts

According to section 9.2.1 of the BAM the assessor must determine an offset for all impacts of projects on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

- ≥15, where the PCT is representative of an EEC or a CEEC
- ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community
- ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

12.1.1 Impacts on native vegetation

The impacts of the project on native vegetation that requires offsetting (in accordance with Section 9.2 of the BAM and as determined using the BAM-C) are outlined below in Table 12-1: and shown in Figure 12-1. The full biodiversity offset credit reports are provided in Appendix E of this report.

No offsets are required for PCT 4028: Estuarine Swamp Oak Twig-rush Forest because the VI score for that vegetation zone is below the threshold for offsetting.

Table 12-1: Impacts that require an offset – ecosystem credits

PCT name	Vegetation zone	Impact area (ha)	Change in VI score	Future VI score	Biodiversity risk weighting	Number of ecosystem credits required
4028: Estuarine Swamp Oak Twig-rush Forest	Low (Sydney Olympic Park)	0.06	-13.3	0	2	0
PCT 4058: Sydney Hinterland Red Gum RIverflat Forest	Moderate	0.02	-46.2	0	2	1
	Low	0.10	-32.4	0	2	2
					Total	**3**



Figure 12-1: Native vegetation to be offset: PCT 4058

12.1.2 Impacts on threatened species and their habitat (species credits)

Impacts to species credit species as a result of the project require offsetting in accordance with Section 10.1.1 of the BAM. The TBDC identifies the assessment method for threatened species to be used when determining credit requirements. Each of the species credit species that requires an offset is classified as an area species, meaning its offset is determined by the area of its species polygon.

Impacts to ecosystem credit species are offset in conjunction with offsets to associated PCTs.

The credit requirements for each species credit species as a result of the project are listed in Table 12-2 and impacts are shown in Figure 12-2, Figure 12-3, Figure 12-4 and Figure 12-5. The full biodiversity offset credit reports are provided in Appendix E of this report.

Table 12-2: Impacts that require an offset – species credits

Scientific name	Common name	Vegetation zone	Area/Count	Sensitivity to Loss	Biodiversity risk weighting	Potential SAII	Number of species credits required
Litorea aurea	Green and Golden Bell Frog	PCT 4028 (low-Sydney Olympic Park)	0.06	High	2	No	1
Myotis macropus	Southern Myotis	PCT 4028 (low-Sydney Olympic Park)	0.06	Moderate	2	No	1
		PCT 4058 (moderate)	0.10	Moderate	2	No	2
		PCT 4058 (low)	0.02	Moderate	2	No	1
Ninox strenua	Powerful Owl	PCT 4058 (moderate)	0.10	Moderate	2	No	2
		PCT 4058 (low)	0.02	Moderate	2	No	1
						Total credits	8

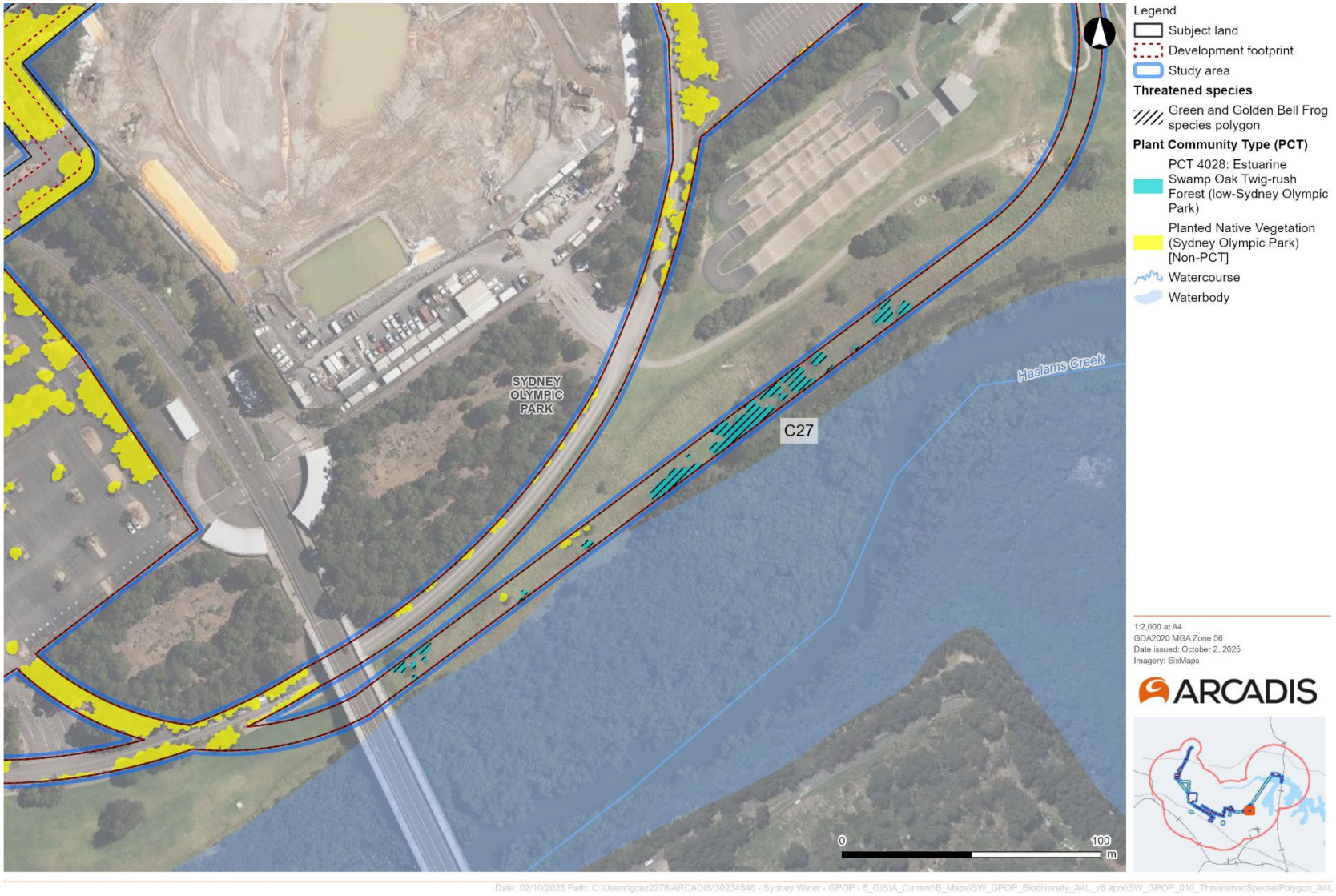


Figure 12-2: Impacts to be offset – Green and Golden Bell Frog, PCT 4028 (low-Sydney Olympic Park)

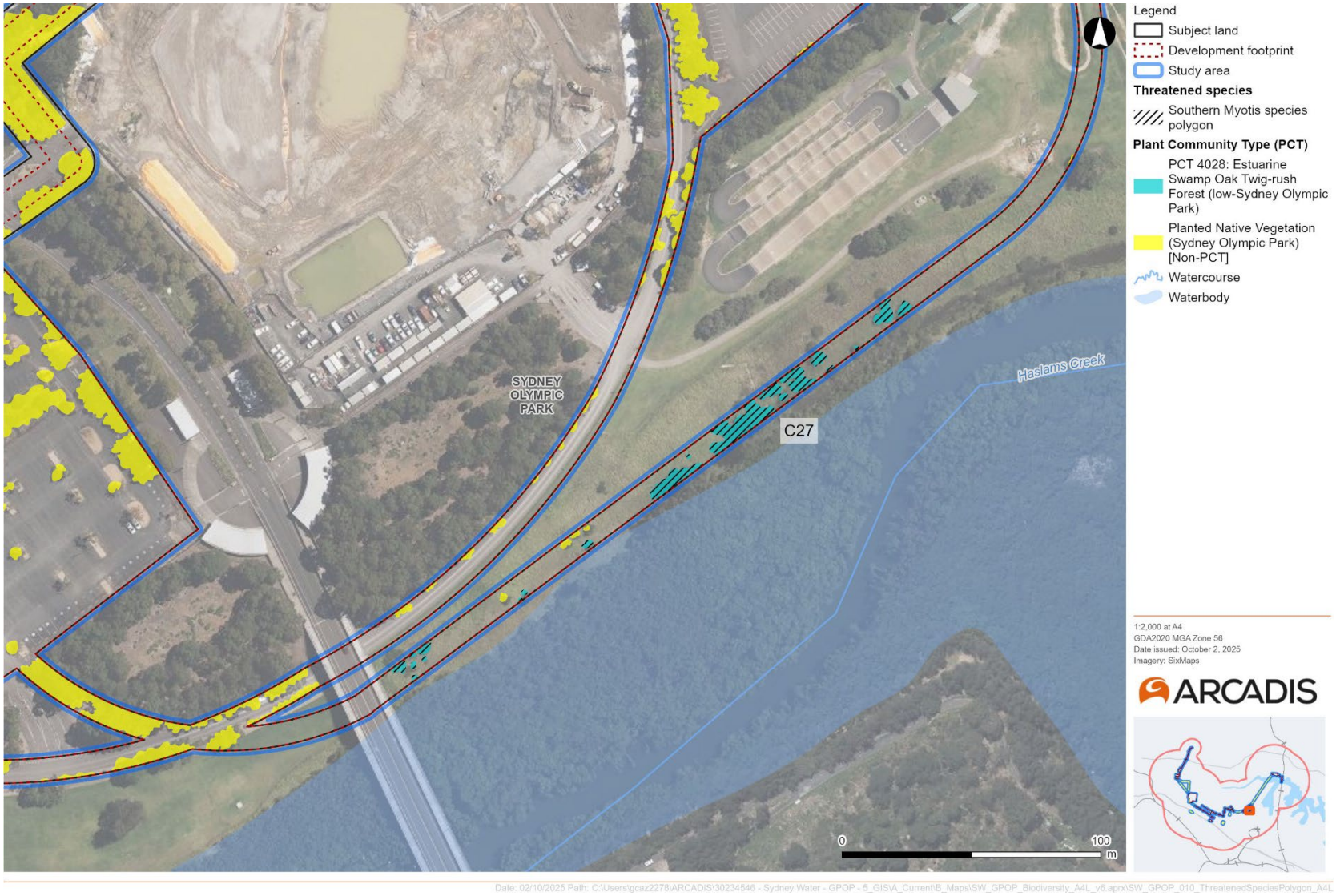


Figure 12-3: Impacts to be offset – Southern Myotis, PCT 4028 (low-Sydney Olympic Park)



Figure 12-4: Southern Myotis, PCT 4058 (low and moderate)



Figure 12-5: Powerful Owl, PCT 4058 (low and moderate)

12.2 Impacts not requiring offset

Impacts to native vegetation within PCTs with a VI score that does not meet the threshold for offsetting do not require offset (Section 12.1.1). Impacts to planted native vegetation and threatened species habitat within planted native vegetation do not require offsetting. Impacts to planted native vegetation are described in Section 9.1.2. Impacts to threatened species that may use planted native vegetation are described in Section 9.1.4.

12.3 Impacts that do not need further assessment

In accordance with BAM Section 4.1.2, areas that do not support native vegetation do not require assessment except where they represent habitat for threatened species. Of the 50.53 ha of the subject land, 45.56 are exotic vegetation, roads, buildings or other infrastructure. Those areas of the subject land with potential to support threatened species have been assessed. No areas of the subject land that do not support native vegetation represent habitat for threatened species.

13 Credit requirements and like-for-like options

The credit requirements and summary reports for the project are shown in Appendix E and outlined below.

13.1 Ecosystem credits

A total of three (3) ecosystem credits are required to offset impacts of the proposed development on PCT 4058.

The following like-for-like options apply for the credit class for PCT 4058:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. This includes PCTs 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138.
- in the following subregions – Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo, or any IBRA subregion that is within 100 km of the outer edge of the impacted site,
- containing hollow bearing trees – Yes.

13.2 Species credits

A total of eight (8) species credits are required to offset impacts of the proposed development on species credit species.

One (1) *Litoria aurea* (Green and Golden Bell Frog) credit is required to offset the impact to habitat for this species. The following like-for-like options apply for Green and Golden Bell Frog:

- *Litoria aurea* (Green and Golden Bell Frog) in any IBRA subregion in NSW.

Four (4) *Myotis macropus* (Southern Myotis) credits are required to offset the impact to habitat for this species. The following like-for-like options apply for Southern Myotis:

- *Myotis macropus* (Southern Myotis) in any IBRA subregion in NSW.

Three (3) *Ninox strenua* (Powerful Owl) credits are required to offset the impact to habitat for this species. The following like-for-like options apply for Powerful Owl:

- *Ninox strenua* (Powerful Owl) in any IBRA subregion in NSW.

13.3 Variation rules

Following the March 7, 2025 commencement of the Biodiversity Conservation Amendment (Biodiversity Offsets Scheme) Act 2024, proponents may no longer seek to use variation rules. Although variation options are displayed in credit reports (Appendix E), consent authorities cannot approve their use in conditions of consent for development approvals.

13.4 Credit retirement options

The BC Act provides several market-based mechanisms for offsetting, including acquiring credits through the market and retiring them or paying into the Biodiversity Conservation Fund.

Credits are anticipated to be retired through a market-based mechanism rather than an offset site. Although no final decision on which market-based credit retirement option has been made, it is anticipated that credits will likely be retired through payment to the Biodiversity Conservation Fund.

No staged retirement of credits is anticipated.

14 Conclusion

This BDAR has been prepared on behalf of Sydney Water to meet the requirements of Section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act). Sydney Water is proposing to build and operate a new WRRF at Camellia- Rosehill with associated infrastructure to support growth across the northern suburbs of Sydney, and in the GPOP growth corridor (the project).

This BDAR has been prepared by Brendan Fletcher, an Accredited Person (BAAS 25005) under the BC Act. The surveys and preparation of the BDAR were conducted under the oversight of Elijah Elias, an Accredited Assessor (BAAS21012), reviewer and certifier. It is based on desktop research and field surveys, carried out by Arcadis from October 2024 to August 2025.

Two PCTs occur within the subject land, occupying a total of 0.18 hectares:

- PCT 4028: Swamp Oak Twig-rush Forest
- PCT 4058: Sydney Hinterland Red Gum Riverflat Forest

Portions of these two PCTs are associated with TECs as follows:

- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Coast Bioregions EEC (BC Act)
- NSW River-Flat Eucalypt Forest on Coastal Floodplains EEC (BC Act)
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria CEEC (EPBC Act).

No threatened flora were recorded within the subject land during targeted surveys. No other threatened flora species are considered to occur within the subject land.

Five threatened fauna species were recorded during surveys:

- *Miniopterus australis* (Little Bent-winged Bat) (Vulnerable, BC Act)
- *Miniopterus orianae oceanensis*) (Large Bent-winged Bat) (Vulnerable, BC Act)
- *Myotis macropus* (Southern Myotis) (Vulnerable, BC Act)
- *Ninox strenua* (Powerful Owl) (Vulnerable, BC Act)
- *Pteropus poliocephalus* (Grey-headed Flying Fox) (Vulnerable, BC Act; Vulnerable EPBC Act).

Presence was assumed for one threatened fauna species, *Litoria aurea* (Green and Golden Bell Frog) (Endangered, BC Act; Vulnerable, EPBC Act), where suitable habitat occurred.

Impacts were assumed where the indicative Parramatta River construction area overlaps with the Important Habitat Map (IHM) for the following two species:

- *Calidris ferruginea* (Curlew Sandpiper) (Critically Endangered, BC Act; Critically Endangered, EPBC Act)
- *Limosa lapponica baueri* (Bar-tailed Godwit) (Vulnerable, BC Act; Endangered, EPBC Act).

There will be (IHM) impacts to one species at risk of Serious and Irreversible Impacts (SAII), *Calidris ferruginea* (Curlew Sandpiper).

Extensive measures were undertaken to avoid and minimise impacts to biodiversity values, including horizontally directionally drilling pipelines beneath river crossings and wetlands, moving alignments, and repurposing existing infrastructure to avoid native vegetation, and adjusting alignments to minimise impacts to native vegetation.

Where impacts could not be avoided, mitigation measures are proposed that would reduce adverse impacts on ecological values. These include preparation of a Construction Flora and Fauna Management Plan, appropriate sediment and erosion controls, avoiding and minimising removal of vegetation where practicable, site inductions, exclusion fencing, pre-clearance surveys and appropriate weed and hygiene protocols.

Where impacts could not be avoided, mitigation measures are proposed that would reduce adverse impacts on ecological values. These include preparation of a Construction Flora and Fauna Management Plan, appropriate sediment and erosion controls, avoiding and minimising removal of vegetation where practicable, site inductions, exclusion fencing, pre-clearance surveys and appropriate weed and hygiene protocols.

Residual impacts to native vegetation and threatened species within PCTs will be offset in accordance with the BAM. A total of three (3) ecosystem credits are required to offset impacts to native vegetation and ecosystem credit species, and a total of eight (8) species credits are required to offset impacts to species credit species.

Significant impact criteria assessments under the EPBC Act concluded that the project is unlikely to have a significant impact on any MNES including listed threatened species. No referral to the Commonwealth for assessment is required.

15 References

(n.d.).

(n.d.).

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APPENDIX A PMST report

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 26-Mar-2025

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	10
Listed Threatened Species:	89
Listed Migratory Species:	55

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	835
Commonwealth Heritage Places:	None
Listed Marine Species:	69
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	2
EPBC Act Referrals:	18
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community may occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
FISH		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROG		
Heleioporus australiacus australiacus		
Giant Burrowing Frog, Eastern Owl Frog [92013]	Endangered	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Notamacropus parma		
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola		
[21932]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Darwinia biflora [14619]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat may occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat known to occur within area
Leucopogon exolasius Woronora Beard-heath [14251]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Hoplocephalus bungaroides Broad-headed Snake [1182]	Endangered	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area
SNAIL		
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres		
Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris pugnax as Philomachus pugnax Ruff [91256]		Foraging, feeding or related behaviour known to occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa limosa Black-tailed Godwit [845]	Endangered	Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Corporation [16051]	NSW
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian Telecommunications Commission [13014]	NSW
Commonwealth Land - Australian Telecommunications Commission [13018]	NSW
Defence	
Defence - NEWINGTON [10943]	NSW
Defence - NEWINGTON [10823]	NSW
Defence - NEWINGTON [10713]	NSW
Defence - NEWINGTON [10843]	NSW
Defence - NEWINGTON [10841]	NSW
Defence - NEWINGTON [10712]	NSW
Defence - NEWINGTON [10596]	NSW
Defence - NEWINGTON [10653]	NSW
Defence - NEWINGTON [10330]	NSW
Defence - NEWINGTON [10842]	NSW
Defence - NEWINGTON [10597]	NSW
Defence - NEWINGTON [10610]	NSW
Defence - NEWINGTON [10955]	NSW
Defence - NEWINGTON [10303]	NSW
Defence - NEWINGTON [10946]	NSW
Defence - NEWINGTON [10940]	NSW
Defence - NEWINGTON [10715]	NSW
Defence - NEWINGTON [10944]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10302]	NSW
Defence - NEWINGTON [10945]	NSW
Defence - NEWINGTON [10764]	NSW
Defence - NEWINGTON [10674]	NSW
Defence - NEWINGTON [10482]	NSW
Defence - NEWINGTON [10677]	NSW
Defence - NEWINGTON [10676]	NSW
Defence - NEWINGTON [10770]	NSW
Defence - NEWINGTON [10489]	NSW
Defence - NEWINGTON [10767]	NSW
Defence - NEWINGTON [10766]	NSW
Defence - NEWINGTON [10765]	NSW
Defence - NEWINGTON [10675]	NSW
Defence - NEWINGTON [10643]	NSW
Defence - NEWINGTON [10775]	NSW
Defence - NEWINGTON [10763]	NSW
Defence - NEWINGTON [10762]	NSW
Defence - NEWINGTON [10761]	NSW
Defence - NEWINGTON [10771]	NSW
Defence - NEWINGTON [10772]	NSW
Defence - NEWINGTON [10773]	NSW
Defence - NEWINGTON [10774]	NSW
Defence - NEWINGTON [10273]	NSW
Defence - NEWINGTON [10562]	NSW
Defence - NEWINGTON [10563]	NSW
Defence - NEWINGTON [10560]	NSW
Defence - NEWINGTON [10821]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10561]	NSW
Defence - NEWINGTON [10948]	NSW
Defence - NEWINGTON [10849]	NSW
Defence - NEWINGTON [10826]	NSW
Defence - NEWINGTON [10848]	NSW
Defence - NEWINGTON [10825]	NSW
Defence - NEWINGTON [10927]	NSW
Defence - NEWINGTON [10845]	NSW
Defence - NEWINGTON [10278]	NSW
Defence - NEWINGTON [10844]	NSW
Defence - NEWINGTON [10279]	NSW
Defence - NEWINGTON [10847]	NSW
Defence - NEWINGTON [10272]	NSW
Defence - NEWINGTON [10642]	NSW
Defence - NEWINGTON [11000]	NSW
Defence - NEWINGTON [10565]	NSW
Defence - NEWINGTON [11003]	NSW
Defence - NEWINGTON [10640]	NSW
Defence - NEWINGTON [10779]	NSW
Defence - NEWINGTON [10641]	NSW
Defence - NEWINGTON [11001]	NSW
Defence - NEWINGTON [10384]	NSW
Defence - NEWINGTON [10777]	NSW
Defence - NEWINGTON [10647]	NSW
Defence - NEWINGTON [10778]	NSW
Defence - NEWINGTON [10822]	NSW
Defence - NEWINGTON [10644]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10645]	NSW
Defence - NEWINGTON [10289]	NSW
Defence - NEWINGTON [10274]	NSW
Defence - NEWINGTON [11004]	NSW
Defence - NEWINGTON [11007]	NSW
Defence - NEWINGTON [11002]	NSW
Defence - NEWINGTON [11005]	NSW
Defence - NEWINGTON [10246]	NSW
Defence - NEWINGTON [10632]	NSW
Defence - NEWINGTON [10408]	NSW
Defence - NEWINGTON [10358]	NSW
Defence - NEWINGTON [10925]	NSW
Defence - NEWINGTON [10566]	NSW
Defence - NEWINGTON [10369]	NSW
Defence - NEWINGTON [10564]	NSW
Defence - NEWINGTON [10433]	NSW
Defence - NEWINGTON [10568]	NSW
Defence - NEWINGTON [10657]	NSW
Defence - NEWINGTON [10569]	NSW
Defence - NEWINGTON [10658]	NSW
Defence - NEWINGTON [10243]	NSW
Defence - NEWINGTON [10655]	NSW
Defence - NEWINGTON [10928]	NSW
Defence - NEWINGTON [10656]	NSW
Defence - NEWINGTON [10245]	NSW
Defence - NEWINGTON [10244]	NSW
Defence - NEWINGTON [10470]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10281]	NSW
Defence - NEWINGTON [11006]	NSW
Defence - NEWINGTON [10576]	NSW
Defence - NEWINGTON [11009]	NSW
Defence - NEWINGTON [10323]	NSW
Defence - NEWINGTON [11008]	NSW
Defence - NEWINGTON [10809]	NSW
Defence - NEWINGTON [10648]	NSW
Defence - NEWINGTON [10247]	NSW
Defence - NEWINGTON [10709]	NSW
Defence - NEWINGTON [10836]	NSW
Defence - NEWINGTON [10619]	NSW
Defence - NEWINGTON [10331]	NSW
Defence - NEWINGTON [10649]	NSW
Defence - NEWINGTON [11030]	NSW
Defence - NEWINGTON [10333]	NSW
Defence - NEWINGTON [11032]	NSW
Defence - NEWINGTON [11033]	NSW
Defence - NEWINGTON [10578]	NSW
Defence - NEWINGTON [11038]	NSW
Defence - NEWINGTON [11039]	NSW
Defence - NEWINGTON [10403]	NSW
Defence - NEWINGTON [10402]	NSW
Defence - NEWINGTON [10332]	NSW
Defence - NEWINGTON [10832]	NSW
Defence - NEWINGTON [10407]	NSW
Defence - NEWINGTON [10833]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10406]	NSW
Defence - NEWINGTON [10834]	NSW
Defence - NEWINGTON [10401]	NSW
Defence - NEWINGTON [10835]	NSW
Defence - NEWINGTON [10400]	NSW
Defence - NEWINGTON [10937]	NSW
Defence - NEWINGTON [10800]	NSW
Defence - NEWINGTON [10936]	NSW
Defence - NEWINGTON [10615]	NSW
Defence - NEWINGTON [10939]	NSW
Defence - NEWINGTON [10409]	NSW
Defence - NEWINGTON [10831]	NSW
Defence - NEWINGTON [10405]	NSW
Defence - NEWINGTON [11034]	NSW
Defence - NEWINGTON [10336]	NSW
Defence - NEWINGTON [11035]	NSW
Defence - NEWINGTON [10337]	NSW
Defence - NEWINGTON [10484]	NSW
Defence - NEWINGTON [10334]	NSW
Defence - NEWINGTON [10485]	NSW
Defence - NEWINGTON [10335]	NSW
Defence - NEWINGTON [10935]	NSW
Defence - NEWINGTON [10802]	NSW
Defence - NEWINGTON [10932]	NSW
Defence - NEWINGTON [10637]	NSW
Defence - NEWINGTON [11036]	NSW
Defence - NEWINGTON [10338]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10934]	NSW
Defence - NEWINGTON [10339]	NSW
Defence - NEWINGTON [10483]	NSW
Defence - NEWINGTON [10249]	NSW
Defence - NEWINGTON [10839]	NSW
Defence - NEWINGTON [10486]	NSW
Defence - NEWINGTON [10487]	NSW
Defence - NEWINGTON [10480]	NSW
Defence - NEWINGTON [10481]	NSW
Defence - NEWINGTON [10952]	NSW
Defence - NEWINGTON [10953]	NSW
Defence - NEWINGTON [10995]	NSW
Defence - NEWINGTON [10942]	NSW
Defence - NEWINGTON [10999]	NSW
Defence - NEWINGTON [10814]	NSW
Defence - NEWINGTON [10998]	NSW
Defence - NEWINGTON [10818]	NSW
Defence - NEWINGTON [10994]	NSW
Defence - NEWINGTON [10950]	NSW
Defence - NEWINGTON [10852]	NSW
Defence - NEWINGTON [10813]	NSW
Defence - NEWINGTON [10855]	NSW
Defence - NEWINGTON [10959]	NSW
Defence - NEWINGTON [10755]	NSW
Defence - NEWINGTON [10815]	NSW
Defence - NEWINGTON [10857]	NSW
Defence - NEWINGTON [10812]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10854]	NSW
Defence - NEWINGTON [10710]	NSW
Defence - NEWINGTON [10499]	NSW
Defence - NEWINGTON [10884]	NSW
Defence - NEWINGTON [10498]	NSW
Defence - NEWINGTON [10717]	NSW
Defence - NEWINGTON [10269]	NSW
Defence - NEWINGTON [10714]	NSW
Defence - NEWINGTON [10324]	NSW
Defence - NEWINGTON [10651]	NSW
Defence - NEWINGTON [10716]	NSW
Defence - NEWINGTON [10592]	NSW
Defence - NEWINGTON [10345]	NSW
Defence - NEWINGTON [11018]	NSW
Defence - NEWINGTON [10652]	NSW
Defence - NEWINGTON [10654]	NSW
Defence - NEWINGTON [10268]	NSW
Defence - NEWINGTON [10265]	NSW
Defence - NEWINGTON [10264]	NSW
Defence - NEWINGTON [10267]	NSW
Defence - NEWINGTON [10886]	NSW
Defence - NEWINGTON [10261]	NSW
Defence - NEWINGTON [10260]	NSW
Defence - NEWINGTON [11019]	NSW
Defence - NEWINGTON [11016]	NSW
Defence - NEWINGTON [11017]	NSW
Defence - NEWINGTON [11014]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [11015]	NSW
Defence - NEWINGTON [11012]	NSW
Defence - NEWINGTON [11013]	NSW
Defence - NEWINGTON [11010]	NSW
Defence - NEWINGTON [11011]	NSW
Defence - NEWINGTON [10951]	NSW
Defence - NEWINGTON [10507]	NSW
Defence - NEWINGTON [10949]	NSW
Defence - NEWINGTON [10889]	NSW
Defence - NEWINGTON [10888]	NSW
Defence - NEWINGTON [10527]	NSW
Defence - NEWINGTON [10344]	NSW
Defence - NEWINGTON [10846]	NSW
Defence - NEWINGTON [10947]	NSW
Defence - NEWINGTON [10521]	NSW
Defence - NEWINGTON [10669]	NSW
Defence - NEWINGTON [10650]	NSW
Defence - NEWINGTON [10611]	NSW
Defence - NEWINGTON [10840]	NSW
Defence - NEWINGTON [10305]	NSW
Defence - NEWINGTON [10304]	NSW
Defence - NEWINGTON [10309]	NSW
Defence - NEWINGTON [10308]	NSW
Defence - NEWINGTON [10301]	NSW
Defence - NEWINGTON [10300]	NSW
Defence - NEWINGTON [10307]	NSW
Defence - NEWINGTON [10306]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10954]	NSW
Defence - NEWINGTON [10379]	NSW
Defence - NEWINGTON [10329]	NSW
Defence - NEWINGTON [10957]	NSW
Defence - NEWINGTON [10956]	NSW
Defence - NEWINGTON [10881]	NSW
Defence - NEWINGTON [10397]	NSW
Defence - NEWINGTON [10448]	NSW
Defence - NEWINGTON [10328]	NSW
Defence - NEWINGTON [10291]	NSW
Defence - NEWINGTON [10290]	NSW
Defence - NEWINGTON [10806]	NSW
Defence - NEWINGTON [10805]	NSW
Defence - NEWINGTON [10626]	NSW
Defence - NEWINGTON [10299]	NSW
Defence - NEWINGTON [10901]	NSW
Defence - NEWINGTON [10248]	NSW
Defence - NEWINGTON [10488]	NSW
Defence - NEWINGTON [10365]	NSW
Defence - NEWINGTON [10856]	NSW
Defence - NEWINGTON [10801]	NSW
Defence - NEWINGTON [10803]	NSW
Defence - NEWINGTON [10583]	NSW
Defence - NEWINGTON [10624]	NSW
Defence - NEWINGTON [10326]	NSW
Defence - NEWINGTON [10584]	NSW
Defence - NEWINGTON [10327]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10588]	NSW
Defence - NEWINGTON [10389]	NSW
Defence - NEWINGTON [10589]	NSW
Defence - NEWINGTON [10325]	NSW
Defence - NEWINGTON [10587]	NSW
Defence - NEWINGTON [10322]	NSW
Defence - NEWINGTON [10580]	NSW
Defence - NEWINGTON [10585]	NSW
Defence - NEWINGTON [10320]	NSW
Defence - NEWINGTON [10586]	NSW
Defence - NEWINGTON [10321]	NSW
Defence - NEWINGTON [10581]	NSW
Defence - NEWINGTON [10582]	NSW
Defence - NEWINGTON [10478]	NSW
Defence - NEWINGTON [10479]	NSW
Defence - NEWINGTON [10286]	NSW
Defence - NEWINGTON [10381]	NSW
Defence - NEWINGTON [10386]	NSW
Defence - NEWINGTON [10387]	NSW
Defence - NEWINGTON [10385]	NSW
Defence - NEWINGTON [10382]	NSW
Defence - NEWINGTON [10383]	NSW
Defence - NEWINGTON [10380]	NSW
Defence - NEWINGTON [10808]	NSW
Defence - NEWINGTON [10510]	NSW
Defence - NEWINGTON [10567]	NSW
Defence - NEWINGTON [10824]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10678]	NSW
Defence - NEWINGTON [10670]	NSW
Defence - NEWINGTON [10671]	NSW
Defence - NEWINGTON [10672]	NSW
Defence - NEWINGTON [10673]	NSW
Defence - NEWINGTON [10388]	NSW
Defence - NEWINGTON [10471]	NSW
Defence - NEWINGTON [10679]	NSW
Defence - NEWINGTON [10930]	NSW
Defence - NEWINGTON [10500]	NSW
Defence - NEWINGTON [10469]	NSW
Defence - NEWINGTON [10754]	NSW
Defence - NEWINGTON [10502]	NSW
Defence - NEWINGTON [11069]	NSW
Defence - NEWINGTON [10501]	NSW
Defence - NEWINGTON [10756]	NSW
Defence - NEWINGTON [10463]	NSW
Defence - NEWINGTON [10757]	NSW
Defence - NEWINGTON [10503]	NSW
Defence - NEWINGTON [10750]	NSW
Defence - NEWINGTON [10751]	NSW
Defence - NEWINGTON [10753]	NSW
Defence - NEWINGTON [10752]	NSW
Defence - NEWINGTON [10614]	NSW
Defence - NEWINGTON [10917]	NSW
Defence - NEWINGTON [10263]	NSW
Defence - NEWINGTON [10262]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10504]	NSW
Defence - NEWINGTON [10505]	NSW
Defence - NEWINGTON [11066]	NSW
Defence - NEWINGTON [11067]	NSW
Defence - NEWINGTON [11064]	NSW
Defence - NEWINGTON [11065]	NSW
Defence - NEWINGTON [10788]	NSW
Defence - NEWINGTON [11068]	NSW
Defence - NEWINGTON [11063]	NSW
Defence - NEWINGTON [11062]	NSW
Defence - NEWINGTON [11061]	NSW
Defence - NEWINGTON [11060]	NSW
Defence - NEWINGTON [10590]	NSW
Defence - NEWINGTON [10396]	NSW
Defence - NEWINGTON [10662]	NSW
Defence - NEWINGTON [10314]	NSW
Defence - NEWINGTON [10506]	NSW
Defence - NEWINGTON [10312]	NSW
Defence - NEWINGTON [10316]	NSW
Defence - NEWINGTON [10317]	NSW
Defence - NEWINGTON [10313]	NSW
Defence - NEWINGTON [10310]	NSW
Defence - NEWINGTON [10574]	NSW
Defence - NEWINGTON [10577]	NSW
Defence - NEWINGTON [10575]	NSW
Defence - NEWINGTON [10474]	NSW
Defence - NEWINGTON [10473]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10472]	NSW
Defence - NEWINGTON [10579]	NSW
Defence - NEWINGTON [10477]	NSW
Defence - NEWINGTON [10476]	NSW
Defence - NEWINGTON [10475]	NSW
Defence - NEWINGTON [10270]	NSW
Defence - NEWINGTON [10271]	NSW
Defence - NEWINGTON [10277]	NSW
Defence - NEWINGTON [10276]	NSW
Defence - NEWINGTON [10570]	NSW
Defence - NEWINGTON [10571]	NSW
Defence - NEWINGTON [10572]	NSW
Defence - NEWINGTON [10573]	NSW
Defence - NEWINGTON [10298]	NSW
Defence - NEWINGTON [10517]	NSW
Defence - NEWINGTON [10296]	NSW
Defence - NEWINGTON [10297]	NSW
Defence - NEWINGTON [10294]	NSW
Defence - NEWINGTON [10295]	NSW
Defence - NEWINGTON [10292]	NSW
Defence - NEWINGTON [10293]	NSW
Defence - NEWINGTON [10392]	NSW
Defence - NEWINGTON [10393]	NSW
Defence - NEWINGTON [10390]	NSW
Defence - NEWINGTON [10391]	NSW
Defence - NEWINGTON [10819]	NSW
Defence - NEWINGTON [10394]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10399]	NSW
Defence - NEWINGTON [10461]	NSW
Defence - NEWINGTON [10398]	NSW
Defence - NEWINGTON [10462]	NSW
Defence - NEWINGTON [10646]	NSW
Defence - NEWINGTON [10746]	NSW
Defence - NEWINGTON [10315]	NSW
Defence - NEWINGTON [10668]	NSW
Defence - NEWINGTON [10882]	NSW
Defence - NEWINGTON [10464]	NSW
Defence - NEWINGTON [10465]	NSW
Defence - NEWINGTON [10509]	NSW
Defence - NEWINGTON [10467]	NSW
Defence - NEWINGTON [11042]	NSW
Defence - NEWINGTON [10284]	NSW
Defence - NEWINGTON [10522]	NSW
Defence - NEWINGTON [10523]	NSW
Defence - NEWINGTON [10520]	NSW
Defence - NEWINGTON [10287]	NSW
Defence - NEWINGTON [10285]	NSW
Defence - NEWINGTON [10593]	NSW
Defence - NEWINGTON [10288]	NSW
Defence - NEWINGTON [10665]	NSW
Defence - NEWINGTON [10526]	NSW
Defence - NEWINGTON [10598]	NSW
Defence - NEWINGTON [10524]	NSW
Defence - NEWINGTON [10594]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10525]	NSW
Defence - NEWINGTON [10595]	NSW
Defence - NEWINGTON [10543]	NSW
Defence - NEWINGTON [10361]	NSW
Defence - NEWINGTON [10663]	NSW
Defence - NEWINGTON [10360]	NSW
Defence - NEWINGTON [10749]	NSW
Defence - NEWINGTON [10599]	NSW
Defence - NEWINGTON [10613]	NSW
Defence - NEWINGTON [10612]	NSW
Defence - NEWINGTON [10816]	NSW
Defence - NEWINGTON [10817]	NSW
Defence - NEWINGTON [10429]	NSW
Defence - NEWINGTON [10617]	NSW
Defence - NEWINGTON [10616]	NSW
Defence - NEWINGTON [10758]	NSW
Defence - NEWINGTON [10759]	NSW
Defence - NEWINGTON [10895]	NSW
Defence - NEWINGTON [10440]	NSW
Defence - NEWINGTON [10892]	NSW
Defence - NEWINGTON [10443]	NSW
Defence - NEWINGTON [10896]	NSW
Defence - NEWINGTON [10897]	NSW
Defence - NEWINGTON [10441]	NSW
Defence - NEWINGTON [10454]	NSW
Defence - NEWINGTON [10444]	NSW
Defence - NEWINGTON [10898]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10447]	NSW
Defence - NEWINGTON [10893]	NSW
Defence - NEWINGTON [10442]	NSW
Defence - NEWINGTON [10891]	NSW
Defence - NEWINGTON [10445]	NSW
Defence - NEWINGTON [10880]	NSW
Defence - NEWINGTON [10691]	NSW
Defence - NEWINGTON [10690]	NSW
Defence - NEWINGTON [10446]	NSW
Defence - NEWINGTON [10697]	NSW
Defence - NEWINGTON [10449]	NSW
Defence - NEWINGTON [10696]	NSW
Defence - NEWINGTON [10519]	NSW
Defence - NEWINGTON [10451]	NSW
Defence - NEWINGTON [10256]	NSW
Defence - NEWINGTON [10723]	NSW
Defence - NEWINGTON [10664]	NSW
Defence - NEWINGTON [10722]	NSW
Defence - NEWINGTON [10721]	NSW
Defence - NEWINGTON [10720]	NSW
Defence - NEWINGTON [10694]	NSW
Defence - NEWINGTON [10373]	NSW
Defence - NEWINGTON [10695]	NSW
Defence - NEWINGTON [10600]	NSW
Defence - NEWINGTON [10257]	NSW
Defence - NEWINGTON [10601]	NSW
Defence - NEWINGTON [10666]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10724]	NSW
Defence - NEWINGTON [10602]	NSW
Defence - NEWINGTON [10363]	NSW
Defence - NEWINGTON [10377]	NSW
Defence - NEWINGTON [10370]	NSW
Defence - NEWINGTON [10371]	NSW
Defence - NEWINGTON [10453]	NSW
Defence - NEWINGTON [10372]	NSW
Defence - NEWINGTON [10829]	NSW
Defence - NEWINGTON [10422]	NSW
Defence - NEWINGTON [10368]	NSW
Defence - NEWINGTON [10375]	NSW
Defence - NEWINGTON [10366]	NSW
Defence - NEWINGTON [10376]	NSW
Defence - NEWINGTON [10513]	NSW
Defence - NEWINGTON [10883]	NSW
Defence - NEWINGTON [10458]	NSW
Defence - NEWINGTON [10860]	NSW
Defence - NEWINGTON [10511]	NSW
Defence - NEWINGTON [10885]	NSW
Defence - NEWINGTON [10459]	NSW
Defence - NEWINGTON [10858]	NSW
Defence - NEWINGTON [10456]	NSW
Defence - NEWINGTON [10887]	NSW
Defence - NEWINGTON [10457]	NSW
Defence - NEWINGTON [10859]	NSW
Defence - NEWINGTON [10455]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10908]	NSW
Defence - NEWINGTON [10452]	NSW
Defence - NEWINGTON [10909]	NSW
Defence - NEWINGTON [10902]	NSW
Defence - NEWINGTON [10870]	NSW
Defence - NEWINGTON [10903]	NSW
Defence - NEWINGTON [10877]	NSW
Defence - NEWINGTON [10871]	NSW
Defence - NEWINGTON [10514]	NSW
Defence - NEWINGTON [10686]	NSW
Defence - NEWINGTON [10692]	NSW
Defence - NEWINGTON [10687]	NSW
Defence - NEWINGTON [10693]	NSW
Defence - NEWINGTON [10684]	NSW
Defence - NEWINGTON [10698]	NSW
Defence - NEWINGTON [10685]	NSW
Defence - NEWINGTON [10699]	NSW
Defence - NEWINGTON [10362]	NSW
Defence - NEWINGTON [10874]	NSW
Defence - NEWINGTON [10875]	NSW
Defence - NEWINGTON [10894]	NSW
Defence - NEWINGTON [10876]	NSW
Defence - NEWINGTON [11070]	NSW
Defence - NEWINGTON [10515]	NSW
Defence - NEWINGTON [10609]	NSW
Defence - NEWINGTON [10516]	NSW
Defence - NEWINGTON [10810]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10726]	NSW
Defence - NEWINGTON [10606]	NSW
Defence - NEWINGTON [10725]	NSW
Defence - NEWINGTON [10607]	NSW
Defence - NEWINGTON [10728]	NSW
Defence - NEWINGTON [10604]	NSW
Defence - NEWINGTON [10727]	NSW
Defence - NEWINGTON [10605]	NSW
Defence - NEWINGTON [10941]	NSW
Defence - NEWINGTON [10729]	NSW
Defence - NEWINGTON [10603]	NSW
Defence - NEWINGTON [10969]	NSW
Defence - NEWINGTON [10968]	NSW
Defence - NEWINGTON [11045]	NSW
Defence - NEWINGTON [11047]	NSW
Defence - NEWINGTON [10967]	NSW
Defence - NEWINGTON [10966]	NSW
Defence - NEWINGTON [10961]	NSW
Defence - NEWINGTON [10960]	NSW
Defence - NEWINGTON [10963]	NSW
Defence - NEWINGTON [10962]	NSW
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Defence - NEWINGTON [10680]	NSW
Defence - NEWINGTON [10958]	NSW
Defence - NEWINGTON [10682]	NSW
Defence - NEWINGTON [10681]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10683]	NSW
Defence - NEWINGTON [10867]	NSW
Defence - NEWINGTON [10828]	NSW
Defence - NEWINGTON [10776]	NSW
Defence - NEWINGTON [10899]	NSW
Defence - NEWINGTON [10450]	NSW
Defence - NEWINGTON [10760]	NSW
Defence - NEWINGTON [11041]	NSW
Defence - NEWINGTON [11040]	NSW
Defence - NEWINGTON [11046]	NSW
Defence - NEWINGTON [11048]	NSW
Defence - NEWINGTON [10518]	NSW
Defence - NEWINGTON [11043]	NSW
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Defence - NEWINGTON [10866]	NSW
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Defence - NEWINGTON [10868]	NSW
Defence - NEWINGTON [10311]	NSW
Defence - NEWINGTON [10618]	NSW
Defence - NEWINGTON [10639]	NSW
Defence - NEWINGTON [10342]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10743]	NSW
Defence - NEWINGTON [10804]	NSW
Defence - NEWINGTON [10740]	NSW
Defence - NEWINGTON [10347]	NSW
Defence - NEWINGTON [10346]	NSW
Defence - NEWINGTON [10742]	NSW
Defence - NEWINGTON [10789]	NSW
Defence - NEWINGTON [10341]	NSW
Defence - NEWINGTON [10340]	NSW
Defence - NEWINGTON [10343]	NSW
Defence - NEWINGTON [10539]	NSW
Defence - NEWINGTON [10537]	NSW
Defence - NEWINGTON [10536]	NSW
Defence - NEWINGTON [10538]	NSW
Defence - NEWINGTON [10534]	NSW
Defence - NEWINGTON [10533]	NSW
Defence - NEWINGTON [10532]	NSW
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Defence - NEWINGTON [10660]	NSW
Defence - NEWINGTON [10748]	NSW
Defence - NEWINGTON [10633]	NSW
Defence - NEWINGTON [10667]	NSW

Commonwealth Land Name	State
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Defence - NEWINGTON [11044]	NSW
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Defence - NEWINGTON [10659]	NSW
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Defence - NEWINGTON [10432]	NSW
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Defence - NEWINGTON [10553]	NSW
Defence - NEWINGTON [10550]	NSW
Defence - NEWINGTON [10551]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10251]	NSW
Defence - NEWINGTON [10250]	NSW
Defence - NEWINGTON [10253]	NSW
Defence - NEWINGTON [10252]	NSW
Defence - NEWINGTON [10411]	NSW
Defence - NEWINGTON [10416]	NSW
Defence - NEWINGTON [10419]	NSW
Defence - NEWINGTON [10412]	NSW
Defence - NEWINGTON [10413]	NSW
Defence - NEWINGTON [10559]	NSW
Defence - NEWINGTON [10410]	NSW
Defence - NEWINGTON [10558]	NSW
Defence - NEWINGTON [10428]	NSW
Defence - NEWINGTON [10708]	NSW
Defence - NEWINGTON [10493]	NSW
Defence - NEWINGTON [10418]	NSW
Defence - NEWINGTON [10254]	NSW
Defence - NEWINGTON [10837]	NSW
Defence - NEWINGTON [10921]	NSW
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Defence - NEWINGTON [10926]	NSW
Defence - NEWINGTON [10255]	NSW
Defence - NEWINGTON [10701]	NSW
Defence - NEWINGTON [10703]	NSW

Commonwealth Land Name	State
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Defence - NEWINGTON [10702]	NSW
Defence - NEWINGTON [10929]	NSW
Defence - NEWINGTON [10707]	NSW
Defence - NEWINGTON [10704]	NSW
Defence - NEWINGTON [10349]	NSW
Defence - NEWINGTON [10706]	NSW
Defence - NEWINGTON [10348]	NSW
Defence - NEWINGTON [10991]	NSW
Defence - NEWINGTON [10992]	NSW
Defence - NEWINGTON [10993]	NSW
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Defence - NEWINGTON [10797]	NSW
Defence - NEWINGTON [10791]	NSW
Defence - NEWINGTON [10790]	NSW
Defence - NEWINGTON [10414]	NSW
Defence - NEWINGTON [10415]	NSW
Defence - NEWINGTON [10795]	NSW
Defence - NEWINGTON [10556]	NSW
Defence - NEWINGTON [10794]	NSW
Defence - NEWINGTON [10555]	NSW
Defence - NEWINGTON [10793]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10792]	NSW
Defence - NEWINGTON [10557]	NSW
Defence - NEWINGTON [10838]	NSW
Defence - NEWINGTON [10811]	NSW
Defence - NEWINGTON [10768]	NSW
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Defence - NEWINGTON [10739]	NSW
Defence - NEWINGTON [10879]	NSW
Defence - NEWINGTON [10738]	NSW
Defence - NEWINGTON [10282]	NSW
Defence - NEWINGTON [11037]	NSW
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Defence - NEWINGTON [10853]	NSW
Defence - NEWINGTON [10873]	NSW
Defence - NEWINGTON [10872]	NSW
Defence - NEWINGTON [10878]	NSW
Defence - NEWINGTON [10735]	NSW
Defence - NEWINGTON [10258]	NSW
Defence - NEWINGTON [10734]	NSW
Defence - NEWINGTON [10528]	NSW
Defence - NEWINGTON [10529]	NSW
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Defence - NEWINGTON [10731]	NSW
Defence - NEWINGTON [10737]	NSW
Defence - NEWINGTON [10733]	NSW
Defence - NEWINGTON [10732]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10318]	NSW
Defence - NEWINGTON [10900]	NSW
Defence - NEWINGTON [10319]	NSW
Defence - NEWINGTON [10378]	NSW
Defence - NEWINGTON [10374]	NSW
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Defence - NEWINGTON [10426]	NSW
Defence - NEWINGTON [10425]	NSW
Defence - NEWINGTON [10367]	NSW
Defence - NEWINGTON [10547]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10356]	NSW
Defence - NEWINGTON [10546]	NSW
Defence - NEWINGTON [10545]	NSW
Defence - NEWINGTON [10544]	NSW
Defence - NEWINGTON [11021]	NSW
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Defence - NEWINGTON [10535]	NSW
Defence - NEWINGTON [10915]	NSW
Defence - NEWINGTON [10359]	NSW
Defence - NEWINGTON [10916]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10350]	NSW
Defence - NEWINGTON [10351]	NSW
Defence - NEWINGTON [10914]	NSW
Defence - NEWINGTON [10353]	NSW
Defence - NEWINGTON [10352]	NSW
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Defence - NEWINGTON [10983]	NSW
Defence - NEWINGTON [10984]	NSW
Defence - NEWINGTON [10985]	NSW
Defence - NEWINGTON [10986]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10494]	NSW
Defence - NEWINGTON [10495]	NSW
Defence - NEWINGTON [10711]	NSW
Defence - NEWINGTON [10982]	NSW
Defence - NEWINGTON [11058]	NSW
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Defence - NEWINGTON [10850]	NSW
Defence - NEWINGTON [10460]	NSW
Defence - NEWINGTON [10621]	NSW
Defence - NEWINGTON [10625]	NSW

Commonwealth Land Name	State
Defence - NEWINGTON [10627]	NSW
Defence - NEWINGTON [10628]	NSW
Defence - NEWINGTON [10629]	NSW
Defence - NEWINGTON [10508]	NSW
Defence - NEWINGTON [10622]	NSW
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Defence - NEWINGTON [10807]	NSW
Defence - NEWINGTON [10970]	NSW
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Defence - NEWINGTON [10972]	NSW
Defence - NEWINGTON [10796]	NSW
Defence - NEWINGTON [10977]	NSW
Defence - NEWINGTON [10974]	NSW
Defence - NEWINGTON [10798]	NSW
Defence - NEWINGTON [10971]	NSW
Defence - NEWINGTON [10799]	NSW
Defence - NEWINGTON [10976]	NSW
Defence - TIMOR BARRACKS - DUNDAS [11096]	NSW
Defence - TIMOR BARRACKS - DUNDAS [11097]	NSW
Defence - Defence Housing Authority	

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [13012]	NSW
Unknown	
Commonwealth Land - [16420]	NSW
Commonwealth Land - [13016]	NSW
Commonwealth Land - [13017]	NSW
Commonwealth Land - [13013]	NSW

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Foraging, feeding or related behaviour known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Foraging, feeding or related behaviour known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area
Sterna striata White-fronted Tern [799]		Migration route may occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Newington	Nature Reserve	NSW

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Bicentennial Park	NSW
Newington Wetlands	NSW

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Parramatta Light Rail Stage 2	2022/09300		Post-Approval

Controlled action

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Shell Clyde Terminal Expansion, Rosehill, NSW	2013/6878	Controlled Action	Post-Approval
Not controlled action			
Clyde Barging Facility, Grand Avenue, Rosehill, NSW	2018/8140	Not Controlled Action	Completed
construct access road and install underground water main	2005/2299	Not Controlled Action	Completed
Construction and Operation of the Parramatta Rail Link - between Parramatta and	2002/673	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Parramatta Light Rail (Stage 1) - Westmead to Carlingford, via Parramatta CBD	2017/7966	Not Controlled Action	Completed
Residential subdivision, cnr Doris Hirst Place and Highs Road	2005/2392	Not Controlled Action	Completed
Residential subdivision works, Spurway St, Ermington	2003/1130	Not Controlled Action	Completed
subdivision and development on the Rhodes Peninsula for residential and commerci	2003/1249	Not Controlled Action	Completed
Subdivision and sale of Commonwealth land in Pymble to Ku-ring-gai City Council	2004/1368	Not Controlled Action	Completed
Subdivision for warehouse construction	2000/119	Not Controlled Action	Completed
Sydney Metro Network Stage 2	2010/5307	Not Controlled Action	Completed
V8 Supercars "Sydney 400" Event	2009/4782	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Replacement of flows with recycled water	2006/3050	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Rhodes 132/11 kV Zone Substation	2010/5779	Not Controlled Action (Particular Manner)	Post-Approval

Bioregional Assessments

[Resource Information]

SubRegion	BioRegion	Website
Sydney	Sydney Basin	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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APPENDIX B Assessments of MNES

This appendix provides information on the assessment of impacts to EPBC-listed entities, including assessments of the significance of impacts to those entities. None of the MNES that may or will be impacted by the project are likely to be significantly impacted; therefore, Referral to the Minister is not required. All MNES impacted by the project are also listed under the BC Act. Accordingly, under the NSW Assessment Bilateral Agreement between NSW and the Commonwealth Government, MNES can be and have been assessed in this BDAR under the BAM.

Directly below there is a table summarising all impacts to MNES recorded within the subject land (TECs and species credit species) or are assumed to occur in the subject land (ecosystem credit species). Significant impact assessments for each MNES that is reasonably likely to occur within the subject land follow.

Table B-1: Summary table for assessment of predicted impacts on EPBC Act-listed threatened species and communities

Threatened species/community listed under the EPBC Act	PCTs associated with the ecosystem credit species / ecological community	Area of predicted impact (ha)	Credits required	Offsetting approach	Section reference
River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria CEEC	PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.02	One (1) ecosystem credit required for that portion of the PCT meeting EPBC condition thresholds.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.1. The Significant Impact Assessment for the species is below in this Appendix.
Australasian Bittern (*Botaurus poiciloptus*)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.
Curlew Sandpiper (*Calidris ferruginea*)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2 and Section 9.1.5. Impacts to the species are also assessed in Section 11. The Significant Impact Assessment for the species is below in this Appendix.
White-throated Needletail (*Hirundapus caudacutus*)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.
Swift Parrot (*Lathamus discolor*)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.

Bar-tailed Godwit (***Limosa lapponica baueri***)	This species is not associated with a PCT in the subject land. Rather, it has Important Habitat Mapping in the Parramatta River.	n/a	n/a	n/a	Impacts are summarised in Section 9.1.5.
Green and Golden Bell Frog (***Litoria aurea***)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	One (1) species credits required for impacts to habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.
Grey-headed Flying-fox (***Pteropus poliocephalus***)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.
Australian Painted Snipe (***Rostratula australis***)	PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.
Migratory bird species • **Common Sandpiper** (***Actitis hypoleucos***) • **Ruddy Turnstone** (***Arenaria interpres***) • **Sharp-tailed Sandpiper** (***Calidris acuminata***) • **Red Knot** (***Calidris canutus***) • **Curlew Sandpiper** (***Calidris ferruginea***) • **Pectoral Sandpiper** (***Calidris melanotos***) • **Ruff** (***Calidris pugnax***)	EPBC-listed migratory bird species are not associated with a PCT within the subject land unless otherwise listed under the BC Act (Curlew Sandpiper, Bar-tailed Godwit, Osprey). However, they may roost within PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest The Curlew Sandpiper and Osprey are associated with PCT 4028: Estuarine Swamp Oak Twig-rush Forest and PCT 4058: Sydney Hinterland Red Gum Riverflat Forest	0.18	Three (3) ecosystem credits required for PCTs with habitat for the BC Act-listed species.	Market-based option such as payment to the Biodiversity Conservation Fund	Impacts are summarised at Section 9.2.2. The Significant Impact Assessment for the species is below in this Appendix.

- **Red-necked Stint (*Calidris ruficollis*)**
- **Great Knot (*Calidris tenuirostris*)**
- **Double-banded plover (*Charadrius bicinctus*)**
- **Greater Sand Plover (*Charadrius leschenaultia*)**
- **Siberian Sand Plover (*Charadrius mongolus*)**
- **Latham's Snipe (*Gallinago hardwickii*)**
- **Swinhoe's Snipe (*Gallinago megala*)**
- **Pin-tailed Snipe (*Gallinago stenura*)**
- **Bar-tailed Godwit (*Limosa lapponica*)**
- **Black-tailed Godwit (*Limosa limosa*)**
- **Eastern Curlew (*Numenius madagascariensis*)**
- **Little Curlew (*Numenius minutus*)**
- **Eurasian Whimbrel (*Numenius phaeopus*)**
- **Osprey (*Pandion haliaetus*)**
- **Pacific Golden Plover (*Pluvialis fulva*)**
- **Grey-tailed Tattler (*Tringa brevipes*)**

- **Common Greenshank (*Tringa nebularia*)**
- **Marsh Sandpiper (*Tringa stagnatilis*)**

Australasian Bittern (*Botaurus poiciloptilus*)

Australasian Bittern ecology

The Australasian Bittern (*Botaurus poiciloptilus*) is listed as Endangered under the EPBC Act and NSW BC Act.

The distribution of the Australasian Bittern ranges from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the southwest of Western Australia. In New South Wales, it occurs along the coast and is also frequently recorded in the Murray Darling Basin, notably in floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers.

The Australasian Bittern favours wetlands with tall, dense vegetation but will inhabit modified environments such as rice fields. Its diet consists of aquatic animals including small fish, frogs, spiders and small reptiles. The Australasian Bittern is capable of moving between habitats as suitability changes.

The Australasian Bittern is generally solitary but sometimes occurs in pairs or dispersed aggregations of up to 12 birds. The Australasian Bittern breeds from October to February in solitary pairs. However, sometimes several nests may be placed in close proximity to each other. The species nests adjacent to relatively deep, densely vegetated freshwater swamps and pools, building its nests under dense cover over shallow water. The species prefers to nest in vegetation that is up to 2.5 m tall and the nests are placed about 30 cm above the water level. The nest is a shallow structure of dry or green reeds, within a clump of reeds in water or a swamp and is built on a platform of bent-over reeds.

The Australasian Bittern appears to be capable of moving between habitats as suitability changes. The species can occur in high densities in temporary or infrequently filled wetlands during exceptionally wet years and will also use ephemeral wetlands when moving from areas that are drying out. The species also frequently utilises artificial habitats such as rice fields.

The key threats to this species include:

- Habitat loss through water reductions
- Increased salinity, siltation and pollution
- Grazing by livestock and feral animals
- Urban development

Australasian Bittern habitat in the subject land

The desktop assessment identified 8 BioNet records of Australasian Bittern within 10 km of the subject land with the majority of the sightings occurring around wetland areas at Sydney Olympic Park. Therefore, the subject land may be providing or is adjacent to foraging and breeding habitat for Australasian Bitterns in the region.

Within the subject land, two Plant Community Types (PCTs) associated with the Australasian Bittern occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with breeding and foraging habitat for this species.

Australasian Bittern SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Endangered species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of a population	**Australasian Bittern – unlikely** A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion. There are 8 BioNet records of Australasian Bittern within 10 km the subject land, with the last records identified in 2013. No Australasian Bitterns were identified in the subject land during the current surveys. A total of 0.18 ha of vegetation associated with Australasian Bittern breeding and foraging habitat (0.06 ha of PCT 4028 and 0.12 ha of PCT 4058) may be impacted within the subject land. The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD. The removal of 0.18 ha of vegetation is unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of the species	**Australasian Bittern – unlikely** While the subject land may provide breeding and foraging habitat, no Australasian Bitterns were identified during surveys. Additionally, the latest records of Australasian Bittern within 10 km of the subject land are from 2013. The removal of 0.18 ha of associated vegetation is unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	**Australasian Bittern – unlikely** No population of Australasian Bittern has been identified within the subject land. The Australasian Bittern is a highly mobile species that can readily fly between fragmented patches of habitat and are more likely to use areas within the avoided wetland habitat. The removal of 0.18 ha of vegetation is unlikely to fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Australasian Bittern – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community • Any natural wetland habitat where the species is known or likely to occur The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD and higher quality wetland habitat outside the subject land will not be impacted.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	The removal of 0.18 ha of vegetation is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	**Australasian Bittern – unlikely** No population of Australasian Bittern has been identified within the subject land. Additionally, the Australasian Bittern is a highly mobile species that can readily fly between fragmented patches of habitat and are more likely to use areas within the avoided wetland habitat. The removal of 0.18 ha of vegetation is unlikely to disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Australasian Bittern – unlikely** While 0.18 ha of potential habitat may be impacted in the subject land, given the availability of higher quality wetland habitat outside of the subject land and the small area of impact, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Australasian Bittern – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 of vegetation is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Australasian Bittern – unlikely** No disease has been identified as a threat to the Australasian Bittern. Additionally, no Australasian Bitterns were identified as occurring within the subject land. The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere with the recovery of the species.	**Australasian Bittern – unlikely** The objectives of the National Recovery Plan for the Australasian Bittern (CoA, 2022) are "to demonstrate, by 2032, an increasing trend (compared to 2020 baseline counts) in the number of mature individuals being recorded in annual surveys at key locations, and to ensure that habitat critical to the survival of the Australasian Bittern is protected and managed to meet the ecological requirements of the species." Habitat loss, predation and reduced water quality are listed as some of the current threats to the survival of the species. While the Project may impact 0.18 ha of habitat, this is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The Australasian Bittern was not identified within the subject land during current surveys. Though the Project may impact 0.18 ha of habitat, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

Curlew Sandpiper (*Calidris ferruginea*)

Curlew Sandpiper ecology

The Curlew Sandpiper (*Calidris ferruginea*) is listed as Critically Endangered under the EPBC Act and NSW BC Act.

The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration.
The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April.

It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds.

The key threats to this species include:

- Habitat loss, fragmentation and degradation
- Increased frequency and length of droughts
- Sea level rise

Curlew Sandpiper habitat in the subject land

The desktop assessment identified 348 BioNet records of Curlew Sandpiper within 10 km of the subject land with the majority of the sightings occurring around wetland and tidal areas around Sydney Olympic Park. Therefore, the subject land may be providing or is adjacent to foraging and roosting habitat for Curlew Sandpipers in the region.

Within the subject land, two PCTs associated with the Curlew Sandpiper occurs. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with roosting and foraging habitat for this species. Approximately 0.18 ha of these PCTs will be impacted by the project.

In addition, 2.93 ha of Important Habitat within and directly adjacent to the Parramatta River mapped for the Curlew Sandpiper will be impacted by the project. The project will construct a river release pipeline, which will split into eight smaller pipes below ground at Memorial Park. These eights pipes will enter the Parramatta River west of the rail bridge and extend 75 to 130 metres into the river. The shoreline will be temporarily impacted to facilitate the construction of the river release structure, with the sandstone wall being reconstructed when the project is completed. There is also a small construction compound on the eastern side of the John Whitton Bridge that overlaps with the IHM.

Potential impacts to the are likely limited to the shoreline either side of the rail bridge. Although the Parramatta River provides potential dispersal habitat for this species; the current use of the river is dominated by ferry and other maritime traffic, with ferries departing every 20 minutes from Meadowbank Wharf. Given this, the potential for this species to utilise the internal areas of the river for dispersal is unlikely.

The potential shoreline habitat is limited, consisting of a small beach and exposed rocky shoreline with limited riparian vegetation between the rail bridge and Meadowbank Wharf. This area is consistent with the definition of potential foraging habitat for the species, however there will be no direct impact to this habitat as construction will be restricted to the western side of the rail bridge. Potential indirect impacts could occur via wave action from construction activities within the Parramatta River or noise and vibration impacts from the adjacent construction compound C30; however, this is unlikely to be substantially greater than the wave activity already generated by ferries using the adjacent wharf or existing uses of C30 as an urban car park. The western side of the rail bridge consists of sandstone walls with no riparian vegetation and is unlikely to be utilised by these species for foraging. Regardless, the sandstone walls will be restored to their current state upon project completion.

Curlew Sandpiper SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Critically Endangered species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of a population	**Curlew Sandpiper – unlikely** A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion. There are 348 BioNet records of Curlew Sandpiper within 10 km the subject land, with the last records identified in 2021. No Curlew Sandpipers were identified in the subject land during the current surveys. A total of 0.18 ha of vegetation associated with Curlew Sandpiper roosting and foraging habitat (0.06 ha of PCT 4028 and 0.12 ha of PCT 4058) may be impacted within the subject land. The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD. A total of 2.93 ha of the Parramatta River and small sandy area immediately adjacent will be temporarily impacted during construction, but these impacts will be minor The removal of 0.18 ha of (ecosystem species credit) habitat and temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of the species	**Curlew Sandpiper – unlikely** While the subject land may provide roosting and foraging habitat, no Curlew Sandpiper were identified during surveys. Additionally, impacts to foraging areas such as tidal flats will mostly be avoided through HDD. This species is highly mobile and as such the removal of 0.18 ha of (ecosystem species credit) habitat and temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to significantly reduce the area of occupancy of the species.

Fragment an existing population into two or more populations	**Curlew Sandpiper – unlikely** No population of Curlew Sandpipers has been identified within the subject land during surveys. The Curlew Sandpiper is a highly mobile species that can readily fly between fragmented patches of habitat and are more likely to use areas within the avoided wetland habitat. The removal of removal of 0.18 ha of (ecosystem species credit) habitat and temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Curlew Sandpiper – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community Habitat critical to the survival of Curlew Sandpipers includes a mosaic of feeding and roosting habitat. While no Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat, the Curlew Sandpiper has important habitat mapped within the subject land. The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD and higher quality wetland habitat outside the subject land will not be impacted. The removal of 0.18 ha of (ecosystem species credit) habitat and temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	**Curlew Sandpiper – unlikely** The Curlew Sandpiper breeds in Siberia, and thus no impacts to the breeding cycle are expected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Curlew Sandpiper – unlikely** While 0.18 ha of potential habitat and 2.93 ha of Parramatta River habitat may be impacted in the subject land, given the availability of higher quality wetland habitat outside of the subject land and the small area of impact, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Curlew Sandpiper – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 ha of (ecosystem species credit) habitat and temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Curlew Sandpiper – unlikely** No disease has been identified as a threat to the Curlew Sandpiper. The Project is unlikely to introduce a disease that may cause the species to decline.

Interfere with the recovery of the species.	**Curlew Sandpiper – unlikely** The approved conservation advice for the Curlew Sandpiper (DCCEEW, 2023) lists the primary conservation objectives as: • Minimise further loss of habitat critical to the survival of curlew sandpiper throughout Australia (including habitat predicted to become habitat critical in the future because of climate change). • Prevent further declines in curlew sandpiper populations by working with relevant Range States to address threats in the East Asian-Australasian Flyway. While the Project may impact 0.18 ha of habitat, this is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The Curlew Sandpiper was not identified within the subject land during current surveys. Though the Project may impact 0.18 ha of (ecosystem species credit) habitat and temporarily impact 2.93 ha of Parramatta River habitat, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

White-throated Needletail (*Hirundapus caudacutus*)

White-throated Needletail ecology

The White-throated Needletail (*Hirundapus caudacutus*) is listed as Vulnerable under the EPBC Act and NSW BC Act.

The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. Further south on the mainland, it is widespread in Victoria, though more so on and south of the Great Dividing Range, and there are few records in western Victoria. The species occurs in adjacent areas of south-eastern South Australia, where it extends west to the Yorke Peninsula and the Mount Lofty Ranges. It is widespread in Tasmania.

The White-throated Needletail occurs over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they have been observed flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. The species roosts in trees amongst dense foliage in the canopy or in hollows.

White-throated Needletail do not breed in Australia.

The key threats to this species include:

- Habitat loss
- Wind turbines and overhead wires
- Poisoning

White-throated Needletail habitat in the subject land

The desktop assessment identified 26 BioNet records of White-throated Needletail within 10 km of the subject land with the majority of the sightings occurring around wetland areas around Sydney Olympic

Park. Therefore, the subject land may be providing or is adjacent to foraging and roosting habitat for White-throated Needletails in the region.

Within the subject land, two PCTs associated with the White-throated Needletail occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with roosting and foraging habitat for this species.

White-throated Needletail SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Vulnerable species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of an important population of a species	**White-throated Needletail – unlikely** An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal. • Populations that are necessary for maintaining genetic diversity and/or; • Populations that are near the limit of the species range. There are 26 BioNet records of White-throated Needletail within 10 km the subject land, with the last records identified in 2023. No White-throated Needletails were identified in the subject land during the current surveys and no important populations are listed as occurring in the subject land. A total of 0.18 ha of vegetation associated with White-throated Needletail roosting and foraging habitat (0.06 ha of PCT 4028 and 0.12 ha of PCT 4058) may be impacted within the subject land. The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD. The removal of 0.18 ha of vegetation is unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of an important population	**White-throated Needletail – unlikely** No important populations of White-throated Needletails have been identified in the subject land or individuals during the current surveys. While 0.18 ha of roosting and foraging habitat may be impacted, some impacts will be avoided through the use of HDD. This species is highly mobile and as such the removal of 0.18 ha of habitat is unlikely to significantly reduce the area of occupancy of an important population of this species.
Fragment an existing population into two or more populations	**White-throated Needletail – unlikely** No population of White-throated Needletails has been identified within the subject land during surveys. The White-throated Needletail is a highly mobile species that can readily fly between fragmented patches of habitat and are more likely to use areas within the avoided wetland habitat. The removal of up to 0.18 ha of habitat will not fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**White-throated Needletail – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	• for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD and higher quality wetland habitat outside the subject land will not be impacted. The removal of 0.18 ha of vegetation is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**White-throated Needletail – unlikely** The White-throated Needletail breeds in Siberia, and thus no impacts to the breeding cycle are expected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**White-throated Needletail – unlikely** While 0.18 ha of potential habitat may be impacted in the subject land, given the availability of higher quality wetland habitat outside of the subject land and the small area of impact, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**White-throated Needletail – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 of vegetation is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**White-throated Needletail – unlikely** No disease has been identified as a threat to the White-throated Needletail. The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere substantially with the recovery of the species.	**White-throated Needletail – unlikely** The approved conservation advice for the White-throated Needletail (TS Scientific Committee, 2019) lists the primary conservation objectives as: • Work with governments in East Asia to minimise destruction of key breeding habitats. • Important habitats in Australia are identified and protected. While the Project may impact 0.18 ha of habitat, this is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The White-throated Needletail was not identified within the subject land during current surveys. Though the Project may impact 0.18 ha of habitat, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

Swift Parrot (Lathamus discolor)

Swift Parrot ecology

The Swift Parrot (*Lathamus discolor*) is listed as Critically Endangered under the EPBC Act and Endangered under the NSW BC Act.

The Swift Parrot occurs as a single migratory population that breeds in Tasmania during spring and summer and migrates to the mainland in autumn and winter; extending from Victoria to the eastern parts of South Australia and south-east Queensland. In NSW, the species mostly occurs on the coast and south-west slopes. The principal over wintering habitat on the mainland is the box-ironbark forests and woodlands inland of the Great Dividing Range in Victoria and NSW.

Key habitat for Swift Parrots on the coast and coastal plains of NSW includes Spotted Gum *Corymbia maculata*, Swamp Mahogany *Eucalyptus robusta* and Forest Red Gum *E. tereticornis* forests. The Swift Parrot is a highly mobile species able to utilise a variety of nectar sources over large areas. On the mainland they occur in areas where prolific eucalypt flowering events occur, or where there are an abundance of sap-sucking bug (lerp) infestations. The species favours Swamp Mahogany, Spotted Gum, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Common lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. When they return to Tasmania, the species breeds from September to January, nesting in tree hollows and foraging in forests dominated by Tasmanian Blue Gum *E. globulus*.

Key threats to the species include:

- Habitat loss and fragmentation from forest harvesting, residential/industrial development, agricultural clearing, senescence and dieback.
- Reduced food availability due to drought conditions.
- Psittacine Beak and Feather Disease (PBFD) vulnerability.
- High fire frequency impacting on food resource availability.

Swift Parrot habitat in the subject land

The desktop assessment identified 14 BioNet records of Swift Parrot within 10 km of the subject land. A few sightings occur around Olympic Park with others occurring at Meadowbank TAFE to the northeast of the subject land. It is possible that the subject land may be providing or is adjacent to foraging habitat for Swift Parrots in the region.

Within the subject land, two PCTs associated with the Swift Parrot occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with foraging habitat for this species.

Swift Parrot SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Critically Endangered species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of a population	**Swift Parrot – unlikely**

	A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion. There are 14 BioNet records of Swift Parrot within 10 km the subject land, with the last records identified in 2023. No Swift Parrots were identified in the subject land during the current surveys. A total of 0.18 ha of vegetation associated with Swift Parrot foraging habitat (0.06 ha of PCT 4028 and 0.12 ha of PCT 4058) may be impacted within the subject land. The removal of 0.18 ha of vegetation is unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of the species	**Swift Parrot – unlikely** While the subject land may provide foraging habitat, no Swift Parrots were identified during surveys and as such, they may only occasionally use vegetation in the subject land. This species is highly mobile and as such the removal of 0.18 ha of habitat is unlikely to significantly reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	**Swift Parrot – unlikely** Swift Parrots are a migratory species which move in response to temporal and spatial flowering patterns. Due to this movement in response to flowering events, it is unlikely that the removal of 0.18 ha of potential foraging habitat will fragment an existing population.
Adversely affect habitat critical to the survival of a species	**Swift Parrot – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community The National Recovery Plan for the Swift Parrot (DCCEEW, 2024) lists habitat critical for survival relevant to this Project as: • All preferred foraging species within known and likely foraging habitat on the mainland including Yellow Gum (*E. leucoxylon*); Red Ironbark (*E. tricarpa*); Mugga Ironbark (*E. sideroxylon*); Grey Box (*E. macrocarpa*); White Box (*E. albens*); Yellow Box (*E. melliodora*); Swamp Mahogany (*E. robusta*); Forest Red Gum (*E. tereticornis*); Blackbutt (*E. pilularis*); and Spotted Gum (*Corymbia maculata*). While some preferred foraging species are present in the 0.18 ha of vegetation to be impacted, they are not in a density or size large enough to adversely affect the survival of the species.

Disrupt the breeding cycle of a population	**Swift Parrot – unlikely** Swift Parrots breed in Tasmania and migrate north to the Australian mainland in Autumn. As the subject land is located outside of Tasmania, in NSW, the species will not breed within the subject land. Therefore, the Project is unlikely to disrupt the breeding cycle of the population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Swift Parrot – unlikely** The foraging habitat available in the subject land is disturbed and fragmented and is unlikely to provide a valuable resource for the Swift Parrot. The removal of 0.18 ha of habitat is unlikely to lead to a decline in the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Swift Parrot – unlikely** The proposed works could result in further spread of invasive plant species, impacting foraging habitat for the species. However, the subject land is already subject to a moderate level of disturbance due to exotic vegetation and subsequently impacts by the Project on the spread of invasive species are minimal.
Introduce disease that may cause the species to decline	**Swift Parrot – unlikely** Standard measures to minimise the spread of pests, weeds and disease, including specific diseases to birds such Psittacine Beak and Feather Disease, are recommended as part of a flora and fauna management plan. These measures should include hygiene protocols to prevent transfer of disease from vehicles, humans and soil/vegetation from other areas. The removal of 0.18 hectares of potential foraging habitat is unlikely to introduce disease that may cause the Swift Parrot to decline.
Interfere with the recovery of the species.	**Swift Parrot – unlikely** The overall objectives of the Swift Parrot National Recovery plan are to: • To prevent further decline of the Swift Parrot population. • To achieve a demonstrable sustained improvement in the quality and quantity of Swift Parrot habitat to increase carrying capacity. Habitat loss and alteration are listed as some of the current threatening processing to the survival of the species. While the Project does require the removal of a small area of foraging habitat, this is not expected to interfere with any recovery actions for this species.
Conclusion:	**No signs of Swift Parrots were found within the subject land however given that the species has been recorded within 10 km of the subject land and the presence of suitable feed trees, the area could be used as foraging habitat for the species. Though the Project would result in the removal of potential habitat it is not likely to lead to a decline in the species or reduce the area of occupancy. Therefore, the proposed works would not have a significant impact on Swift Parrots and as such, Referral to the Minister is not required.**

Bar-tailed Godwit (Limosa lapponica baueri)

Bar-tailed Godwit ecology

Bar-tailed Godwit (*Limosa lapponica baueri*) is listed as Vulnerable under the EPBC Act and Endangered under the NSW BC Act.

The Bar-tailed Godwit has a breeding range extending from northeast Siberia to western and northern Alaska. It overwinteres in China, Australia, New Zealand and some Pacific islands. In Australia, the species mainly occurs along the north and east coasts.

Bar-tailed godwits are primarily a coastal species. Feeding habitat includes areas of mud or soft, wet sand within sandflats, intertidal mudflats and beaches. Their diet consists mainly of molluscs, crustaceans, worms, aquatic insects and some plant material.

Roosting occurs on large intertidal sandflats, spits and banks. Less frequently roosting can occur within estuaries, coastal lagoons and bays. There are few reports of roosting in areas of sandy ocean beach or rock platforms.

Key threats to the species include:

- Habitat loss caused by residential and commercial development
- Climate change
- Anthropogenic disturbance
- Exploitation

Bar-tailed Godwit habitat in the subject land

The desktop assessment identified 14 BioNet records of Bar-tailed Godwit within 10 km of the subject land with the majority of the sightings occurring around wetland and tidal areas around Sydney Olympic Park. Therefore, the subject land may be providing or is adjacent to foraging and roosting habitat for Bar-tailed Godwit in the region.

Within the subject land, there is no PCT that is associated with roosting and foraging habitat for this species.

However, 2.93 ha of Important Habitat within and directly adjacent to the Parramatta River mapped for the Bar-tailed Godwit will be impacted by the project. The project will construct a river release pipeline, which will split into eight smaller pipes below ground at Memorial Park. These eights pipes will enter the Parramatta River west of the rail bridge and extend 75 to 130 metres into the river. The shoreline will be temporarily impacted to facilitate the construction of the river release structure, with the sandstone wall being reconstructed when the project is completed. There is also a small construction compound on the eastern side of the John Whitton Bridge that overlaps with the IHM.

Potential impacts to the Bar-tailed Godwit are likely limited to the shoreline either side of the rail bridge. Although the Parramatta River provides potential dispersal habitat for this species; the current use of the river is dominated by ferry and other maritime traffic, with ferries departing every 20 minutes from Meadowbank Wharf. Given this, the potential for this species to utilise the internal areas of the river for dispersal is unlikely.

The potential shoreline habitat is limited, consisting of a small beach and exposed rocky shoreline with limited riparian vegetation between the rail bridge and Meadowbank Wharf. This area is consistent with the definition of potential foraging habitat for the species, however there will be no direct impact to this habitat as construction will be restricted to the western side of the rail bridge. Potential indirect impacts could occur via wave action from construction activities within the Parramatta River or noise and vibration impacts from the adjacent construction compound C30; however, this is unlikely to be

substantially greater than the wave activity already generated by ferries using the adjacent wharf or existing uses of C30 as an urban car park. The western side of the rail bridge consists of sandstone walls with no riparian vegetation and is unlikely to be utilised by these species for foraging. Regardless, the sandstone walls will be restored to their current state upon project completion

Bar-tailed Godwit SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Endangered species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of a population	**Bar-tailed Godwit – unlikely** A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion. There are no BioNet records of Bar-tailed Godwit within 10 km the subject land. No Bar-tailed Godwit were identified in the subject land during the current surveys. Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to lead to a long-term decrease in the size of the population. Therefore, the Project is unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of the species	**Bar-tailed Godwit – unlikely** Impacts to aquatic habitat will be avoided through the use of HDD. Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Therefore, the Project is unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	**Bar-tailed Godwit – unlikely** Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to have fragment habitat. Therefore, the Project will not fragment and existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Bar-tailed Godwit – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	• for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community Habitat critical to the survival of Bar-tailed Godwits includes a mosaic of feeding and roosting habitat. While no Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat, the Bar-tailed Godwit has important habitat mapped within the subject land. The majority of impacts to waterbodies and within the subject land will be avoided with the use of HDD and higher quality wetland habitat outside the subject land will not be impacted. There is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	**Bar-tailed Godwit – unlikely** The Bar-tailed Godwit does not breed in Australia, and thus no impacts to the breeding cycle are expected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Bar-tailed Godwit – unlikely** Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Bar-tailed Godwit – unlikely** Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to have any impact on invasive species. Additionally, the subject land already contains the presence of invasive species and is subject to disturbance. Therefore, the Project is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Bar-tailed Godwit – unlikely** No disease has been identified as a threat to the Bar-tailed Godwit. The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere with the recovery of the species.	The approved conservation advice for the Bar-tailed Godwit (DCCEEW, 2024) lists the primary conservation objectives as: • Minimise further loss of habitat critical to the survival of Bar-tailed Godwit throughout Australia (including habitat predicted to become habitat critical to survival in the future because of climate change).

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	• Prevent further declines in Bar-tailed Godwit subpopulations by working with relevant Range States to address threats in the East Asian-Australasian Flyway. Though the subject land is mapped in the important habitat map for Bar-tailed Godwit, there is no PCT associated with this species in the subject land. Temporary impacts to 2.93 ha of Parramatta River habitat are unlikely to interfere with species recovery. Therefore, the Project is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The Bar-tailed Godwit was not identified within the subject land during current surveys and no PCT in the subject land is associated with this species, though subject land is mapped in the important habitat map for Bar-tailed Godwit. Temporary minor impacts to 2.93 ha of Parramatta River habitat are unlikely to lead to a significant impact on the species. It is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

Green and Golden Bell Frog (*Litoria aurea*)

Green and Golden Bell Frog ecology

The Green and Golden Bell Frog (*Litoria aurea*) is listed as Vulnerable under the EPBC Act and Endangered under the NSW BC Act.

Once widespread and common, the species now occurs in small, fragmented populations at 50 locations across NSW, most of which are situated on or near the coast. Larger populations of Green and Golden Bell Frog in NSW occur around metropolitan Sydney, Shoalhaven and the mid-north coast. There is only one known population on the NSW Southern Tablelands. These populations are classified as key populations. In the absence of genetic information, a population is described as any distributional entity of the species that is separated by distances of up to 10 kilometres, or less if barriers are present that will inhibit interconnection.

The Green and Golden Bell Frog is highly mobile, and may move among breeding sites, however, dispersal patterns can vary between populations. Observations suggest movements of up to five kilometres may be common, and the frog may possibly disperse as far as 10 kilometres. The Green and Golden Bell Frog inhabits marshes, dams and streams, particularly where bulrushes *Typha* sp. or spikerushes *Eleocharis* spp. are abundant. Optimal habitat includes unshaded water-bodies that have adjacent grassy areas, diurnal sheltering sites available, and are free of predatory fish such as the Plague Minnow/Mosquito Fish *Gambusia holbrooki*. They are known to still occupy sites that are within highly disturbed areas.

Breeding occurs in summer when conditions are warm and wet. Sites with a significantly higher proportion of ephemeral (temporary) ponds, rather than sites with fluctuating or permanent ponds, and where predatory fish are absent, are selected for breeding. Males call while floating in the water, and females produce a raft of eggs that sinks to the bottom, often amongst vegetation. Tadpoles feed on algae and plant matter, while adults forage on insects and other species of frog.

Key threats to the species include:

- Alteration of drainage patterns and stormwater runoff.
- Chytridiomycosis (Frog Chytrid Fungus; Batrachochytrium dendrobatidis).
- Predation by feral animals such as the European Red Fox.
- Predation by exotic fish such as Gambusia holbrooki.
- Loss of suitable breeding habitat through alteration by infilling and destruction of wetlands.

Green and Golden Bell Frog habitat in the subject land

The desktop assessment identified 17064 BioNet records of Green and Golden Bell Frog within 10 km of the subject land with the majority of the sightings occurring around wetland areas at Sydney Olympic Park, in or adjacent to the subject land. Given the high number of records, it is likely that the subject land is providing breeding and foraging habitat for Green and Golden Bell Frogs in the region.

Within the subject land, two PCTs associated with the Green and Golden Bell Frog occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with breeding and foraging habitat for this species.

Green and Golden Bell Frog SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Vulnerable species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of an important population of a species	**Green and Golden Bell Frog – unlikely** An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal. • Populations that are necessary for maintaining genetic diversity and/or; • Populations that are near the limit of the species range. There are 17065 BioNet records of Green and Golden Bell Frog within 10 km the subject land, with the last records identified in 2023. Eight key source populations exist within the greater Sydney Region, representing some of the largest, but most disturbed and isolated populations of Green and Golden Bell Frog. Green and Golden Bell Frogs that may be in the subject land are part of the Homebush Bay key population. The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD, though a total of 0.18 ha of vegetation associated with Green and Golden Bell Frog may be impacted within the subject land. The removal of 0.06 ha of vegetation is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	**Green and Golden Bell Frog – unlikely** While 0.06 ha of breeding and foraging habitat may be impacted, some impacts will be avoided through the use of HDD. The removal of 0.06 ha of habitat is unlikely to significantly reduce the area of occupancy of an important population of this species

Fragment an existing population into two or more populations	**Green and Golden Bell Frog – unlikely** The removal of 0.06 ha of habitat is unlikely to fragment the Homebush Bay Green and Golden Bell Frog population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Green and Golden Bell Frog – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community The removal of 0.06 ha of habitat is unlikely to adversely affect the survival of the species.
Disrupt the breeding cycle of an important population	**Green and Golden Bell Frog – unlikely** Green and Golden Bell Frog breeding occurs in ponds which are either outside of the subject land or will be avoided by the Project. Therefore, it is unlikely that the removal of 0.06 ha of habitat will disrupt the breeding cycle of the Homebush Bay population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Green and Golden Bell Frog – unlikely** The Project would result in the removal of a small amount of potential foraging, breeding and dispersal habitat for the Green and Golden Bell Frog. Given that there is other suitable habitat in the locality, and the species is highly mobile (dispersing as far as 10 kilometres), it is unlikely that the removal of 0.06 hectares of potential habitat is likely to lead to a decline in the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Green and Golden Bell Frog – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.06 of habitat is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Green and Golden Bell Frog – unlikely** Green and Golden Bell Frogs are known to be affected by chytridiomycosis (chytrid fungus); listed as a Key Threatening Process (KTP) for this species. The fungus is water borne and transmitted by motile zoospores which attach to keratinised areas of frog skin and tadpole mouthparts. Therefore, it is likely spread by direct contact or through exposure to infected water. Chytrid fungus is not known to occur in the subject land or in the locality. As such, the Project is highly unlikely to introduce disease that may cause the Green and Golden Bell Frog to decline.
Interfere substantially with the recovery of the species.	**Green and Golden Bell Frog – unlikely** The Draft Recovery Plan for the Green and Golden Bell Frog (*Litoria aurea*) (DEC, 2005) describes five recovery objectives for the species. These include: • Increase the security of key GGBF populations by way of preventing the further loss of GGBF habitat at key populations across the species range and where possible secure opportunities for increasing protection of habitat areas.

	• Ensure extant GGBF populations are managed to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species. • Implement habitat management initiatives that are informed by data obtained through investigations into the general biology and ecology of the GGBF through a systematic and coordinated monitoring program. • Establish, within more than one institution, self-sustaining and representative captive populations (particularly 'at risk' populations) of the Green and Golden Bell Frog for the primary purpose of maintaining 'insurance' colonies for re-establishment and supplementation of populations of the species (captive breeding and translocation). • Increase the level of regional and local awareness of the conservation status of the Green and Golden Bell Frog and provide greater opportunity for community involvement. While the Project may impact 0.06 ha of habitat, this is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The subject land overlaps with the Homebush Bay Green and Golden Bell Frog key population and likely supports individuals of the population. Aquatic habitat in the subject land will mostly be avoided through HDD and only 0.06 ha of potential habitat may be impacted by Project. Therefore, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Grey-headed Flying-fox ecology

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as Vulnerable under the EPBC Act and NSW BC Act.

It primarily occurs in the coastal belt from central Queensland to Victoria, however, it occasionally ranges into South Australia and is frequently observed west of the Great Dividing Range. The relative abundance of this species varies widely within its distribution between seasons and from year to year.

The Grey-headed Flying-fox typically roosts near water on exposed branches and can form aggregations (camps) ranging from a few individuals to over 70,000. The species utilises a range of vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It is often found in highly modified vegetation in urban and suburban areas.

Mating occurs in early autumn and females give birth to a single young each year in September/October after a six-month gestation.

Initially the young are carried around by the mother, but after several weeks they are left in the camp while the mother forages. The young remain in the camp until January/February when they leave to forage for themselves. The Grey-headed Flying-fox has a diverse diet of nectar, pollen and fruit which is derived from native and introduced plants. The species usually forages within 15 kilometres of roost sites but will migrate over greater distances in response to the availability of food resources. Sedentary individuals form the core population of continuously occupied camps. However, the majority are highly nomadic and move several hundred kilometres each year in largely unpredictable patterns. The key threats to this species include:

- Habitat loss and fragmentation
- Culling for orchard protection
- Competition and hybridisation
- Pollutants, electrocution, and pathogens

Grey-headed Flying-fox habitat in the subject land

The desktop assessment identified 586 BioNet records of Grey-headed Flying-fox within 10 km of the subject land. These records are most likely fly-overs and opportunistic records of the species foraging. Clumping of records occur at known camps. The closest Grey-headed Flying-fox camp to the subject land is approximately 2.5 kilometres away in Westmead (Paramatta Park 1, ID:134) and is a nationally important camp. A single Grey-headed Flying-fox was recorded foraging in Memorial Park at Meadowband during field survey.

Grey-headed Flying-foxes were recorded during the current surveys in the subject land. It is likely that subject land is providing foraging habitat for Grey-headed Flying-foxes in the region.

Within the subject land, two PCTs associated with the Grey-headed Flying-fox occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with foraging habitat for this species.

Grey-headed Flying-fox SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Vulnerable species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of an important population of a species	**Grey-headed Flying-fox – unlikely** An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal. • Populations that are necessary for maintaining genetic diversity and/or; • Populations that are near the limit of the species range. Grey-headed Flying-fox are considered to form one single interbreeding population across most states of Australia. As such, local populations of the species may be considered to be an important population. These individuals within the camps in proximity to the subject land are part of the national population and are therefore considered part of an important population. Grey-headed Flying-fox was recorded within the subject land and the nearby (2.5km away) Parramatta Park 1 camp is considered a nationally important camp. Therefore, it is likely that the individuals from this camp are utilising the subject land as a feeding resource. Given the high mobility and dispersal area of the species, the removal of 0.18 ha of habitat is unlikely to lead to a long-term decrease in the size of an important population of Grey-headed Flying-fox.
Reduce the area of occupancy of an important population	**Grey-headed Flying-fox – unlikely** The removal of a maximum of 0.18 ha of vegetation considered foraging habitat for Grey-headed Flying-fox, would reduce foraging resources within the subject

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	land, however, it would not reduce the area of occupancy for Grey-headed Flying-fox within the local area, nor fragment populations, since Grey-headed Flying-fox would be able to utilise other areas within the local landscape, including within the wider subject land.
Fragment an existing population into two or more populations	**Grey-headed Flying-fox – unlikely** Grey-headed Flying-fox are considered to form one single interbreeding population across most states of Australia. Given this species is highly mobile, the removal of 0.18 ha of habitat is unlikely to fragment the population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Grey-headed Flying-fox – unlikely** Critical habitat for the Grey-headed Flying-fox is defined when the roost meets particular criteria to make them a nationally important camp. The Parramatta Park 1 camp located within 2.5 km of the subject land is considered nationally important. Winter and spring flowering vegetation communities which encompass the following species are considered habitat critical to the survival of the species: *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera*. Vegetation not containing the aforementioned species may still be considered habitat critical to the survival of the species if they: • Contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May) • Contain native species used for foraging and occur within 20km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or • Contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-fox camp as identified on the Department's interactive flying-fox web viewer. While important feed tree species were present in the subject land, and the subject land is located 2.5 km from a nationally important camp, the removal of 0.18 ha of habitat is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**Grey-headed Flying-fox – unlikely** Adults of this species are highly nomadic and travel large distances in response to flowering eucalypts and fruiting trees. While only foraging habitat and no breeding habitat / camps occur within the subject land, any direct impact on the breeding cycle of this species is considered unlikely. During the breeding season adults may forage within the subject land, especially when there are local, prolific flowering events. Some of this foraging habitat would be removed but breeding habitat would not be impacted, and areas of foraging habitat are still available within the local landscape. Therefore, no disruption to the breeding cycle is expected as a result of the proposed works.
Modify, destroy, remove, isolate or decrease the availability or quality of	**Grey-headed Flying-fox – unlikely**

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
habitat to the extent that the species is likely to decline	The proposed works would remove 0.18 ha of native vegetation comprising foraging habitat for the species. As Grey-Headed Flying-fox is a highly mobile species, the vegetation removal for the Project would unlikely be reducing the connectivity of habitat for the species. For these reasons, it is very unlikely that the removal of this potential habitat would lead to a decline in the local Grey-headed Flying-fox population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Grey-headed Flying-fox – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 ha of habitat is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Grey-headed Flying-fox – unlikely** Grey-headed Flying-fox are known to carry a number of diseases, some of which have been found to be dangerous to humans (e.g. Hendra and Lyssa virus). Impacts of disease is not well understood in the Grey-headed Flying-fox population, although incidence of disease in the population is low. The removal of 0.18 ha of potential foraging habitat is unlikely to introduce disease that may cause the Grey-headed Flying-fox to decline.
Interfere substantially with the recovery of the species.	**Grey-headed Flying-fox – unlikely** The Recovery Plan for the Grey-headed Flying-fox (*Pteropus poliocephalus*) (DAWE 2021b) lists two key recovery objectives: • To improve the Grey-headed flying-fox national population trend by reducing the impact of threatening processes on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring; and • To assist communities and Grey-headed flying-fox to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers. While the proposed works does not contribute to these actions, it does not substantially interfere with any recovery actions for this species, since the extent of potential foraging habitat to be removed is minimal (0.18 ha). Therefore, the Project is considered unlikely to interfere substantially with the recovery of the species
Conclusion:	**This species is known to use the subject land and surrounds for foraging. Additionally, a nationally important camp is located within 2.5 km of the subject land. However, no breeding habitat would be impacted and the small area of potential foraging habitat (0.18 ha) to be removed is unlikely to significantly impact this species. For these reasons, a referral to the Minister is not recommended for Grey-headed Flying-fox.**

Australian Painted Snipe (*Rostratula australis*)

Australian Painted Snipe ecology

The Australian Painted Snipe (*Rostratula australis*) is listed as Endangered under the EPBC Act and NSW BC Act.

The distribution of the Australian Painted Snipe is spread across all states and territories but is most common in east Australia. Important areas for this species include the Murray-Darling Basin, Queensland Channel Country, Fitzroy Basin of Central Queensland, south-eastern South Australia and adjacent parts of Victoria.

The Australian Painted Snipe inhabits shallow terrestrial freshwater wetlands, preferring fringes of swamps, dams and marshland where vegetation cover exists, such as grasses, lignum, low scrub or open timber. Typical sites include those with rank emergent tussocks of grasses, sedges, rushes, reeds and clumps of lignum Muehlenbeckia., canegrass or tea-tree Melaleuca sp. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. Breeding often occurs in response to local conditions but generally occurs from September to December. The Australian Painted Snipe is a nocturnal forager, feeding on worms, molluscs, insects and plant-matter on mud-flats and in shallow waters.

Key threats to the species include:

- Drainage of breeding sites in wetlands
- Reduced water quality from siltation and pollution
- Predation by the European Red Fox and feral cats
- Use of herbicides, insecticides and other chemicals near wetlands
- Grazing and associated frequent burning of wetlands
- Exotic weeds and invasive native plants degrading wetland habitat

Australian Painted Snipe habitat in the subject land

The desktop assessment identified 3 BioNet records of Australian Painted Snipe within 10 km of the subject land with all sightings occurring around wetland areas at Sydney Olympic Park. Therefore, the subject land may be providing or is adjacent to foraging and breeding habitat for Australian Painted Snipes in the region.

Within the subject land, two PCTs associated with the Australian Painted Snipe occur. Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are PCTs associated with breeding and foraging habitat for this species.

Australian Painted Snipe SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Endangered species is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Lead to a long-term decrease in the size of a population	**Australian Painted Snipe – unlikely** A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations, or • a population, or collection of local populations, that occurs within a particular bioregion. There are 3 BioNet records of Australian Painted Snipe within 10 km the subject land, with the last records identified in 2017. No Australian Painted Snipe were identified in the subject land during the current surveys. A total of 0.18 ha of vegetation associated with Australian Painted Snipe foraging habitat (0.06 ha of PCT 4028 and 0.12 ha of PCT 4058) may be impacted within the subject land. The removal of 0.18 ha of vegetation is unlikely to lead to a long-term decrease in the size of the population.
Reduce the area of occupancy of the species	**Australian Painted Snipe – unlikely** While the subject land may provide breeding and foraging habitat, no Australian Painted Snipe were identified during surveys. Additionally, impacts to foraging areas such as tidal flats will mostly be avoided through HDD. This species is highly mobile and as such the removal of 0.18 ha of habitat is unlikely to significantly reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	**Australian Painted Snipe – unlikely** No population of Australian Painted Snipes has been identified within the subject land during surveys. The Australian Painted Snipe is a highly mobile species that can readily fly between fragmented patches of habitat and are more likely to use areas within the avoided wetland habitat. The removal of up to 0.18 ha of habitat will not fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Australian Painted Snipe – unlikely** Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community The majority of impacts to waterbodies within the subject land will be avoided with the use of HDD and higher quality wetland habitat outside the subject land will not be impacted. The removal of 0.18 ha of vegetation is unlikely to adversely affect habitat critical to the survival of the species.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Disrupt the breeding cycle of a population	**Australian Painted Snipe – unlikely** The Australian Painted Snipe inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They are also known to use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire. Breeding habitat is specific; the species preferring shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nesting usually occurs on small islands in freshwater wetlands. Areas suitable for breeding will either be avoided using HDD or are not within the subject land. Therefore, the Project is unlikely to disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Australian Painted Snipe – unlikely** While 0.18 ha of potential habitat may be impacted in the subject land, given the availability of higher quality wetland habitat outside of the subject land and the small area of impact, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Australian Painted Snipe – unlikely** The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 ha of vegetation is unlikely to introduce new invasive species which would significantly impact the species habitat.
Introduce disease that may cause the species to decline	**Australian Painted Snipe – unlikely** No disease has been identified as a threat to the Australian Painted Snipe. Additionally, no Australian Painted Snipes were identified as occurring within the subject land. The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere with the recovery of the species.	**Australian Painted Snipe – unlikely** The objectives of the National Recovery Plan for the Australian Painted Snipe (CoA, 2022) are "by 2032, sustain a positive population trend (compared to 2020 baseline counts) in the number of mature individuals of the Australian Painted Snipe". Strategies to achieve this objective include: • Manage and protect known Australian Painted Snipe habitat at the landscape scale • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions • Reduce, or eliminate threats at breeding and non-breeding habitats • Undertake research to improve knowledge of the habitat requirements, biology and behaviour of Australian Painted Snipe • Engage community stakeholders to improve awareness of the conservation of Australian Painted Snipe • Coordinate, review and report on recovery progress

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	While the Project may impact 0.18 ha of habitat, this is unlikely to significantly interfere with the recovery of the species.
Conclusion:	**The Australian Painted Snipe was not identified within the subject land during current surveys. Though the Project may impact 0.18 ha of habitat, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

River-flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria

River-flat Eucalypt Forest ecology

River-flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria ecological community (hereby referred to as River-flat Eucalypt Forest) is listed as Critically Endangered under the EPBC Act.

River-flat Eucalypt Forest occurs on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates, including floodplains, river-banks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans. Floodplains may be occasionally or more often saturated, water-logged or inundated.

The structure of the ecological community is generally a tall open forest to woodland, but there may be localised areas of closed forest and/or low forest.

River-flat Eucalypt Forest within the subject land

The community occurs in the subject land as PCT 4058 – Red Gum Riverflat Forest in a moderate condition. Field surveys identified approximately 0.02 hectares of Red Gum Riverflat Forest in the subject land.

River-flat Eucalypt Forest SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for the Critically Endangered ecological community is outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Reduce the extent of an ecological community	**River-flat Eucalypt Forest – unlikely** The Project will impact 0.02 ha of River-flat Eucalypt Forest. While this will reduce the extent of the ecological community, it is unlikely to have a significant impact on this ecological community.
Fragment or increase fragmentation of an ecological community, for example by clearing	**River-flat Eucalypt Forest – unlikely** The Project will impact 0.02 ha of River-flat Eucalypt Forest, which exists on the fringe of a larger patch of River-flat Eucalypt Forest and is next to a cleared area

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
vegetation for roads or transmission lines	which leads to residential area. As only the edge of the patch is being impacted, the Project is unlikely to fragment or increase fragmentation of the listed community.
Adversely affect habitat critical to the survival of an ecological community	**River-flat Eucalypt Forest – unlikely** The vegetation to be removed is a small area (0.02 ha) in 'moderate' (Class C1) condition and therefore is not critical to the survival of this community (e.g. Class A or B) (DAWE, 2020). The vegetation to be impacted is a small strip along the edge of the existing patch and is unimportant for the survival of the ecological community. Therefore, the removal of this vegetation is unlikely to adversely affect habitat critical to the survival of River-flat Eucalypt Forest.
Modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**River-flat Eucalypt Forest – unlikely** Provided standard control measures (i.e. sediment fencing, water movement control and stabilisation with coir), implemented through a CFFMP, are followed throughout the Project, this community should not experience impacts from increased sedimentation or changes in groundwater or surface water drainage. Therefore, it is considered that the Project is unlikely to modify or destroy abiotic factors necessary for survival of this ecological community.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**River-flat Eucalypt Forest – unlikely** Areas of the community adjacent to the subject land will be protected from construction impacts through fencing, signage, and sediment control. A relatively small (0.2) area will be removed from this community. Therefore, it is considered that the Project is unlikely to cause a substantial change in the species composition of an occurrence of River-flat Eucalypt Forest.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: • **Assisting invasive species, that are harmful to the listed ecological community, to become established, or** • **Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological**	**River-flat Eucalypt Forest – unlikely** The Project will be removing vegetation that occurs at the edge of a larger patch. While the Project may increase existing edge effects and exotic species coverage, the vegetation is already subject to edge effects and the presence of invasive species. Being adjacent to a residential area, this community already experiences pollution impacts from dumped rubbish and run-off from road/residential areas. Once the Project commences these impacts could temporarily increase. As standard environmental mitigation measures will be implemented during the Project, it is anticipated that this community will not experience a substantial reduction in its quality or integrity.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
community which kill or inhibit the growth of species in the ecological community	
Interfere with the recovery of an ecological community	**River-flat Eucalypt Forest – unlikely** The Project will impact 0.02 ha of the listed community, which is a very small fragment of the community within the locality and represents <0.001% of its estimated total occurrence. Considering the patch to be impacted is already weed infested, a weed management plan should be implemented to assist in the recovery of this community. Additionally, if the standard environmental mitigation measures are implemented during the Project, then it is considered unlikely that the removal of 0.02 ha of this ecological community would interfere with its recovery.
Conclusion:	**The Project will remove 0.02 ha of River-flat eucalypt forest. This removal will occur along the northern-most edge of the larger patch of the community. With standard environmental mitigation measures in place, it is considered unlikely that the removal of 0.02 ha will constitute a significant impact on this critically endangered ecological community.**

Listed migratory species

Migratory species ecology

All MNES migratory wetland species that are ranked as known or likely as occurring within 10 kilometres of the subject land will be assessed below in a single assessment.

The following migratory wetland species will be assessed:

- Common Sandpiper (*Actitis hypoleucos*)
- Ruddy Turnstone (*Arenaria interpres*)
- Sharp-tailed Sandpiper (*Calidris acuminata*)
- Red Knot (*Calidris canutus*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Pectoral Sandpiper (*Calidris melanotos*)
- Ruff (*Calidris pugnax*)
- Red-necked Stint (*Calidris ruficollis*)
- Great Knot (*Calidris tenuirostris*)
- Double-banded plover (*Charadrius bicinctus*)
- Greater Sand Plover (*Charadrius leschenaultia*)
- Siberian Sand Plover (*Charadrius mongolus*)
- Latham's Snipe (*Gallinago hardwickii*)
- Swinhoe's Snipe (*Gallinago megala*)
- Pin-tailed Snipe (*Gallinago stenura*)
- Bar-tailed Godwit (*Limosa lapponica*)
- Black-tailed Godwit (*Limosa limosa*)
- Eastern Curlew (*Numenius madagascariensis*)

- Little Curlew (*Numenius minutus*)
- Eurasian Whimbrel (*Numenius phaeopus*)
- Osprey (*Pandion haliaetus*)
- Pacific Golden Plover (*Pluvialis fulva*)
- Grey-tailed Tattler (*Tringa brevipes*)
- Common Greenshank (*Tringa nebularia*)
- Marsh Sandpiper (*Tringa stagnatilis*)

Migratory species habitat in the subject land

Within the subject land, two PCTs may provide habitat to wetland migratory species. Both Estuarine Swamp Oak Twig-rush Forest (PCT 4028) and Sydney Hinterland Red Gum Riverflat Forest (PCT 4058) are classified as 'Forested Wetlands' and may provide habitat for these species.

PCT 4028 occurs in a single condition state (low) in a single site within the subject land.

At the Sydney Olympic Park location, PCT 4028 occurs as a few small patches of *C. glauca* adjacent to mangrove forest (PCT 4091), with an almost entirely exotic understorey. About 80% of all groundcover was made up of exotic species.

PCT 4058 occurs in two condition states (low and moderate) at one site in the subject land, in memorial Park in Meadowbank.

PCT 4058 (moderate) occurs in the northwest corner of Memorial Park in an area that may be remnant vegetation. PCT 4058 is fully structured within this patch with canopy characteristic of the vegetation community, shrubs that include *B. oblongifolia* and *B. spinosa*, and a largely native groundcover dominated by *I. cylindrica* and *P. pandorana*.

PCT 4058 (low) occurs along Meadow Crescent. In this condition state, native trees that are characteristic of PCT 4058 such as *E. tereticornis* occur in the verge adjacent to the street, but the understorey consists of mown, largely exotic grasses. Shrubs and smaller native trees have been removed, and the vegetation community in this condition state consists solely of remnant trees.

Migratory species SIA

Assessment against the MNES Significant Impact Guidelines (DoE, 2013) for migratory species are outlined in the table below.

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	An area of 'important habitat' for a migratory species is: • Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species. • Habitat that is of critical importance to the species at particular life-cycle stages. • Habitat utilised by a migratory species which is at the limit of the species range. • Habitat within an area where the species is declining. The areas of PCT 4028 and 4058 in the subject land (0.18ha) do not meet the definition of 'important habitat' for migratory species because:

Criteria if there is a real chance or possibility that the action (the proposed works) will:	Response criteria
	• While the habitat might be occasionally used by these species, it does not support an ecologically significant proportion of the population of these species. • The only migratory species assessed that breeds in Australia is the Osprey (*Pandion haliaetus*). It is unlikely that the 0.18 ha of low-moderate habitat in the subject land is of critical importance to this species. • The 0.18 ha of low-moderate habitat in the subject land is not at the range limit of any of the migratory species. • While some of these migratory species may be declining, it is hard to estimate if they are declining in the area around the subject land, due to population fluctuations and the nature of migratory species. However, the removal of 0.18 ha of already altered habitat is unlikely to provide important habitat such that it would impact a declining species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land already contains the presence of invasive species and is subject to disturbance. The removal of 0.18 of vegetation is unlikely to introduce new invasive species which would significantly impact these species' habitat.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Factors that should be considered to assess an ecologically significant population includes: • Species population status • Genetic distinctiveness • Species specific behavioural patterns (e.g. site fidelity and dispersal rates) While it unlikely that an ecologically significant population is present in the subject land, the Project will remove 0.18 ha of potential roosting and feeding habitat for all assessed migratory species and breeding habitat for the Osprey. While 0.18 ha of potential habitat may be impacted in the subject land, given the availability of higher quality wetland habitat outside of the subject land and the small area of impact, the Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of a population of a migratory species.
Conclusion:	**No assessed migratory species were identified within the subject land during current surveys. The subject land does not contain 'important habitat' for these species and the Project is unlikely to result in the establishment of a harmful invasive species or seriously disrupt the lifecycle of these migratory species.** **Though the Project may impact 0.18 ha of habitat, it is considered unlikely that the Project would significantly impact the species, as such, Referral to the Minister is not required.**

APPENDIX C Database search results - fauna

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Litoria aurea **Green and Golden Bell Frog**	BC Act: E EPBC Act: V	Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands.	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the	BioNet: 17064 records, most recent 24/07/2023 PMST BAMC: Candidate	High	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs. Preyed upon by various wading birds and snakes.			
Stictonetta naevosa **Freckled Duck**	BC Act: V EPBC Act: Not listed	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times.	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally, rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December	BioNet: 2 records, most recent 15/02/2017	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.			
Ptilinopus superbus **Superb Fruit-Dove**	BC Act: V EPBC Act: Not listed	The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. There are records of vagrants as far south as eastern Victoria and Tasmania.	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn. Breeding takes place from September to	BioNet: 1 record, most recent 11/06/1969\	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, and is usually 5-30 metres up in rainforest and rainforest edge tree and shrub species. The male incubates the single egg by day, the female incubates at night.			
Hirundapus caudacutus **White-throated Needletail**	BC Act: V EPBC Act: V	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Peninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (e.g. termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More		BioNet: 26 records, most recent 15/03/2023 PMST, Mig BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		common in coastal areas, less so inland.				
Botaurus poiciloptilus **Australasian Bittern**	BC Act: E EPBC Act: E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west.	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	BioNet: 8 records, most recent 16/09/2013 PMST BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Ixobrychus flavicollis **Black Bittern**	BC Act: V EPBC Act: Not listed	The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. The species also occurs in the south-west of Western Australia. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland.	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. Feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again. Generally solitary,	BioNet: 4 records, most recent 02/03/2023	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			but occurs in pairs during the breeding season, from December to March. Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks. Between three and five eggs are laid and both parents incubate and rear the young.			
Circus assimilis **Spotted Harrier**	BC Act: V EPBC Act: Not listed	The Spotted Harrier occurs throughout the Australian mainland, except in densly forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population.	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with	BioNet: 4 records, most recent 15/02/2017 BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.			
Haliaeetus leucogaster **White-bellied Sea-Eagle**	BC Act: V EPBC Act: Not listed	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways.	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists	BioNet: 374 records, most recent 23/06/2023 BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground. May be solitary, or live in pairs or small family groups			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days.			
Hieraaetus morphnoides **Little Eagle**	BC Act: V EPBC Act: Not listed	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW.	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	BioNet: 8 records, most recent 24/08/2022 BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.
Lophoictinia isura **Square-tailed Kite**	BC Act: V EPBC Act: Not listed	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland,	Found in a variety of timbered habitats including dry woodlands and open forests. Shows	BioNet: 1 record, most recent	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.	a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. 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 occupy large hunting ranges of more than 100 square km. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	02/06/2021 BAMC: Predicted		
Pandion cristatus **Eastern Osprey**	BC Act: V EPBC Act: Not listed	The Osprey has a global distribution with four subspecies previously recognised throughout its range. However, recent studies	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over	BioNet: 6 records, most recent	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		have identified that there are two species of Osprey - the Western Osprey P. halietus) with three susbpecies occurring in Europe, Asia and the Americas and the Eastern Osprey aa (P. cristatus) occurring between Sulawesi (in Indonesia), Australia and New Caledonia. Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas.	clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.	09/12/2022 BAMC: Predicted		
Falco subniger **Black Falcon**	BC Act: V EPBC Act: Not listed	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with		BioNet: 1 record, most recent 31/12/1990 BAMC: Predicted	Possible	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.				
Burhinus grallarius **Bush Stone-curlew**	BC Act: E EPBC Act: Not listed	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.	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	BioNet: 1 record, most recent 15/09/2020 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.
Haematopus longirostris **Pied Oystercatcher**	BC Act: E EPBC Act: Not listed	The species is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast,	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small	BioNet: 1 record, most recent 13/12/2021	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		with fewer than 200 breeding pairs estimated to occur in the State. 'Pied' Oystercatchers are occasionally recorded on Lord Howe island but it is uncertain which species is involved.	fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones. Two to three eggs are laid between August and January. The female is the primary incubator and the young leave the nest within several days.			
Charadrius leschenaultii **Greater Sand-plover**	BC Act: V EPBC Act: V	The Greater Sand-plover breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging	BioNet: 1 record, most recent PMST, Mig 24/01/1991	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries.	activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey.			
Rostratula australis **Australian Painted Snipe**	BC Act: E EPBC Act: E	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally	BioNet: 3 records, most recent PMST 15/02/2017 BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.	occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.			
Calidris canutus **Red Knot**	BC Act: Not listed EPBC Act: V	The Red Knot is a non-breeding migratory visitor from Arctic regions of Siberia. It is capable of flying non-stop between north-eastern China and northern Australia. Birds arrive between September and October and leave between March and April, with a small number of individuals overwintering. In NSW it is recorded in small numbers along some of the major river estuaries and sheltered embayments of the coastline, in particular the Hunter River estuary. This environment is used as a staging area for birds to rest and replenish fat resources; large numbers arrive in September then most move south to Victoria by October. The Red Knot is a rare visitor to wetlands	In NSW the Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. It usually forages near the water's edge, with feeding activity regulated by the tide as birds closely follow the tide-edge. The diet consists of	BioNet: 14 records, most recent 15/02/2017 PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		away from the coast with a few records (mostly during southward migration) as far west as Lake Menindee and the Riverina.	worms, bivalves, gastropods, crustaceans and echinoderms. The birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. It is rarely found on inland lakes or swamps.			
Calidris ferruginea **Curlew Sandpiper**	BC Act: CE EPBC Act: CE	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April.	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in	BioNet: 348 records, most recent 10/10/2021 PMST, Mig BAMC: Predicted	Moderate	**Yes.** Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.			
Calidris tenuirostris **Great Knot**	BC Act: V EPBC Act: V	In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. It has also been observed inland at Tullakool, Armidale, Gilgandra and Griffith.	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although	BioNet: 2 records, most recent 15/02/2017 PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.			
Gallinago hardwickii **Latham's Snipe**	BC Act: V EPBC Act: V	N/A	N/A	BioNet: 980 records, most recent 17/02/2023 PMST, Mig	Moderate	**No.** Not associated with PCTs in subject land.
Limicola falcinellus **Broad-billed Sandpiper**	BC Act: V EPBC Act: Not listed	The eastern form of this species breeds in northern Siberia before migrating southwards in winter to Australia. In Australia, Broad-billed Sandpipers overwinter on the northern coast, particularly in the north-west, with birds located occasionally on the southern coast. In NSW, the main site for the species is the Hunter River estuary, with birds occasionally	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in sewage	BioNet: 2 records, most recent 15/02/2017	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		reaching the Shoalhaven estuary. There are few records for inland NSW.	farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches. The species is an active forager, typically feeding by rapidly and repeatedly jabbing its bill into soft wet mud. Feeding also occurs while wading, often in water so deep that they have to submerge their heads and necks in order to probe the underlying mud. Their diet includes insects, crustaceans, molluscs, worms and seeds. Individuals are strongly migratory and only mildly gregarious when not breeding. Large flocks are seldom recorded and birds are often either encountered alone or feeding with other waders such as			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Red-necked Stints or Curlew Sandpipers.			
Limosa limosa **Black-tailed Godwit**	BC Act: V EPBC Act: E	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. In NSW, it is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. The species has been recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state.	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars. Frequently recorded in mixed flocks with Bar-tailed Godwits.	BioNet: 14 records, most recent 15/02/2017 PMST, Mig	Moderate	**No.** Not associated with PCTs in subject land.
Numenius madagascariensis **Eastern Curlew**	BC Act: Not listed	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states, particularly the north,	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales	BioNet: 30 records, most	Moderate	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
	EPBC Act: CE	east, and south-east regions including Tasmania. Eastern Curlews are rarely recorded inland. In NSW the species occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. The Eastern Curlew breeds in Russia and north-eastern China but its distribution is poorly known. During the non-breeding season a few birds occur in southern Korea and China, but most spend the non-breeding season in north, east and south-east Australia.	is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures The Eastern Curlew is carnivorous, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs, as well as	recent 13/09/2022 PMST, Mig		PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			some insects. The birds may delay breeding until three to four years of age. Within Australia, immature birds, which do not migrate, move northward in winter.			
Xenus cinereus **Terek Sandpiper**	BC Act: V EPBC Act: V	A rare migrant to the eastern and southern Australian coasts, being most common in northern Australia, and extending its distribution south to the NSW coast in the east. The two main sites for the species in NSW are the Richmond River estuary and the Hunter River estuary. The latter has been identified as nationally and internationally important for the species.	In Australia, has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves, but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally roosts communally amongst mangroves or dead trees, often with related wader species. Breaks up into smaller flocks or even solitary birds when feeding in open intertidal mudflats. The diet includes worms, crabs and other crustaceans, small shellfish and the	BioNet: 1 record, most recent 06/02/2010	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			adults and larvae of various flies, beetles and water-bugs. Feeding is undertaken by moving rapidly and erratically over soft, wet mud, pecking or probing at the surface.			
Sternula albifrons **Little Tern**	BC Act: E EPBC Act: Not listed	Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months.	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. Both parents incubate up to three well-	BioNet: 7 records, most recent 02/02/2019	Moderate	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.			
Calyptorhynchus lathami lathami **South-eastern Glossy Black-Cockatoo**	BC Act: V EPBC Act: V	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuarina diminuta*, and *A.*	BioNet: 2 records, most recent 01/09/2020 PMST BAMC: Dual	Moderate	**Yes**. Assessed in Table 5-1: and Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			gymnathera. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.			
Glossopsitta pusilla **Little Lorikeet**	BC Act: V EPBC Act: Not listed	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats	BioNet: 14 records, most recent 06/09/2022 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs.	are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.			
Lathamus discolor **Swift Parrot**	BC Act: E EPBC Act: CE	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.	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured	BioNet: 14 records, most recent 19/11/2023 PMST BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*. Return to some foraging sites on a cyclic basis depending on food availability. 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			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Tasmanian Blue Gum Eucalyptus globulus.			
Neophema pulchella **Turquoise Parrot**	BC Act: V EPBC Act: Not listed	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.	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. 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. 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. Nests in tree hollows, logs or posts, from August to December. It	BioNet: 2 records, most recent 26/03/2021 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			lays four or five white, rounded eggs on a nest of decayed wood dust.			
Ninox connivens **Barking Owl**	BC Act: V EPBC Act: Not listed	The Barking Owl is found throughout continental Australia except for the central arid regions. Although still common in parts of northern Australia, the species has declined greatly in southern Australia and now 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. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Extensive wildfires in 2019-20 reduced habitat quality further, burnt many old, hollow-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small	BioNet: 2 records, most recent 31/10/1996 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		bearing trees needed as refuge by prey species and reduced the viability of some regional owl populations.	arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats. Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			years by a pair, but they may switch sites if disturbed by predators (e.g. goannas). Nesting occurs during mid-winter and spring, being variable between pairs and among years. As a rule of thumb, laying occurs during August and fledging in November. The female incubates for 5 weeks, roosts outside the hollow when chicks are 4 weeks old, then fledging occurs 2-3 weeks later. Young are dependent on their parents for several months. Territorial pairs respond strongly to recordings of Barking Owl calls from up to 6 km away, though humans rarely hear this response farther than 1.5 km. Because disturbance reduces the pair's foraging time, and can pull the female off her eggs even on cold nights,			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			recordings should not be broadcast unnecessarily nor during the nesting season.			
Ninox strenua **Powerful Owl**	BC Act: V EPBC Act: Not listed	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. Recent increases in population density across Sydney and some other semi-urban areas do not seem to be solely due to increased awareness of this flagship species.	The Powerful Owl 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. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple	BioNet: 131 records, most recent 20/08/2023 BAMC: Candidate	Known	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Angophora floribunda, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying-foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			most prey species require hollows and a shrub layer, these are important habitat components for the owl. Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 ha can support a pair when prey are dense. Where hollow trees and prey have been depleted, the owls need up to 4000 ha. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			concealment from other birds that harass him. Powerful Owls are monogamous and mate for life. Nesting typically occurs from May to October, being variable between pairs and among years. Fledging can occur as late as December if a pair re-nests after a failed first attempt. Clutches consist of two dull white eggs and incubation lasts approximately 38 days.			
Tyto longimembris **Eastern Grass Owl**	BC Act: V EPBC Act: Not listed	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Eastern Grass Owl numbers can fluctuate greatly, increasing especially during rodent plagues.	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth. If disturbed they burst out of cover, flying low and	BioNet: 2 records, most recent 15/02/2017	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			slowly, before dropping straight down again into cover. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation. Breeding season is highly variable and dependent on environmental conditions, but in NSW nesting most typically occurs in autumn or winter.			
Tyto novaehollandiae **Masked Owl**	BC Act: V EPBC Act: Not listed	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. There is no seasonal variation in its distribution.	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. Pairs have a large home-range of 1000 hectares or more, depending on prey availability. Roosts and breeds in moist eucalypt	BioNet: 2 records, most recent 09/06/2021 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			forested gullies, using large tree hollows or sometimes caves for nesting.			
Anthochaera phrygia **Regent Honeyeater**	BC Act: CE EPBC Act: CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are very few breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley, Mudgee/Wollar, Lower Hunter Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering	BioNet: 5 records, most recent 15/02/2017 PMST BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are several known key breeding areas, four of them in NSW - Capertee Valley, Lower Hunter Valley, Mudgee/Wollar and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.			
Epthianura albifrons **White-fronted Chat**	BC Act: V EPBC Act: Not listed	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low	BioNet: 508 records, most recent 26/09/2017 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas.	vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days Birds can breed at one year of age and are estimated to live for five years.			
Artamus cyanopterus cyanopterus **Dusky Woodswallow**	BC Act: V EPBC Act: Not listed	Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range.	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in	BioNet: 19 records, most recent 14/01/2022 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Tasmanian birds migrate to southeastern NSW after breeding. Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding. Although dusky woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species. Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.			
Petroica boodang **Scarlet Robin**	BC Act: V EPBC Act: Not listed	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. 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. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter.	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. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great	BioNet: 3 records, most recent 31/03/2021 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. The Scarlet Robin is a quiet and unobtrusive species which is often quite tame and easily approached. Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			canopy layer. Scarlet Robin pairs defend a breeding territory and mainly breed between the months of July and January; they may raise two or three broods in each season. This species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub. Eggs are pale greenish-, bluish- or brownish-white, spotted with brown; clutch size ranges from one to four. Birds usually occur singly or in pairs, occasionally in small family parties; pairs stay together year-round. In autumn and winter, the Scarlet Robin joins mixed flocks of other small insectivorous birds which			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			forage through dry forests and woodlands.			
Petroica phoenicea **Flame Robin**	BC Act: V EPBC Act: Not listed	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.	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, heathlands, shrublands and sedgelands at high altitudes. 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). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up	BioNet: 1 record, most recent 21/05/2017	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas. Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. Flying insects are often taken in the air and sometimes gleans for invertebrates from foliage and bark. In their autumn and winter habitats, birds often sally from fence-posts or thistles and other prominent perches in open habitats. Occur singly, in pairs, or in flocks of up to 40 birds or more; in the non-breeding season they will join up with other insectivorous			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			birds in mixed feeding flocks. Breeds in spring to late summer. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks. Builds an open cup nest made of plant materials and spider webs. Eggs are oval in shape and are pale bluish- or greenish-white and marked with brownish blotches; clutch size is three or four eggs.			
Dasyurus maculatus **Spotted-tailed Quoll**	BC Act: V EPBC Act: E	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common.	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. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Mostly nocturnal, although will hunt during the day; spend most of	BioNet: 1 record, most recent 07/07/1993 BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges of 200-500 hectares, while			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creeklines. Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.			
Phascolarctos cinereus **Koala**	BC Act: E EPBC Act: E	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than	BioNet: 4 records, most recent 06/08/2022	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			two ha to several hundred hectares in size. Generally solitary but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.			
Petauroides volans **Southern Greater Glider**	BC Act: E EPBC Act: E	The Southern Greater Glider occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria.	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Recorded using hollows with a minimum diameter of 8 cm. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months	BioNet: 1 record, most recent 08/03/2014 PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.			
Pteropus poliocephalus **Grey-headed Flying-fox**	BC Act: V EPBC Act: V	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations.	Occur 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. Individual camps may have tens of thousands of animals and	BioNet: 586 records, most recent 21/05/2024 PMST BAMC: Predicted	Known	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.			
Saccolaimus flaviventris **Yellow-bellied Sheathtail-bat**	BC Act: V EPBC Act: Not listed	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	BioNet: 9 records, most recent 09/02/2023 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes.	When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.			
***Micronomus norfolkensis* Eastern Coastal Free-tailed Bat**	BC Act: V EPBC Act: Not listed	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW.	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded	BioNet: 7 records, most recent 01/02/2023 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			roosting communally, probably insectivorous.			
Chalinolobus dwyeri **Large-eared Pied Bat**	BC Act: E EPBC Act: E	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes.	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), 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 caves, overhangs, mine adits and concrete structures such as derelict buildings. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area	BioNet: 3 records, most recent 27/03/2023 PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.			
Falsistrellus tasmaniensis **Eastern False Pipistrelle**	BC Act: V EPBC Act: Not listed	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania.	Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	BioNet: 7 records, most recent 09/02/2023 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.
Myotis macropus **Southern Myotis**	BC Act: V EPBC Act: Not listed	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels,	BioNet: 48 records, most recent 27/04/2023	Moderate	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		km inland, except along major rivers.	buildings, wharves, bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December.	BAMC: Candidate		
Scoteanax rueppellii **Greater Broad-nosed Bat**	BC Act: V EPBC Act: Not listed	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m.	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles	BioNet: 3 records, most recent 07/09/2018 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.			
Miniopterus australis **Little Bent-winged Bat**	BC Act: V EPBC Act: Not listed	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW.	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. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at	BioNet: 10 records, most recent 04/05/2023 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (*Miniopterus schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Miniopterus orianae oceanensis **Large Bent-winged Bat**	BC Act: V EPBC Act: Not listed	Eastern Bentwing-bats occur along the east and north-west coasts of Australia.	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	BioNet: 97 records, most recent 04/05/2023 BAMC: Predicted	Moderate	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
***Meridolum corneovirens* Cumberland Plain Land Snail**	BC Act: E EPBC Act: Not listed	Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. known from over 100 different locations, but not all are currently occupied, and they are usually isolated from each other as a result of land use patterns.	Primarily inhabits Cumberland Plain Woodland (a critically endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest, which are also listed communities. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Can dig several centimetres into soil to escape drought. Is a fungus specialist. Unlike the Garden Snail, does not eat green plants. It is generally active at night. Little is known of its biology,	BioNet: 2 records, most recent 26/01/2012 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			including breeding biology. It is known to be hermaphroditic, laying clutches of 20-25 small, round, white eggs in moist, dark areas (such as under logs), with the eggs taking 2-3 weeks to hatch. There is a suggestion that the species breeds throughout the year when conditions are suitable.			
Pommerhelix duralensis **Dural Land Snail**	BC Act: E EPBC Act: E	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the Cumberland IBRA subregion on shale-sandstone transitional landscapes. The species is definitely found within the Local Government Areas of The Hills Shire, Hawkesbury Shire and Hornsby Shire. Records from the Blue Mountains City, Penrith City and Parramatta City may represent this species. Occurrence in Wollondilly Shire is considered	The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris. It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it	BioNet: 17 records, most recent 06/04/2019 PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		unlikely in light of current knowledge.	will also shelter beneath leaves, rocks and light woody debris. Migration and dispersal is limited, with overnight straight-line distances of under 1 metre identified in the literature and studies. The species is active from approximately one hour after dusk until dawn and no confirmed diurnal activity is reported. It exhibits no roost-site behaviour. The species is known to aestivate, and secretes an epiphragm to protect against desiccation. The main food sources are hyphae and fruiting bodies of native fungi. It is possible other detritus may be consumed. Reproduction rates are very low, with few eggs (about 32) per season. Mortality is 90% in the first year, and 99.8% within four-five years.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Seriolella brama **Blue Warehou**	BC Act: Not listed EPBC Act: CD	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Sphyrna lewini **Scalloped Hammerhead**	BC Act: Not listed EPBC Act: CD	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Neophema chrysogaster **Orange-bellied Parrot**	BC Act: CE EPBC Act: CE	The Orange-bellied Parrot breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria. There are occasional reports from NSW, with the most recent records from Shellharbour and Maroubra in May 2003. It is expected that NSW habitats may be being more frequently utilised than observations suggest. Typical winter habitat is saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons. Spits and islands are favoured but they will turn up anywhere within these coastal regions. The species can be found foraging in weedy areas	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland. Diet mainly comprises seeds and fruits of sedges and salt-tolerant coastal and saltmarsh plants.	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		associated with these coastal habitats or even in totally modified landscapes such as pastures, seed crops and golf courses.	Occasionally, flowers and stems are eaten. Orange-bellied Parrots are known to forage among flocks of Blue-winged Parrots. Recent records from unexpected places, including Shellharbour and Maroubra suggest that the species may be expanding their selection of habitats and foraging plant species. Birds seen in NSW in 2003 were foraging on weed species several hundred metres from the coast.			
Callocephalon fimbriatum **Gang-gang Cockatoo**	BC Act: E EPBC Act: E	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-	PMST BAMC: Dual	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		north as Coffs Harbour and as far west as Mudgee.	ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground.			
Macquaria australasica **Macquarie Perch**	BC Act: Not listed EPBC Act: E	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Caretta caretta **Loggerhead Turtle**	BC Act: E EPBC Act: E	Loggerhead Turtles are found in tropical and temperate waters off the Australian coast. In NSW they are seen as far south as Jervis Bay and have been recorded nesting on the NSW north coast and feeding around Sydney.	Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			regions during the warmer months.			
Erythrotriorchis radiatus **Red Goshawk**	BC Act: E EPBC Act: E	This unique Australian endemic raptor is distributed sparsely through northern and eastern Australia, from the western Kimberley Division of northern Western Australia to north-eastern Queensland and south to far north-eastern NSW, and with scattered records in central Australia. The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens.	Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			km2 for females and 200 km2 for males. Red Goshawks mainly eat medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets, but they also take mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and late in the day and tend to hunt more on the wing at other times of the day. The breeding behaviour of Red Goshawks is not well known. Breeding is likely to be in spring and summer in southern Queensland and NSW.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December. In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands. The age at which Red Goshawks first breed is not known, nor is the life expectancy. Young remain with their parents for at least 70-80 days after they leave the nest and may remain with their parents for 4-5 months.			
Charadrius mongolus **Lesser Sand Plover, Mongolian Plover**	BC Act: V EPBC Act: E	The Lesser Sand-plover breeds in central and north eastern Asia, migrating further south for winter. In Australia the species is found around the entire coast but is most	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW. Individuals are rarely recorded south of the Shoalhaven estuary, and there are few inland records.	intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Diet includes insects, crustaceans, molluscs and marine worms. Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Isoodon obesulus obesulus **Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)**	BC Act: E EPBC Act: E	The Southern Brown Bandicoot has a patchy distribution. It is found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the northern tip of Queensland.	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees Xanthorrhoea spp.,	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest. Mating occurs any time of the year, usually following heavy rain. Two or three litters of 2-4 young may be produced annually. The gestation period of 11-12 days is the shortest known of any marsupial while young remarkably become independent around 60 days after being born.			
Limosa lapponica baueri **Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit**	BC Act: E EPBC Act: E	The Bar-tailed Godwit is a migratory wader which undertakes the largest non-stop flight of any bird. The trans-Pacific route from its breeding grounds in the Arctic to its non-breeding grounds in the southern hemisphere covers over 11,000 km. Birds arrive in New South Wales between August and October and then leave between February and April, with a small	It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. It often occurs	PMST; added as species credit	Low	**Yes**. Assessed in Table 5-2:

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		number of individuals overwintering. The subspecies is most frequently recorded along major coastal river estuaries and sheltered embayments, particularly the Tweed, Richmond, Clarence, Macleay, Hastings, Hunter and Shoalhaven river estuaries, Port Stephens and Botany Bay. It is a rare visitor to wetlands away from the coast with scattered records as far west as along the Darling River and the Riverina.	around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas. It forages at low to mid tide in shallow water or along the water's edge on sandy substrates on intertidal flats, banks and beaches or on soft mud substrates. Its diet consists of worms, molluscs, crustaceans, insects and some plant material. In NSW its high tide roost areas on sandy beaches, sandbars, spits and near-coastal saltmarsh are frequently shared with other shorebirds. It is rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips. In large part, the observed decline in Bar-tailed Godwit (Western Alaskan) numbers across Australia stems from ongoing loss of intertidal			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			mudflat habitat at key migration staging sites in the Yellow Sea.			
Dasyornis brachypterus **Eastern Bristlebird**	BC Act: E EPBC Act: E	The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia. There are three main populations: Northern - southern Queensland/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. The estimated population size is less than 2000 individuals occupying a total area of about 120 sq km. There are now only four populations in the southern Queensland/northern NSW area with a total of 35 birds, compared to 15 years ago when 14 populations and 154 birds were recorded. This population once extended as far south as at least Dorrigo and has recently been identified as a separate ultrataxon (monoides) but further research is being undertaken to determine the	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone. Age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years; however, habitat in northern NSW requires frequent fires to maintain habitat condition and	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		validity of this. The remaining populations are the nominate ultrataxon (brachypterus) and once extended at least to what is now the Sydney urban area. The central population comprises an estimated 1600 birds, mainly from Barren Grounds Nature Reserve, Budderoo National Park and the Jervis Bay area. The southern population in Nadgee Nature Reserve and Howe's Flat is around 200 birds. Further surveys are required in parts of Ben Boyd National Park and Sydney Catchment Authority lands to determine whether further populations of the Eastern Bristlebird occur in these areas.	suitability. The northern fire regimes is between 3-6 years and of variable intensity depending on the habitat condition. Shy and cryptic and rarely flies, although can be seen scampering over the ground; when approached, may move to a lookout perch 1 m or more above the ground, then retreat into dense vegetation. Feeds on a variety of insects, particularly ants. Nests are elliptical domes constructed on or near the ground amongst dense vegetation. Two eggs are laid during August to February; producing more than one clutch a year is rare, and recruitment into the population is low. Males are strongly territorial			
Dermochelys coriacea **Leatherback Turtle, Leathery Turtle, Luth**	BC Act: E EPBC Act: E	Throughout the world's tropical and temperate seas and in all coastal waters of Australia. Most	Occurs in inshore and offshore marine waters. Rarely breeds in	PMST, Mig	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		sightings are in temperate waters. Large numbers of Leatherback Turtles feed in coastal waters from southern Queensland to the central coast of NSW.	Australia, with the nearest regular nesting sites being the Solomon Islands and Malayan Archipelago. Occasional breeding records from NSW coast, including between Ballina and Lennox Head in northern NSW. Number of sightings in southern waters suggest species actively seeks temperate feeding grounds, rather than occurring only as stray vagrants. Feed on jellyfish.			PCTs in subject land.
Melanodryas cucullata cucullata **South-eastern Hooded Robin, Hooded Robin (south-eastern)**	BC Act: E EPBC Act: E	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies cucullata) is found from Brisbane to Adelaide and	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. Often perches	PMST BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. Two other subspecies occur outside NSW.	on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Macronectes giganteus **Southern Giant-Petrel, Southern Giant Petrel**	BC Act: E EPBC Act: E	The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20° S and is a common visitor off the coast of NSW.	Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory. A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population does not nest. It is an opportunistic scavenger and predator, and scavenges from fishing vessels and animal carcasses on land. It is also an active predator of cephalopods and euphausiids, as well as smaller birds (particularly penguins) both at land and at sea. Birds will desert their nests if disturbed at the breeding colony.	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Diomedea sanfordi **Northern Royal Albatross**	BC Act: Not listed	The Northern Royal Albatross breeds in New Zealand waters.	The Northern Royal Albatross primarily	PMST, Mig	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
	EPBC Act: E	The main population (estimated at 6,500 to 7,000 pairs) nests on islands off the Chatham Islands, and up to 50 pairs nest at Taiaroa Head on the South Island. Away from its nesting sites this Albatross is circumpolar between 30 and 45 degrees south. Most the population spends the non-breeding period off both coasts of southern South America, especially off Chile and Argentina. It is a rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period.	forages in inshore and offshore waters over the continental shelf to the shelf edge. It feeds mainly on cephalopods and fish, but also salps, crustacea and carrion.			PCTs in subject land.
Phascolarctos cinereus **(combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)**	BC Act: Not listed EPBC Act: E	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Thalassarche eremita **Chatham Albatross**	BC Act: Not listed EPBC Act: E	This albatross principally breeds on Pyramid Rock in the Chatham Islands with one pair nesting on the Western Chain in the Snares Islands. The known population is estimated to be between 18,000	Occasional individuals are encountered both in inshore and offshore over the continental shelf and	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		and 20,000 individuals. Satellite tracking has shown it ranges at sea west to the south and east coast of New Zealand and occasionally west to Tasmania. It is a rare winter visitor to waters off the east coast of Australia. This species predominantly ranges east to Chile and Peru where the majority of the population winter.	in pelagic waters off the shelf break.			
Tringa nebularia **Common Greenshank, Greenshank**	BC Act: E EPBC Act: E	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Hoplocephalus bungaroides **Broad-headed Snake**	BC Act: E EPBC Act: E	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney.	Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in cervices or hollows in large trees within 500m of escarpments in summer. Feeds mostly on geckos and small skinks; will also eat frogs and small mammals occasionally. Females produce four to	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			12 live young from January to March, which is a relatively low level of fecundity.			
Thalassarche cauta **Shy Albatross**	BC Act: E EPBC Act: E	This species is circumpolar in distribution, occurring widely in the southern oceans. Islands off Australia and New Zealand provide breeding habitat. In Australian waters, the Shy Albatross occurs along the east coast from Stradbroke Island in Queensland along the entire south coast of the continent to Carnarvon in Western Australia. Although uncommon north of Sydney, the species is commonly recorded off southeast NSW, particularly between July and November, and has been recorded in Ben Boyd National Park.	This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. While at sea, it soars on strong winds and when calm, individuals may rest on the ocean, in groups during the breeding season or as individuals at other times. Occasionally the species occurs in continental shelf waters, in bays and harbours. The species feeds on fish, crustaceans, offal and squid and may forage in mixed-species flocks. Food may be caught by seizing prey from the water's surface while swimming, by landing on top of prey, diving for	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			prey beneath the water and by scavenging behind fishing vessels. Known breeding locations include Albatross Island off Tasmania, Auckland Island, Bounty Island and The Snares, off New Zealand, where nesting colonies of 6-500 nests occur and may contain other species such as the Australian Gannet. Located on sheltered sides of islands, on cliffs and ledges, in crevices and slopes, nests are used annually and consist of a mound of mud, bones, plant matter and rocks. Parents are territorial while nesting, having both defensive and mating displays. Breeding occurs September-December, when a single egg is laid and incubated for 72 days. Both parents feed and guard the young for approximately 5 months			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			before they fledge and become independent.			
***Dasyurus maculatus maculatus* (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)**	BC Act: Not listed EPBC Act: E	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
***Eretmochelys imbricata* Hawksbill Turtle**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
***Chelonia mydas* Green Turtle**	BC Act: V EPBC Act: V	Widely distributed in tropical and sub-tropical seas. Usually found in tropical waters around Australia but also occurs in coastal waters of NSW, where it is generally seen on the north or central coast, with occasional records from the south coast.	Ocean-dwelling species spending most of its life at sea. Carnivorous when young but as adults they feed only on marine plant material. Eggs laid in holes dug in beaches throughout their range. Scattered nesting records along the NSW coast.	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
***Thalassarche melanophris* Black-browed Albatross**	BC Act: V EPBC Act: V	The Black-browed Albatross has a circumpolar range over the southern oceans, and are seen off the southern Australian coast mainly during winter. This species migrates to waters off the	Inhabits antarctic, subantarctic, subtropical marine and coastal waters over upwellings and boundaries of currents. Can tolerate	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		continental shelf from approximately May to November and is regularly recorded off the NSW coast during this period. The species has also been recorded in Botany Bay National Park.	water temperatures between 0ºC and 24ºC. Spends most of its time at sea, breeding on small isolated islands. When at sea, individuals soar on strong winds and rest on the ocean, when calm, often in groups. This species feeds on fish, crustaceans, offal and squid and often forages in flocks with other seabirds. Individuals seize prey from the surface while swimming or landing, sometimes submerging their head and body to capture prey underwater, and they scavenge in large flocks behind fishing vessels. This species nests annually on a mound of soil and vegetation, on the cliffs or steep slopes of vegetated antarctic and subantarctic islands. Colonies of up to 100,000 nests are formed, occasionally containing			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			other species such as the Grey-headed Albatross, during which time the birds are territorial while nesting. Breeding occurs September-December, when a single egg is laid and incubated for 65-72 days by both parents. Both parents feed and guard the young for 4-5 months before they fledge and become independent. After breeding, the fledgling and adults leave the breeding colony, with the young reaching breeding age at approximately 11 years of age.			
Grantiella picta **Painted Honeyeater**	BC Act: V EPBC Act: V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers	PMST BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		more likely to be found in the north of its distribution.	mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.			
Heleioporus australiacus **Giant Burrowing Frog**	BC Act: V EPBC Act: V	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria.	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. The home ranges of both	PMST	Low	

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			sexes appear to be non-overlapping suggesting exclusivity of non-breeding habitat. Home ranges are approximately 0.04 ha in size. Individuals move into the breeding site either immediately before or following heavy rain and occupy these sites for up to 10 days. Most individuals will not attempt to breed every year. The Giant Burrowing Frog has a generalist diet and studies to date indicate that they eat mainly invertebrates including ants, beetles, cockroaches, spiders, centipedes and scorpions. When breeding, frogs will call from open spaces, under vegetation or rocks or from within burrows in the creek bank. Males show strong territoriality at breeding sites. This			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			species breeds mainly in autumn, but has been recorded calling throughout the year. Egg masses are foamy with an average of approximately 500-800 eggs and are laid in burrows or under vegetation in small pools. After rains, tadpoles are washed into larger pools where they complete their development in ponds or ponded areas of the creekline. Tadpole development ranges from around 12 weeks duration to up to 12 months with late developing tadpoles overwintering and completing development when warmer temperatures return. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			swamp' seepage lines and where small pools form from the collected water. This frog is a slow growing and long-lived species, living up to 10 years of age, possibly longer.			
Neophema chrysostoma **Blue-winged Parrot**	BC Act: V EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Calidris acuminata **Sharp-tailed Sandpiper**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Epinephelus daemelii **Black Rockcod, Black Cod, Saddled Rockcod**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Thalassarche bulleri platei **Northern Buller's Albatross, Pacific Albatross**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Arenaria interpres **Ruddy Turnstone**	BC Act: Not listed	N/A	N/A	PMST, Mig	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
	EPBC Act: V					PCTs in subject land.
Thalassarche salvini **Salvin's Albatross**	BC Act: Not listed EPBC Act: V	This species principally nests on the Bounty Islands, with small numbers on the Western Chain Islets in the Snares Islands and a few pairs nesting on Pyramid Rock and The Forty-Fours in the Chatham Islands of New Zealand. A small number of pairs also nest on Iles Crozet in the French Southern Territories. The total population is estimated between 350,000 and 380,000 individuals, with 99% nesting on the Bounty Islands. It ranges widely through the South Pacific Ocean, particularly in the Humboldt Current off western South America. In NSW waters it is an uncommon visitor principally occurring between June and October, with the majority of sightings from waters south of Sydney.	Occasional individuals are encountered both in inshore and offshore over the continental shelf and in pelagic waters off the shelf break.	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Thalassarche steadi **White-capped Albatross**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
***Notamacropus* parma Parma Wallaby**	BC Act: V EPBC Act: V	The species once occurred in north-eastern NSW from the Queensland boarder to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino.	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover.	PMST	Low	**No.** Not associated with PCTs in subject land.
***Diomedea antipodensis gibsoni* Gibson's Albatross**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
***Thalassarche bulleri* Buller's Albatross, Pacific Albatross**	BC Act: Not listed EPBC Act: V	This albatross only nests on islands off New Zealand. The northern subspecies (platei) nests on islands off Chatham Island with an estimated population of around 18,200 breeding pairs. The southern subspecies (bulleri) breeds on the Snares and Solander islands with a total population of around 13,600 breeding pairs. After breeding	Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters. Feeds mainly on squid, fish, tunicates, octopus and crustacea.	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		both subspecies migrate to the seas off Peru and Chile. In NSW waters it is a relatively common visitor between March and October, with few sightings outside this period.				
Falco hypoleucos **Grey Falcon**	BC Act: V EPBC Act: V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW.	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			and early spring; two or three eggs are laid.			
Aprasia parapulchella **Pink-tailed Worm-lizard, Pink-tailed Legless Lizard**	BC Act: V EPBC Act: V	The Pink-tailed Legless Lizard is primarily known from the Central and Southern Tablelands and the South Western Slopes, with a confirmed outlier record on the Hay Plains north of Hay. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory.	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. Feeds on the larvae and eggs of the ants with which it shares its burrows. It is thought that this species lays 2 eggs inside the ant nests during summer; the	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			young first appear in March. Not all sites are rocky. For instance, on the Hay Plains the species has been recorded from a disturbed ants nest in chenopod shrubland and the West Wyalong population occurs in mallee woodland.			
Stagonopleura guttata **Diamond Firetail**	BC Act: V EPBC Act: V	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River.	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves,	PMST BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			and on insects (especially in the breeding season). Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.			
Macronectes halli **Northern Giant Petrel**	BC Act: V EPBC Act: V	The Northern Giant-Petrel has a circumpolar pelagic distribution, usually between 40-64ºS in open oceans. Their range extends into subtropical waters (to 28ºS) in winter and early spring, and they	Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer. Adults usually remain near the breeding	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		are a common visitor in NSW waters, predominantly along the south-east coast during winter and autumn.	colonies throughout the year (though some do travel widely) while immature birds make long and poorly known circumpolar and trans-oceanic movements. Hence most birds recorded in NSW coastal waters are immature birds. Northern Giant-Petrels seldom breed in colonies but rather as dispersed pairs, often amidst tussocks in dense vegetation and areas of broken terrain. A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population do not nest. There are marked differences in diet between the sexes. Females obtain most of their prey live from the sea, while males also scavenge from the carcases of penguins and seals on land. At sea,			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			both sexes are aggressive opportunists, feeding on fish, cephalopods, birds and crustaceans, including euphausiids or krill, and regularly scavenge on fishing vessels. During the vulnerable early chick phase adult birds utilise land-based carrion resources (e.g. seals) extensively.			
Natator depressus **Flatback Turtle**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Prototroctes maraena **Australian Grayling**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Mixophyes balbus **Stuttering Frog, Southern Barred Frog (in Victoria)**	BC Act: E EPBC Act: V	Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Considered to have disappeared from Victoria and to have undergone considerable range contraction in NSW, particularly in south-east	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		NSW. It is the only Mixophyes species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney. The Dorrigo region, in north-east NSW, appears to be a stronghold for this species.	understorey vegetation on the forest floor. Feed on insects and smaller frogs. Breed in streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams. As the tadpoles grow they move to deep permanent pools and take approximately 12 months to metamorphose.			
Petaurus australis australis **Yellow-bellied Glider (south-eastern)**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Sternula nereis nereis **Australian Fairy Tern**	BC Act: Not listed EPBC Act: V	Within Australia, the Fairy Tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia; occurring as far north as the Dampier Archipelago near Karratha. The subspecies has been known from New South Wales (NSW) in the past, but it is unknown if it persists there (Birdlife International 2010; Garnett & Crowley 2000).	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			and mainland coastline (Higgins & Davies 1996; Lindsey 1986a). The bird roosts on beaches at night (Higgins & Davies 1996).			
Diomedea antipodensis **Antipodean Albatross**	BC Act: V EPBC Act: V	The species ranges across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia.	The majority of birds breed on Antipodes Island, with a small number of pairs breeding on Campbell Island. The Antipodean Albatross breeds biennially in colonies on ridges, slopes and plateaus of isolated subantarctic islands, usually in vegetation such as grass tussocks. Egg laying begins in January (Antipodes Island) and February (Campbell Island), and chicks usually fledge the following year in January and March. The annual breeding population is relatively small and has been estimated at 5,154 pairs. This species	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			regularly occurs in small numbers off the NSW south coast from Green Cape to Newcastle during winter where they feed on cuttlefish. Although representing a small proportion on its total foraging area, potential forage in NSW waters is nonetheless considered significant for the species. Forage for the Antipodean Albatross is extremely patchy, both spatially and temporally, and individuals traverse great distances in search of food. This species feeds pelagically on squid, fish and crustaceans.			
Thalassarche impavida **Campbell Albatross, Campbell Black-browed Albatross**	BC Act: Not listed EPBC Act: V	This species nests only at Campbell Island and the adjacent Isle de Jeanette Marie south of New Zealand, with a total population estimated at 24,600 pairs. It ranges widely in Australasian seas. In NSW waters it is probably frequently	Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters. Forages on fish, squid, crustacea, carrion and gelatinous organisms.	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		overlooked due to the difficulties of separating it from the Black-browed Albatross. However, it appears to be a regular visitor occurring in most months of the year with peaks in winter during the non-breeding season.				
Petrogale penicillata **Brush-tailed Rock-wallaby**	BC Act: E EPBC Act: V	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Males tend to have larger home ranges than females. The	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			home range consists of a refuge area and a foraging range linked by habitually used commuting routes. Females settle in or near their mother's range, while males mainly disperse between female groups within colonies, and less commonly between colonies. Dominant males associate and breed with multiple females. Breeding occurs throughout the year with a peak in births between February and May, especially in the southern parts of the range and at higher altitudes.			
Aphelocephala leucopsis **Southern Whiteface**	BC Act: V EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Climacteris picumnus victoriae	BC Act: V EPBC Act: V	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the	PMST BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Brown Treecreeper (south-eastern)		slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of Climacteris picumnus victoriae runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper Climacteris picumnus picumnus which then occupies the remaining parts of the state. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than	inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range;			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		300 hectares, that have been isolated or fragmented for more than 50 years.	present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae. Hollows in standing dead or live trees and tree stumps are essential for nesting. The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). Each group is composed of a breeding pair with retained male offspring and, rarely, retained			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			female offspring. Often in pairs or cooperatively breeding groups of two to five birds.			
Pachyptila turtur subantarctica **Fairy Prion (southern)**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Pycnoptilus floccosus **Pilotbird**	BC Act: V EPBC Act: V	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land.
Diomedea epomophora **Southern Royal Albatross**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Diomedea exulans **Wandering Albatross**	BC Act: E EPBC Act: V	The Wandering Albatross visits Australian waters extending from Fremantle, Western Australia, across the southern water to the Whitsunday Islands in Queensland between June and September. It has been recorded along the length of the NSW coast. At other times birds roam the southern oceans and	Wandering albatross spend the majority of their time in flight, soaring over the southern oceans. They breed on a number of islands just north of the Antarctic Circle: South Georgia Island (belonging to the UK), Prince Edward and Marion Islands (South Africa), Crozet and	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		commonly follow fishing vessels for several days.	Kerguelen Islands (French Southern Territories) and Macquarie Island (Australia). Breeding takes place on exposed ridges and hillocks, amongst open and patchy vegetation. Wandering albatross pairs mate for life; these long-lived birds do not reach sexual maturity until 9-11 years of age. Wandering Albatross breed bienially in small, loose colonies among grass tussocks, using a large mud nest. A single egg is laid; both parents incubate the egg (that hatches after two months) and feed the growing chick, which remains on the nest for around 9 months. They feed in pelagic, offshore and inshore waters, often at night, taking fish and cephalopods such as squid, crustaceans and			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			carrion, and will often follow ships feeding on the refuse they trail.			
Ardenna grisea **Sooty Shearwater**	BC Act: Not listed EPBC Act: V	N/A	N/A	PMST, Mig	Low	**No.** Not associated with PCTs in subject land.
Pseudomys novaehollandiae **New Holland Mouse, Pookila**	BC Act: Not listed EPBC Act: V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Genetic evidence indicates that the New Holland Mouse once formed a single continuous population on mainland Australia and the distribution of recent subfossils further suggest that the species has undergone a large range contraction since European settlement. Total population size of mature individuals is now estimated to be less than 10,000 individuals although, given the number of sites from which the species is known to have disappeared between 1999 and 2009, it is likely that the species' distribution is actually smaller than current estimates.	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 Distribution is patchy in time and space, with peaks in abundance during early to mid stages of vegetation succession typically induced by fire	PMST	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Cuculus optatus **Oriental Cuckoo, Horsfield's Cuckoo**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Gallinago megala **Swinhoe's Snipe**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Pandion haliaetus **Osprey**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Balaenoptera edeni **Bryde's Whale**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Charadrius bicinctus **Double-banded Plover**	BC Act: Not listed EPBC Act:	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Lagenorhynchus obscurus **Dusky Dolphin**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Lamna nasus **Porbeagle, Mackerel Shark**	BC Act: Not listed	N/A	N/A	Mig	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
	EPBC Act: Mig					PCTs in subject land.
Tringa stagnatilis **Marsh Sandpiper, Little Greenshank**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Anous stolidus **Common Noddy**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Mobula birostris **Giant Manta Ray**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Calonectris leucomelas **Streaked Shearwater**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Mobula alfredi **Reef Manta Ray, Coastal Manta Ray**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Apus pacificus **Fork-tailed Swift**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Pluvialis fulva **Pacific Golden Plover**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Calidris melanotos **Pectoral Sandpiper**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Tringa brevipes **Grey-tailed Tattler**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Numenius phaeopus **Whimbrel**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Gallinago stenura **Pin-tailed Snipe**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Motacilla flava **Yellow Wagtail**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Numenius minutus **Little Curlew, Little Whimbrel**	BC Act: Not listed	N/A	N/A	Mig	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
	EPBC Act: Mig					PCTs in subject land.
Calidris pugnax **Ruff**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Fregata minor **Great Frigatebird, Greater Frigatebird**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Fregata ariel **Lesser Frigatebird, Least Frigatebird**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Caperea marginata **Pygmy Right Whale**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Limosa lapponica **Bar-tailed Godwit**	BC Act: E EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Actitis hypoleucos **Common Sandpiper**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Phaethon lepturus **White-tailed Tropicbird**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Calidris ruficollis **Red-necked Stint**	BC Act: Not listed EPBC Act: Mig	N/A	N/A	Mig	Low	**No.** Not associated with PCTs in subject land.
Ephippiorhynchus asiaticus **Black-necked Stork**	BC Act: E EPBC Act: Not listed	The species Ephippiorhynchus asiaticus comprises two subspecies, E. a. asiaticus in India and south-east Asia, and E. a. australis in Australia and New Guinea. In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah.	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers,	BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). In NSW, breeding activity occurs May - January; incubation May - October; nestlings July - January; fledging from September. Parents share nest duties and in one study about 1.3-1.7 birds were fledged per nest. The NSW breeding population has been estimated at about 75 pairs. Territories are large and variable in size. They have been estimated to average about 9,000ha, ranging from 3,000-6,000ha in high quality habitat and 10,000-15,000ha in areas where habitat is poor or dispersed.			

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Varanus rosenbergi **Rosenberg's Goanna**	BC Act: V EPBC Act: Not listed	Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Also occurs in South Australia and Western Australia.	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. Feeds on carrion, birds, eggs, reptiles and small mammals. 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. Runs along the ground when pursued (as opposed to the Lace Monitor, which climbs trees). Lays up to 14 eggs in a termite mound; the hatchlings dig themselves out of the mounds. Generally slow moving; on the tablelands likely only to be seen on the hottest days.	BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
Chthonicola sagittata **Speckled Warbler**	BC Act: V EPBC Act: Not listed	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive.	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants 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. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in	BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.			
Daphoenositta chrysoptera **Varied Sittella**	BC Act: V EPBC Act: Not listed	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands.	Inhabits eucalypt forests and woodlands, especially those containing rough-barked	BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
		Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.	species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. Generation length is estimated to be 5 years.			
Petaurus australis **Yellow-bellied Glider**	BC Act: V EPBC Act: V	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek	BAMC: Predicted	Low	**Yes**. Assessed in Table 5-1:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.			
Petaurus norfolcensis **Squirrel Glider**	BC Act: V EPBC Act: Not listed	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 Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood	BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Source (BioNet, PMST, BAMC) Date of most recent record)	Likelihood of Occurrence (desktop assessment)	Further assessed in this document?
			forest with heath understorey in coastal areas. 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 Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.			
***Epthianura albifrons* - endangered population White-fronted Chat population in the Sydney Metropolitan Catchment Management Area**	BC Act: EP EPBC Act: Not listed	N/A		BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.

APPENDIX D Database search results - flora

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
Isotoma fluviatilis subsp. fluviatilis	BC Act: Not listed EPBC Act: EX	Currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks.	Known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone. May be an early successional species that benefits from some disturbance. Possibly out-competed when overgrown by some species such as Cynodon dactylon.	BioNet: 2 records, most recent 24/09/1951	Low	**No.** Not associated with PCTs in subject land.
Wahlenbergia multicaulis **Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield**	BC Act: EP EPBC Act: Not listed	N/A	N/A	BioNet: 47 records, most recent 24/10/2023	Low	**No.** Not associated with PCTs in subject land
Wilsonia backhousei **Narrow-leafed Wilsonia**	BC Act: V EPBC Act: Not listed	In NSW Narrow-leaf Wilsonia is found on the coast between Mimosa Rocks National Park and Wamberal north of Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully,	This is a species of the margins of salt marshes and lakes. Flowering occurs in spring and summer.	BioNet: 1322 records, most recent 05/08/2020 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		Parramatta River at Ermington, Clovelly, Voyager Point, Wollongong and Royal National Park). It grows in all southern states.				
Tetratheca glandulosa	BC Act: V EPBC Act: Not listed	Restricted to the following Local Government Areas: The Hills Shire, Gosford, Hawkesbury, Hornsby, Ku-ring-gai, Northern Beaches, Ryde and Wyong. There are approximately 150 populations of this plant ranging from Sampons Pass (Yengo NP) in the north to West Pymble (Lane Cove NP) in the south. The eastern limit is at Ingleside (Northern Beaches LGA) and the western limit is at East Kurrajong (Wollemi NP). There are historical collections of this species south to Manly, Willoughby and Mosman, however these populations are now extinct. The current north-south range is approximately 65km.	Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Stony lateritic fragments are also common in the soil profile on many of these ridgetops. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland (Map Unit 10ar). Common woodland tree species include: Corymbia gummifera, C. eximia, Eucalyptus haemastoma, E. punctata, E. racemosa, and/or E. sparsifolia, with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridaceae. Flowers July-November however residual	BioNet: 12 record, most recent 1800s	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			flowers may persist until late December. Flowering influenced by seasonal weather conditions and/or the microclimate effects (e.g. exposure) of each particular site. The age of individual plants is difficult to determine and the life span of the plant is unknown. Life expectancy is approximately six to ten years, however, based on field investigations which indicate that the plant resprouts from a woody root following fire, this may be an underestimate. The breeding system for this species is poorly known. In comparison to a similar species, Tetratheca juncea, it is expected that this plant is unable to self-pollinate due to the physical characteristics of the plant's reproductive parts, and that a pollen vector (possibly a species of native bee) is required for successful pollination. Seedbank dynamics (fecundity, viability, dispersal, longevity, dormancy etc) for this species are poorly known. Juveniles appear to be uncommon within any given population, with the majority of plants usually consisting of resprouting adults. Resprouts from a woody root following fire, however the role fire plays in seed germination and persistence of the species is unclear. In a similar species, Tetratheca hirsuta, it has been shown that exposure of			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			the seed to cold smoke and/or smoked water derived from burnt native vegetation promoted germination. Field observations following fire indicate that the plant is likely to be clonal. Tetratheca species are reported to be readily propagated by cuttings, however the long term survival of these plants is poorly known.			
Epacris purpurascens var. purpurascens	BC Act: V EPBC Act: Not listed	Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South.	Found in a range of habitat types, most of which have a strong shale soil influence. Lifespan is recorded to be 5-20 years, requiring 2-4 years before seed is produced in the wild. Killed by fire and re-establishes from soil-stored seed.	BioNet: 202 records, most recent 23/05/2019	Low	**No.** Not associated with PCTs in subject land
Dillwynia tenuifolia	BC Act: V EPBC Act: Not listed	The core distribution is the Cumberland Plain from Windsor and Penrith east to Dean Park near Colebee. Other populations in western Sydney are recorded from Voyager Point and Kemps Creek in the Liverpool LGA, Luddenham in the Penrith LGA and South Maroota in the Baulkham Hills Shire. Disjunct localities outside the Cumberland Plain include the Bulga Mountains at Yengo in the north, and Kurrajong Heights and	In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. At Yengo, is reported to occur in disturbed escarpment woodland on Narrabeen sandstone. *Eucalyptus fibrosa* is usually the dominant canopy species. *Eucalyptus globoidea*, E. longifolia, *E. parramattensis*, *E. sclerophylla* and *E. sideroxylon* may also be present or codominant, with Melaleuca	BioNet: 22 records, most recent 15/02/2017	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		Woodford in the Lower Blue Mountains.	decora frequently forming a secondary canopy layer. Associated species may include *Allocasuarina littoralis*, *Angophora bakeri*, *Aristida* spp. *Banksia spinulosa*, *Cryptandra* spp. *Daviesia ulicifolia*, *Entolasia stricta*, *Hakea sericea*, *Lissanthe strigosa*, *Melaleuca nodosa*, *Ozothamnus diosmifolius* and *Themeda australis*. *D. tenuifolia* is often found in association with other threatened species such as *Dodonaea falcata*, *Grevillea juniperina*, *Micromyrtus minutiflora*, *Pultenaea parviflora* and *Styphelia laeta*. At Yengo *D. tenuifolia* is reported to occur in disturbed escarpment woodland on Narrabeen sandstone. Associated tree species include *Eucalyptus eximia*, *E. punctata*, *E. sparsifolia* and *Callitris endlicheri*. The shrub layer is dominated by *D. tenuifolia*, *Leucopogon muticus*, *Leptospermum parvifolium* and *Pultenaea microphylla* (Maryott-Brown & Wilks 1993). Flowering occurs sporadically through the year with a peak from from August to March depending on environmental conditions. Pollinators are unknown. The lifespan is estimated to be 20-30 years. It is thought a minimum of 3-4 years is required before seed is produced. Seeds are hard coated and are persistent in the			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			soil seed bank. Dispersal is likely to be localised and ants are the probable vectors Killed by fire and re-establishes from soil-stored seed. Abundance is influenced by past disturbance history e.g. fire. The high population densities at some recorded sites (200,000+ individuals) reflects prolific seed germination in response to fire.			
Acacia clunies-rossiae **Kanangra Wattle**	BC Act: V EPBC Act: Not listed	Kanangra Wattle grows in the Kowmung and Coxs River areas entirely within Kanangra-Boyd and Blue Mountains National Parks.	Grows in dry sclerophyll forest on skeletal soils on rocky slopes, or on alluvium along creeks.	BioNet: 12 records, most recent 01/07/2010	Low	**No.** Not associated with PCTs in subject land
Acacia pubescens **Downy Wattle**	BC Act: V EPBC Act: V	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon.	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Longevity is unknown, but clonal species have been known to survive for many decades. Flowers from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December. Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod	BioNet: 100, 2 records, most recent 14/10/2022 PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			production and seed fall for this species appears to be low. Acacia species generally have high seed dormancy and long-lived persistent soil seedbanks. It is thought that the species needs a minimum fire free period of 5 - 7 years to allow an adequate seedbank to develop.			
Grammitis stenophylla **Narrow-leaf Finger Fern**	BC Act: E EPBC Act: Not listed	Grammitis stenophylla is known from thirty (30) locations across New South Wales. The species is known to occur in twenty four (24) conservations reserves. It is common in several areas, such as the Mount Warning Shield, the sandstone reserves of the lower Clarence, the granites of Washpool, Gibraltar and Nymbioda National Parks, and also Mt Jerusalem and Nightcap National Park. The species was also recently recorded from New England National Park.	Moist places, usually near streams, on rocks in rainforest and dry and moist eucalypt forest.	BioNet: 1 record, most recent 1800s	Low	**No.** Not associated with PCTs in subject land
Callistemon linearifolius **Netted Bottle Brush**	BC Act: V EPBC Act: Not listed	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury	Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers spring – summer.	BioNet: 6 records, most recent 09/01/2009	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		River. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park.				
***Eucalyptus nicholii* Narrow-leaved Black Peppermint**	BC Act: V EPBC Act: V	This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range. Found largely on private property and roadsides, and occasionally in conservation reserves. Planted as urban trees, windbreaks and corridors.	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. Tends to grow on lower slopes in the landscape.	BioNet: 1 record, most recent 15/03/2002	Low	**No.** Not associated with PCTs in subject land
***Eucalyptus scoparia* Wallangarra White Gum**	BC Act: E EPBC Act: V	In NSW it is known from only three locations near Tenterfield, including Bald Rock National Park. In Queensland it is equally rare, occurring at three sites on the Stanthorp Plateau including one	Found in open eucalypt forest, woodland and heaths on well-drained granite/rhyolite hilltops, slopes and rocky outcrops, typically at high altitudes. At lower	BioNet: 1 record, most recent 15/03/2002	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		population in Girrawween National Park.Only one Queensland population has more than a dozen trees.	elevations can occur in less rocky soils in damp situations.			
Melaleuca deanei **Deane's Paperbark**	BC Act: V EPBC Act: V	Deane's Paperbark occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas.	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	BioNet: 1 records, most recent 30/04/1914 PMST	Low	**No.** Not associated with PCTs in subject land
Rhodamnia rubescens **Scrub Turpentine**	BC Act: CE EPBC Act: CE	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm.	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	BioNet: 7 records, most recent, PMST, PMST 09/06/2021 BAMC	Moderate	**Yes**. Assessed in Table 5-2:.
Syzygium paniculatum **Magenta Lilly Pilly**	BC Act: E EPBC Act: V	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of	BioNet: 7, PMST 13/09/2022	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		strip from Upper Lansdowne to Conjola State Forest.	littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.			PCTs in subject land
Triplarina imbricata **Creek Triplarina**	BC Act: E EPBC Act: E	Found only in a few locations in the escarpment ranges and near Tabulam in north-east NSW. The species was previously recorded in Parramatta, near Sydney, however, the species is no longer thought to occur in this area.	Occurs along watercourses in low open forest with Water Gum (*Tristaniopsis laurina*) or in montane bogs, often with Baekea amissa.	BioNet: 4 records, most recent 04/03/2008	Low	**No.** Not associated with PCTs in subject land
Zannichellia palustris	BC Act: E EPBC Act: Not listed	In NSW, known from the lower Hunter and in Sydney Olympic Park.	Grows in fresh or slightly saline stationary or slowly flowing water. Flowers during warmer months. NSW populations behave as annuals, dying back completely every summer.	BioNet: 6 records, most recent 01/06/2020 BAMC: Candidate	Moderate	**Yes**. Assessed in Table 5-2:.
Grevillea beadleana **Beadle's Grevillea**	BC Act: E EPBC Act: E	Known from four separate areas, all in north-east NSW: the Torrington area west of Tenterfield, Oxley Wild Rivers National Park, Guy Fawkes River National Park and at Chambigne Nature Reserve south-west of Grafton. Historical records suggest it was also once found near Walcha.	Open eucalypt forest and woodland with a shrubby understorey on granite. Growing on rocks on a sandstone cliffline and escarpment at Chambigne Nature Reserve	BioNet: 1 record, most recent 15/03/2002	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
***Pomaderris prunifolia* P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas**	BC Act: EP EPBC Act: Not listed	N/A	N/A	BioNet: 19 records, most recent 15/02/2017	Low	**No.** Not associated with PCTs in subject land
***Hibbertia spanantha* Julian's Hibbertia**	BC Act: CE EPBC Act: CE	Endemic to NSW where it is restricted to six known locations. It may occur at other locations that are currently unknown.	Grows in forest with canopy species including *Eucalyptus pilularis*, *E. resinifera*, *Corymbia gummifera* and *Angophora costata*. The understorey is open with species of Poaceae, Orchidaceae, Fabaceae and Liliaceae. Flowering in October and November, but with an odd flower throughout the year. The soil is identified as a light clay occurring on a shale sandstone soil transition.	PMST	Low	**No.** Not associated with PCTs in subject land
***Hibbertia puberula* subsp. glabrescens**	BC Act: CE EPBC Act: CE	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land
***Rhodomyrtus psidioides* Native Guava**	BC Act: CE EPBC Act: CE	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		in the Hunter and Clarence River catchments and along the Border Ranges in NSW.				
Eucalyptus cryptica	BC Act: CE EPBC Act: CE	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land
Persoonia hirsuta **Hairy Geebung, Hairy Persoonia**	BC Act: E EPBC Act: E	Persoonia hirsuta has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to the west. Persoonia hirsuta has a large area of occurrence, but occurs in small populations or isolated individuals, increasing the species' fragmentation in the landscape.	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations. Plants are generally killed by all but the lowest intensity fire or partial burning. Fire may promote germination of soil-stored seed, although it may also kill some of the seedbank if it is of high severity. Extreme wet-dry weather cycles may also promote germination of soil-stored seed.	PMST	Low	**No.** Not associated with PCTs in subject land
Persoonia mollis **subsp. maxima**	BC Act: E EPBC Act: E	Highly restricted, known from the Hornsby Heights-Mt Colah area north of Sydney in the Sydney Basin Bioregion. Occurs in three populations (described on a catchment basis) located over an approximate north-south range of	Occurs in sheltered aspects of deep gullies or on the steep upper hillsides of narrow gullies on Hawkesbury Sandstone. These habitats support relatively moist, tall forest vegetation communities, often with warm temperate rainforest influences. Associated species: Smooth Barked Apple *Angophora*	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		5.75 km and east-west distance of 7.5 km. Additional locations may exist outside the current distribution.	*costata,* Sydney Peppermint *Eucalyptus piperita*, Red Bloodwood *Corymbia gummifera*, Turpentine *Syncarpia glomulifera*, Coachwood *Ceratopetalum apetalum* and Black Wattle *Callicoma serratifolia*. Flowers late December – March. Flowers are likely to be pollinated predominantly by native bees. Self-pollination is usually unsuccessful. Long-lived, with the oldest individuals approximately 20 years of age. Age structure varies across the populations according to fire history, however, a large proportion of the population is reproductively immature. Reproductive maturity of individuals is unlikely to be reached until approximately 8 years, with peak flowering and fruiting unlikely to be reached until individuals are at least 12–15 years. The *P. mollis* complex have low seed germination rates. Persoonia seeds have a dormancy mechanism which is poorly understood and this species has not been successfully propagated from seed. Fire sensitive and usually killed by fire. Regeneration is from soil stored seed.			
Epacris sparsa	BC Act: V EPBC Act: E	Restricted to the lower Grose River, within the Hawkesbury and Blue Mountains LGAs.	Grows in Riparian Sandstone Scrub, where it is found on the base of cliffs or rock faces, on rock ledges or among rocks in	PMST	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			the riparian flood zone. Grows in small pockets of damp clay soil, chiefly on south-west facing slopes. In rocky sites the scrub vegetation is dominated by *Tristaniopsis laurina*, *Leptospermum trinervium*, *Allocasuarina littoralis*, *Acacia longifolia*, *Grevillea sericea* and *Lomandra fluviatilis*. In wetter, more sheltered sites typical species include *Callicoma serratifolia*, *Backhousia myrtifolia*, *Austromyrtus tenuifolia*, *Leucopogon lanceolatus*, *Lomandra montana*, *Todea barbara*, *Sticherus flabellatus* and *Dracophyllum secundum*. Flowering occurs from April to June, with pollinators unknown. Young plants start flowering when 20–30cm high. Flowers are often plentiful, with flower tubes dropping readily and exposing the developing fruit. Appears to be killed by fire. There is no evidence of vegetative spread in E. sparsa, however, plants appear to resprout readily from lignotubers at the woody base after disturbance.			PCTs in subject land
Asterolasia elegans	BC Act: E EPBC Act: E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also likely to occur in the western part of Gosford local government area. Known from only seven	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (*Syncarpia glomulifera* subsp. *glomulifera*),	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		populations, only one of which is wholly within a conservation reserve.	Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*), Forest Oak (*Allocasuarina torulosa*) and Christmas Bush (*Ceratopetalum gummiferum*). Ecological knowledge about this species is very limited. The species is considered to be fire sensitive and reliant on seed germination after disturbance to maintain populations. A soil seedbank appears to be established by this species, so for a number of years following fire or other disturbance the species may not be apparent, but be present only as seed in the soil. The size of the seedbank depends not only on the amount of seed contributed by mature plants each season, but on the level of dormancy of the seed which can vary from year to year. The longevity of each crop of seed in the soil is probably relatively short (perhaps 5 - 10 years). Either heat or smoke or a combination of these factors may play a role in breaking soil-stored seed dormancy. Both the amount of smoke and the level of heating could influence germination success. A certain level of heat may be optimal for breaking seed dormancy (such that too little heat results in seeds staying dormant, while too much heat kills seeds).			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
***Prostanthera junonis* Somersby Mintbush**	BC Act: E EPBC Act: E	Has a north-south range of approximately 19 km on the Somersby Plateau in the Gosford and Wyong local government areas.	The species is restricted to the Somersby Plateau. It occurs on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. It occurs in both disturbed and undisturbed sites. The dominant flowering period for this species is October to mid-December depending on weather/site conditions. The plant is very difficult to identify outside of this time. While mature plants appear to be incapable of resprouting after fire, it may trigger seed germination.	PMST	Low	**No.** Not associated with PCTs in subject land
***Pterostylis saxicola* Sydney Plains Greenhood**	BC Act: E EPBC Act: E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Two populations occur within a conservation reserve (Georges River National Park; Scheyville NP).	Occurs primarily on the Cumberland Plain along an ecological gradient from clay soils derived from Ashfield Shale to thin accumulations of humus rich sandy soils on Hawkesbury Sandstone sheets and rock shelves. Habitat ranges from grassy woodland on flat to gently sloping landscapes on shale soils, to open-forest on hilly landscapes on transitional soils, and woodland on the rims and steep sides of river valleys on sandstone soils. The species has also been recorded outside the Cumberland Plain in grassy woodland on Devonian slate. All species	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			of Pterostylis are deciduous and die back to fleshy, rounded underground tuberoids. Rosettes start to emerge around March/April for this species, with flowering from late September to November. Flowering time and abundance may vary due to climatic conditions. The above ground parts of the plant wither and die following seed dispersal and the plant persists as a tuberoid until the next year. Typically occurs as scattered individuals or in small groups.			
***Pterostylis gibbosa* Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood**	BC Act: E EPBC Act: E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). It is apparently extinct in western Sydney which is the area where it was first collected (1803).	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum *Eucalyptus tereticornis*, Woollybutt *E. longifolia* and White Feather Honey-myrtle *Melaleuca decora*. Near Nowra, the species grows in an open forest of Spotted Gum *Corymbia maculata*, Forest Red Gum and Grey Ironbark *E. paniculata*. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark *E. crebra*, Forest Red Gum and Black Cypress Pine *Callitris endlicheri*. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place). As with many other greenhoods, male fungus gnats are believed to be the pollinator. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.			
***Cynanchum elegans* White-flowered Wax Plant**	BC Act: E EPBC Act: E	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley.	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honeymyrtle Melaleuca armillaris scrub to open scrub. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific. The fruit can take up to	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			six months to mature. Seed production is variable and unreliable. Seeds are wind dispersed. It is considered to be unlikely that a soil seed bank for this species exists. Plants are capable of suckering from rootstock in response to occasional slashing or grazing. The fire response of the species is unknown although it has been known to reshoot following fire. Annual burning at one site has been shown to result in population decline.			
Rhizanthella slateri **Eastern Underground Orchid**	BC Act: V EPBC Act: E	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra.	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	PMST	Low	**No.** Not associated with PCTs in subject land
Persoonia nutans **Nodding Geebung**	BC Act: E EPBC Act: E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (and 99% of individuals) occurring in the north of the species range in	Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		the Agnes Banks, Londonderry, Castlereagh, Berkshire Park and Windsor Downs areas. Core distribution occurs within the Penrith, and to a lesser extent Hawkesbury, local government areas, with isolated and relatively small populations also occurring in the Liverpool, Campbelltown, Bankstown and Blacktown local government areas. The southern and northern populations have distinct habitat differences.	populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest. Peak flowering is from November to March with sporadic flowering all year round. An obligate seed regenerator. Seed germination is promoted by fire and also by physical disturbance. Although listed as a short-lived species much of the ecology is poorly known. Maturity is expected in about 10 years. Plants appear to set abundant fruit. Seed is likely to be dispersed, after consumption of the fruit, by large birds such as currawongs and large mammals such as wallabies, kangaroos and possums. Abundance at a site appears to be related to disturbance history. Sites with higher abundance also appear to be more disturbed.			
Deyeuxia appressa	BC Act: E EPBC Act: E	A highly restricted NSW endemic known only from two pre-1942 records in the Sydney area. Was first collected in 1930 at Herne Bay, Saltpan Creek, off the Georges River, south of Bankstown. Was then collected in 1941 from Killara, near Hornsby. Has not been collected since and may now be	Given that *D. appressa* hasn't been seen in over 60 years, almost nothing is known of the species' habitat and ecology. Flowers spring to summer and is mesophytic (grows in moist conditions).	PMST BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		extinct in the wild due to the level of habitat loss and development that has occurred within these areas.				
Genoplesium baueri **Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid**	BC Act: E EPBC Act: E	The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments.	Grows in dry sclerophyll forest and moss gardens over sandstone. Flowers February to March.	PMST	Low	**No.** Not associated with PCTs in subject land
Haloragodendron lucasii **Hal**	BC Act: E EPBC Act: E	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney.	Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			phosphorus levels. Highly clonal, which implies the true population size may be considerably smaller than expected. Flowering occurs from August to November with fruits appearing from October to December. Has demonstrated an ability to resprout from its rootstock.			
Pimelea spicata **Spiked Rice-flower**	BC Act: E EPBC Act: E	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama).	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The co-occurring species in the Cumberland Plain sites are grey box (*Eucalyptus moluccana*), forest red gum (*E. tereticornis*) and narrow-leaved ironbark (*E. crebra*). Blackthorn (*Bursaria spinosa*) is often present at sites (and may be important in protection from grazing) and kangaroo grass (*Themeda australis*) is usually present in the groundcover (also indicative of a less intense grazing history). In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites. the Illawarra populations	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			usually occur in one of two communities - a woodland or a coastal grassland. Woodland sites are dominated by forest red gum (*E. tereticornis*) and stringybark (*E. eugenioides*), with a groundcover dominated by kangaroo grass (*Themeda australis*) and matrush (*Lomandra longifolia*). The grassland sites are dominated by kangaroo grass (*Themeda australis*) and matrush (*Lomandra longifolia*), with blady grass (*Imperata cylindrica*). A shrubby layer, where present, is dominated by coastal wattle (*Acacia sophorae*) and coast rosemary (*Westringia fruticosa*) with coast banksia (*Banksia integrifolia*). Mature plants spread over short distances through underground rhizomes, and this can assist them to recover from disturbances like fire and irregular grazing. However, the age plants must be, and what proportion recover, is largely unknown. Flowers may be self-pollinating, although fruit production is variable. Fruit are not dispersed well, with most seedlings germinating close to the adult (within 30cm or so according to P. Hogbin). A soil seedbank develops and is maintained in the presence of a suitable disturbance regime.			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
Allocasuarina glareicola	BC Act: E EPBC Act: E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool.	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Angophora bakeri*, *Eucalyptus sclerophylla* and *Melaleuca decora*. Common associated understorey species include *Melaleuca nodosa*, *Hakea dactyloides*, *Hakea sericea*, *Dillwynia tenuifolia*, *Micromyrtus minutiflora*, *Acacia elongata*, *Acacia brownei*, *Themeda australis* and *Xanthorrhoea minor*. Not killed outright by fire but resprouts from the rootstock. Spreads by vegetative means, such that clumps of up to 100s of stems may be a single individual. The time taken for the plants to flower and set seed is not known, but only those plants growing in areas unburnt for some time produced substantial numbers of fruit.	PMST	Low	**No.** Not associated with PCTs in subject land
Acacia terminalis subsp. Eastern Sydney (G.P.Phillips 126) **Sunshine Wattle (Sydney region)**	BC Act: E EPBC Act: E	N/A	N/A	PMST	Low	**No.** Not associated with PCTs in subject land
Pomaderris brunnea **Rufous Pomaderris, Brown Pomaderris**	BC Act: E EPBC Act: V	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers,	Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. Flowers	PMST	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria.	appear in September and October. The species is expected to live for 10 - 20 years, while the minimum time to produce seed is estimated to be 4 - 6 years. The species has been found in association with Eucalyptus amplifolia, *Angophora floribunda*, *Acacia parramattensis*, *Bursaria spinosa* and *Kunzea ambigua*.	BAMC: Candidate		
Micromyrtus blakelyi	BC Act: V EPBC Act: V	Restricted to areas near the Hawkesbury River, north of Sydney. Distribution extends from north of Maroota in the north, to Cowan in the south. All known populations occur within the Baulkham Hills and Hornsby local government areas.	Typically occurs within heathlands in shallow sandy soil in cracks and depressions of sandstone rock platforms. Flowers in Spring from September to November and produces fruit (an indehiscent nut) October to November. Fire sensitive, with adults killed by fire and recruitment occurring from a soil seed bank. It is not known whether germination occurs in the absence of disturbance.	PMST	Low	**No.** Not associated with PCTs in subject land
Melaleuca biconvexa **Biconvex Paperbark**	BC Act: V EPBC Act: V	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north.	Habitat present in mapped PCTs:4028 Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Flowering occurs over just 3-4 weeks in September and October. Resprouts following fire.	PMST BAMC	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
Persicaria elatior **Knotweed, Tall Knotweed**	BC Act: V EPBC Act: V	Tall Knotweed has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland.	Habitat present in mapped PCTs:4058, 4028 This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	PMST BAMC: Candidate	Low	**Yes.** Assessed in Table 5-2.
Cryptostylis hunteriana **Leafless Tongue-orchid**	BC Act: V EPBC Act: V	The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra (although it is uncommon at all sites). Also recorded at Munmorah State Conservation Area, Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park and Ben Boyd National Park.	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). Little is known about the ecology of the species; being leafless it is expected to have limited photosynthetic capability and probably	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			depends upon a fungal associate to meet its nutritional requirements from either living or dead organic material. In addition to reproducing from seed, it is also capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site. On the Central Coast of NSW, populations have been recorded in woodland dominated by Scribbly Gum (*Eucalyptus haemastoma*), Brown Stringybark (*Eucalyptus capitellata*), Red Bloodwood (*Corymbia gummifera*) and also associated with Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*).			
Lasiopetalum joyceae	BC Act: V EPBC Act: V	Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved.	Grows in heath on sandstone.	PMST	Low	**No.** Not associated with PCTs in subject land
Kunzea rupestris	BC Act: V EPBC Act: V	Restricted, with most locations in the Maroota - Sackville - Glenorie area and one outlier in Ku-ring-gai Chase National Park, all within the Central Coast botanical subdivision of NSW. Currently known to exist in	Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland. Flowering occurs in spring. It has indehiscent fruits which resist soil entrapment and so may disperse many metres per week. Resprouts from the base	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		20 populations, 6 of which are reserved.	after fire or mechanical damage. Seedlings have also been observed after fire.			
Darwinia biflora	BC Act: V EPBC Act: V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. The northern, southern, eastern and western limits of the range are at Maroota, North Ryde, Cowan and Kellyville, respectively.	Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include *Eucalyptus haemastoma*, *Corymbia gummifera* and/or *E. squamosa*. The vegetation structure is usually woodland, open forest or scrub-heath. Longevity is thought to be 15-20 years. Flowering occurs throughout the year but is concentrated in autumn, with mature fruits being produced from May to August. Self-pollination is the usual form of pollination. Flowers and fruit are produced 18 months after germination, though at this stage few reach maturity. Maturation rates are higher for plants older than 5 years. Seed viability is high (up to 99%). Fire is an important factor in the life cycle of this species. Fire kills all plants, but also produces a flush of germination from seed stored in the soil. The number of individuals at a site then declines with time since fire, as the surrounding vegetation develops.	PMST	Low	**No.** Not associated with PCTs in subject land
Leptospermum deanei **Deane's Tea-tree**	BC Act: V EPBC Act: V	Occurs in Hornsby, Warringah, Ku-ring-gai and Ryde LGAs.	Woodland on lower hill slopes or near creeks. Sandy alluvial soil or sand over sandstone. Occurs in Riparian Scrub - e.g. *Tristaniopsis laurina*, *Baechea myrtifolia*;	PMST	Low	**No.** Not associated with

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			Woodland - e.g. *Eucalyptus haemastoma*; and Open Forest - e.g. *Angophora costata*, *Leptospermum trinervium*, *Banksia ericifolia*. Flowers October-November. Probably killed by fire.			PCTs in subject land
***Thesium australe* Austral Toadflax, Toadflax**	BC Act: V EPBC Act: V	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region.	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	PMST	Low	**No.** Not associated with PCTs in subject land
Pimelea curviflora var. curviflora	BC Act: V EPBC Act: V	Confined to the coastal area of the Sydney and Illawarra regions. Populations are known between northern Sydney and Maroota in the north-west. New population discovered at Croom Reserve near Albion Park in Shellharbour LGA in August 2011. Formerly recorded around the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly.	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.			
Caladenia tessellata **Thick-lipped Spider-orchid, Daddy Long-legs**	BC Act: V EPBC Act: V	The Thick LipSpider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border.	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	PMST	Low	**No.** Not associated with PCTs in subject land
Grevillea parviflora **subsp. *parviflora*** **Small-flower Grevillea**	BC Act: V EPBC Act: V	Sporadically distributed throughout the Sydney Basin with sizeable populations around Picton, Appin and Bargo (and possibly further south to the Moss Vale area) and in the Hunter at in the Cessnock - Kurri Kurri area (particularly Werakata NP). Separate populations are also known from Putty to Wyong and Lake Macquarie on the Central Coast.	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			Woodland. however, other communities occupied include *Corymbia maculata* - *Angophora costata* open forest in the Dooralong area, in Sydney Sandstone Ridgetop Woodland at Wedderburn and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek. Associated species in the Kurri Sand Swamp Woodland include *Eucalyptus parramattensis* subsp. *decadens*, *Angophora bakeri* and *E. fibrosa* with *Acacia elongata*, *Dillwynia parvifolia*, *Melaleuca thymifolia*, *Grevillea montana*, *Eragrostis brownii* and *Aristida vagans*. In the Shale Sandstone Transition Forest associated species include *Eucalyptus fibrosa*, *E. punctata*, *Corymbia gummifera*, *Pultenaea scabra* var. *biloba*, *Kunzea ambigua*, *Allocasuarina littoralis* and *Themeda australis*. At sites with a stronger sandstone influence *Eucalyptus sclerophylla*, *E. piperita*, *E. oblonga*, *Grevillea diffusa*, *G. mucronulata*, *Acacia suaveolens* and *Persoonia pinifolia* are found. Despite the range of associated communities several understorey species which are common to several of the known sites of *Grevillea parviflora* subsp. *parviflora* can be identified and include *Allocasuarina littoralis*, *Daviesia ulicifolia*, *Kunzea ambigua*, *Banksia spinulosa*,			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			Leptospermum trinervium, *Melaleuca nodosa*, *Pimelea linifolia*, *Themeda australis*, *Entolasia stricta* and *Eragrostis brownii*. *G. parviflora* subsp. *parviflora* has been recorded growing with several other threatened species including *Acacia bynoeana* (Heddon Greta), *Dillwynia tenuifolia* (Kemps Creek) and *Persoonia bargoensis* (S. of Appin and at Bargo). Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30-70m ASL, while the southern Sydney occurrences are typically at 100-300m ASL. Often occurs in open, slightly disturbed sites such as along tracks. Plants are capable of suckering from a rootstock and most populations demonstrate a degree of vegetative spread, particularly after disturbance such as fire. This can make counts of individual genets in a population very difficult, and stem counts are usually an acceptable means of assessment for management purposes. Flowering has been recorded between July to December as well as April-May. Flowers are insect-pollinated and seed dispersal is limited. Seedling recruitment after fire is uncommon, and most recovery after disturbance appears to be resprouting from			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			rhizomes. Competition from tick bush (*Kunzea ambigua*) can affect recruitment and recovery, including spread, following disturbance.			
***Eucalyptus camfieldii* Camfield's Stringybark**	BC Act: V EPBC Act: V	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park.	Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. Associated species frequently include stunted species of *E. oblonga* Narrow-leaved Stringybark, *E. capitellata* Brown Stringybark and *E. haemastoma* Scribbly Gum. Population sizes are difficult to estimate because its extensive lignotubers may be 20 m across. A number of stems arise from these lignotubers giving the impression of individual plants. Flowering period is irregular, flowers recorded throughout the year. Poor response to too frequent fires.	PMST	Low	**No.** Not associated with PCTs in subject land
***Leucopogon exolasius* Woronora Beard-heath**	BC Act: V EPBC Act: V	Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park.	The plant occurs in woodland on sandstone. Flowering occurs in August and September.	PMST	Low	**No.** Not associated with PCTs in subject land

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
Acacia bynoeana **Bynoe's Wattle, Tiny Wattle**	BC Act: E EPBC Act: V	Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations, with the size of the populations at most locations being very small (1-5 plants).It has recently been found in the Colymea and Parma Creek areas west of Nowra.	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	PMST	Low	**No.** Not associated with PCTs in subject land
Prostanthera densa **Villous Mintbush**	BC Act: V EPBC Act: V	This species has been recorded from the Currarong area in Jervis Bay, Royal National Park (Marley), Cronulla, Helensburgh and Port Stephens (Nelson Bay). The Sydney and Royal National Park populations were thought possibly extinct, but the species is now known to occur at Bass and Flinders Point in Cronulla.	Prostanthera densa generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea. Plants regenerate from rootstock after fire and flower within the first year or two.	PMST	Low	**No.** Not associated with PCTs in subject land
Zieria involucrata	BC Act: E EPBC Act: V	Has a disjunct distribution north and west of Sydney, in the Baulkham Hills, Hawkesbury, Hornsby and Blue Mountains local government areas. Recent records for the species come from 22 populations	Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support	PMST BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		in the catchments of the Macdonald, Colo and Hawkesbury Rivers between Melon Creek and Mogo Creek in the north to Little Cattai Creek (Hillside) and Wheeny Creek (Colo) in the south and from a single population in the upper Blue Mountains north of Katoomba. In addition, historical records exist for at least two other localities in the eastern Blue Mountains: south of Springwood Valley Heights and north-west of Kurrajong.	sheltered forest, although some populations extend upslope into drier vegetation. Also known from at least two atypical ridgetop locations. The canopy typically includes *Syncarpia glomulifera* subsp. *glomulifera* (Turpentine), *Angophora costata* (Smooth-barked Apple), *Eucalyptus agglomerata* (Blue-leaved Stringybark) and *Allocasuarina torulosa* (Forest Oak). Ecological knowledge about this species is limited. Flowering usually takes place in spring. Plants usually first flower and set seed 3 – 5 years after germination, but maximum seed production probably does not occur until 6 – 10 years of age. While there is some evidence that individual plants may be capable of resprouting after fire, the species is probably best considered as an obligate seeder that relies on seed germination after disturbance to maintain populations. A soil seedbank, which may last 1 – 2 decades, appears to be established by this species, so for a number of years following fire or other disturbance the species may not be apparent, but be present only as seed in the soil. Either heat or smoke or a combination of these factors may play a role in breaking soil-stored seed dormancy. Both the amount of smoke and the level of			

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
			heating could influence germination success. A certain level of heat may be optimal for breaking seed dormancy (such that too little heat results in seeds staying dormant, while too much heat kills seeds).			
Eucalyptus benthamii **Camden White Gum**	BC Act: CE EPBC Act: V	Occurs on the alluvial flats of the Nepean River and its tributaries. There are two major subpopulations: in the Kedumba Valley of the Blue Mountains National Park and at Bents Basin State Recreation Area. Several trees are scattered along the Nepean River around Camden and Cobbitty, with a further stand at Werriberri (Monkey) Creek in The Oaks. At least five trees occur on the Nattai River in Nattai National Park. Large areas of habitat were inundated by the formation of Warragamba Dam in 1933.	Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. Recruitment of juveniles appears to be most successful on bare silt deposits in rivers and streams. The recorded elevation range for the species is from 30m ASL at Bents Basin to 750m ASL in the Kedumba population. Most of the individuals are around 60 to 300m ASL. Occurs in open forest. Associated species at the Bents Basin site include *Eucalyptus elata*, *E. bauerina, E. amplifolia*, *E. deanei* and *Angophora subvelutina*. Understorey species include *Bursaria spinosa*, *Pteridium esculentum* and a wide variety of agricultural weeds. The Kedumba Valley site lists *E. crebra*, *E. deanei*, *E. punctata*, *Leptospermum flavescens*, *Acacia filicifolia* and *Pteridium esculentum* among its associated species.	BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.
Eucalyptus glaucina **Slaty Red Gum**	BC Act: V EPBC Act: V	Found in separate districts along the eastern seaboard of NSW, from near Casino, to Taree, south to Broke, and recently discovered on	Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	BAMC: Candidate	Low	**Yes**. Assessed in Table 5-2:.

Species	Listing status	Distribution	Habitat	Records (BioNet, PMST Date of most recent record)	Likelihood of occurrence (desktop assessment)	Further assessed in this document?
		the eastern side of the Blue Mountains National Park near Warragamba Dam.				

APPENDIX E BAM Calculator reports

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00052103/BAAS21012/24/00052122

Proposal Name
SW GPOP BDAR

BAM data last updated *
05/08/2025

Assessor Name
Elijah Elias

Assessor Number
BAAS21012

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
16/01/2026

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
16/01/2026

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
4058-Sydney Hinterland Red Gum Riverflat Forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.1	3	0	3
4028-Estuarine Swamp Oak Twig-rush Forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.1	0	0	0

BAM Biodiversity Credit Report (Like for like)

4028-Estuarine Swamp Oak Twig-rush Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 1731, 3962, 3963, 3985, 3987, 3993, 4016, 4023, 4026, 4027, 4028, 4030, 4035, 4038, 4040, 4048, 4049, 4050, 4056	-	4028_Low_SOP	No	0	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4058-Sydney Hinterland Red Gum Riverflat Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	-	4058_Moderate	Yes	1	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3145, 3181, 3185, 3188, 3192, 3258, 3328, 4024, 4025, 4039, 4041, 4058, 4138	-	4058_Low	Yes	2	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Litoria aurea / Green and Golden Bell Frog	**4028_Low_SOP**	0.1	1.00
Myotis macropus / Southern Myotis	**4028_Low_SOP, 4058_Moderate, 4058_Low**	0.2	4.00
Ninox strenua / Powerful Owl	**4058_Moderate, 4058_Low**	0.1	3.00

Credit Retirement Options

Like-for-like credit retirement options

Litoria aurea / Green and Golden Bell Frog	Spp	IBRA subregion
	Litoria aurea / Green and Golden Bell Frog	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id 00052103/BAAS21012/24/00052122	Proposal Name SW GPOP BDAR	BAM data last updated * 05/08/2025
Assessor Name Elijah Elias	Report Created 16/01/2026	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS21012	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 3	BOS entry trigger	Date Finalised 16/01/2026

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

List of Species Requiring Survey

Name	Presence	Survey Months
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Calidris ferruginea Curlew Sandpiper	No (expert report)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Deyeuxia appressa Deyeuxia appressa	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Epthianura albifrons - endangered population White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Eucalyptus benthamii Camden White Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Eucalyptus glaucina Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Gyrostemon thesioides Gyrostemon thesioides	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Limosa lapponica baueri Bar-tailed Godwit (baueri)	No (expert report)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Melaleuca biconvexa Biconvex Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Meridolum corneovirens Cumberland Plain Land Snail	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Myotis macropus Southern Myotis	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persicaria elatior Tall Knotweed	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Pomaderris brunnea Brown Pomaderris	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Zieria involucrata Zieria involucrata	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Bar-tailed Godwit (baueri)	Limosa lapponica baueri

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Eastern Osprey	Pandion cristatus	Habitat constraints
Eastern Pygmy-possum	Cercartetus nanus	Habitat degraded
Giant Burrowing Frog	Heleioporus australiacus	Habitat degraded
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints

Koala	Phascolarctos cinereus	Habitat degraded
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Long-nosed Bandicoot population in inner western Sydney	Perameles nasuta - endangered population	Refer to BAR
Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Marsdenia viridiflora subsp. viridiflora - endangered population	Refer to BAR
Narrow-leafed Wilsonia	Wilsonia backhousei	Habitat constraints
Red-crowned Toadlet	Pseudophryne australis	Habitat degraded
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Square-tailed Kite	Lophoictinia isura	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints
Zannichellia palustris	Zannichellia palustris	Habitat degraded Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00052103/BAAS21012/24/00052122

Proposal Name
SW GPOP BDAR

BAM data last updated *
05/08/2025

Assessor Name
Elijah Elias

Report Created
16/01/2026

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS21012

BAM Case Status
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Date Finalised
16/01/2026

Assessment Revision
3

BOS entry trigger

Assessment Type
Major Projects

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

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

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

Estuarine Swamp Oak Twig-rush Forest												
2	4028_Low_SOP	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	13.3	13.3	0.06	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
											Subtotal	**0**
Sydney Hinterland Red Gum Riverflat Forest												
1	4058_Moderate	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	46.2	46.2	0.02	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1

3	4058_Low	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	32.4	32.4	0.1	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	2
										Subtotal	**3**
										Total	**3**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Litoria aurea / Green and Golden Bell Frog (Fauna)									
4028_Low_SOP	13.3	13.3	0.06	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False	1
								Subtotal	**1**

Myotis macropus / Southern Myotis (Fauna)									
4028_Low_SOP	13.3	13.3	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
4058_Moderate	46.2	46.2	0.02	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
4058_Low	32.4	32.4	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
								Subtotal	**4**
Ninox strenua / Powerful Owl (Fauna)									
4058_Moderate	46.2	46.2	0.02	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
4058_Low	32.4	32.4	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
								Subtotal	**3**

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00052103/BAAS21012/24/00052122	SW GPOP BDAR	05/08/2025
Assessor Name	Report Created	BAM Data version *
Elijah Elias	16/01/2026	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS21012	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
3		16/01/2026

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

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Australian Painted Snipe	Rostratula australis	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Black Falcon	Falco subniger	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Black-necked Stork	Ephippiorhynchus asiaticus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Curlew Sandpiper	Calidris ferruginea	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Diamond Firetail	Stagonopleura guttata	4058-Sydney Hinterland Red Gum Riverflat Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest

Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Eastern Osprey	Pandion cristatus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	4028-Estuarine Swamp Oak Twig-rush Forest
Grey-headed Flying-fox	Pteropus poliocephalus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	4028-Estuarine Swamp Oak Twig-rush Forest
Little Bent-winged Bat	Miniopterus australis	4028-Estuarine Swamp Oak Twig-rush Forest
Little Eagle	Hieraaetus morphnoides	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Little Lorikeet	Glossopsitta pusilla	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Regent Honeyeater	Anthochaera phrygia	4058-Sydney Hinterland Red Gum Riverflat Forest
Rosenberg's Goanna	Varanus rosenbergi	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Scarlet Robin	Petroica boodang	4058-Sydney Hinterland Red Gum Riverflat Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	4058-Sydney Hinterland Red Gum Riverflat Forest
Speckled Warbler	Chthonicola sagittata	4058-Sydney Hinterland Red Gum Riverflat Forest
Spotted Harrier	Circus assimilis	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Spotted-tailed Quoll	Dasyurus maculatus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Square-tailed Kite	Lophoictinia isura	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest

Swift Parrot	Lathamus discolor	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Turquoise Parrot	Neophema pulchella	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Varied Sittella	Daphoenositta chrysoptera	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
White-fronted Chat	Epthianura albifrons	4028-Estuarine Swamp Oak Twig-rush Forest
White-throated Needletail	Hirundapus caudacutus	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Yellow-bellied Glider	Petaurus australis	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	4058-Sydney Hinterland Red Gum Riverflat Forest
		4028-Estuarine Swamp Oak Twig-rush Forest

Threatened species Manually Added

None added

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

Common Name	Scientific Name	Plant Community Type(s)
Painted Honeyeater	Grantiella picta	4058-Sydney Hinterland Red Gum Riverflat Forest

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

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Painted Honeyeater	Grantiella picta	Habitat constraints

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00052103/BAAS21012/24/00052122

Assessment name
SW GPOP BDAR

BAM data last updated *
05/08/2025

Assessor Name
Elijah Elias

Report Created
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BAM Data version *
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Assessor Number
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Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
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BOS entry trigger

Date Finalised
16/01/2026

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Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	4058_Moderate	4058-Sydney Hinterland Red Gum Riverflat Forest	Moderate	0.02	1	
2	4028_Low_SOP	4028-Estuarine Swamp Oak Twig-rush Forest	Low_SOP	0.06	1	

3	4058_Low	4058-Sydney Hinterland Red Gum Riverflat Forest	Low	0.1		

APPENDIX F Fauna recorded in the study area

Common name	Scientific name	BC Act	EPBC Act	Native/ Exotic	Observation type
Amphibians					
Common Eastern Froglet	*Crinia signifera*			Native	W
Peron's Tree Frog	*Litoria peronii*			Native	W
Birds					
Australasian Darter	*Anhinga novaehollandiae*			Native	O
Australasian Swamp Hen	*Porphyrio melanotus*			Native	O
Australian Magpie	*Gymnorhina tibicen*			Native	O
Australian Pied Cormorant	*Phalacrocorax varius*			Native	O
Australian Raven	*Corvus coronoides*			Native	O
Australian White Ibis	*Threskiornis moluccus*			Native	O
Australian Wood Duck	*Chenonetta jubata*			Native	O
Common Myna	*Acridotheres tristis*			Exotic	O
Crested Pigeon	*Ocyphaps lophotes*			Native	O
Galah	*Eolophus roseicapilla*			Native	O
Grey Butcherbird	*Cracticus torquatus*			Native	O
Kookaburra	*Dacelo novaeguineae*			Native	O
Masked Lapwing	*Vanellus miles*			Native	O
Noisy Miner	*Manorina melanocephala*			Native	O
Pied Currawong	*Strepera graculina*			Native	O
Powerful Owl	*Ninox strenua*	V		Native	OW

Common name	Scientific name	BC Act	EPBC Act	Native/ Exotic	Observation type
Rainbow Lorikeet	*Trichoglossus moluccanus*			Native	O
Rock Dove	*Columba livia*			Exotic	O
Mammals					
Chocolate Wattled Bat	*Chalinolobus morio*			Native	AR (definite)
Common Brush-tailed Possum	*Trichosurus vulpecula*			Native	O
Common Ring-tailed Possum	*Pseudocheirus peregrinus*			Native	O
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		Native	AR (definite)
Eastern Free-tailed Bat	*Ozimops ridei*			Native	AR (definite)
Gould's Wattled Bat	*Chalinolobus gouldii*			Native	AR (definite)
Grey-headed Flying Fox	*Pteropus poliocephalus*	V	V	Native	OW
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V		Native	AR (definite)
Lesser Long-eared Bat/ Gould's Long-eared Bat	*Nyctophilus geoffroyi / N. gouldii*			Native	AR (possible)
Little Bent-wing Bat	*Miniopterus australis*	V		Native	AR (definite)
Southern Myotis	*Myotis macropus*	V		Native	AR (possible)
White-striped free-tailed bat	*Austronomus australis*			Native	AR (definite)

- O = observed, W = heard call, AR = anabat recording

APPENDIX G Flora recorded in the study area

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
Acanthaceae	*Avicennia marina*	Grey Mangrove													
Adoxaceae	*Viburnum spp.*		*												
Aizoaceae	*Tetragonia tetragonoides*	New Zealand Spinach												8	110
Amaranthaceae	*Alternanthera nana*	Hairy Joyweed													
	Amaranthus viridis	Green Amaranth													
Anacardiaceae	*Schinus molle*	Pepper Tree	*												
Apiaceae	*Centella asiatica*	Indian Pennywort						0.3	30						
Apocynaceae	*Araujia sericiflora*	Moth Vine	*	1	20			0.3	5					1	50
	Nerium oleander	Oleander	*												
	Parsonsia straminea	Common Silkpod													
	Plumeria spp.	Frangipani	*												
Araceae	*Zantedeschia aethiopica*	Arum Lily	*							3	50				
Araliaceae	*Hedera helix*	English Ivy	*												
Araucariaceae	*Agathis robusta*	Queensland Kauri													
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	*											10	2
	Syagrus romanzoffiana	Cocos Palm	*												
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	*	0.1	2					0.2	5			0.2	5
Asteraceae	*Ageratina adenophora*	Crofton Weed	*			2	20								
	Bidens pilosa	Cobbler's Pegs	*			5	50	5	50					0.2	15
	Cirsium vulgare	Spear Thistle	*			2	10	0.1	1						
	Conyza bonariensis	Flaxleaf Fleabane	*			0.2	20								
	Gamochaeta spp.		*									0.2	50		
	Hypochaeris albiflora	White Flatweed	*											0.1	1
	Hypochoeris radicata	Catsear	*									0.5	50		
	Lactuca serriola	Prickly Lettuce	*												

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
	Ozothamnus diosmifolius	White Dogwood													
	Sonchus oleraceus	Common Sowthistle	*	0.1	1	0.2	10							0.1	1
	Taraxacum officinale	Dandelion	*			0.1	1					0.5	50		
Basellaceae	*Anredera cordifolia*	Madeira Vine	*	0.5	10										
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	*												
	Pandorea pandorana	Wonga Wonga Vine								50	1000				
Brassicaceae	*Brassica spp.*	Brassica	*												
	Lepidium spp.		*												
Campanulaceae	*Lobelia purpurascens*	Whiteroot													
Caryophyllaceae	*Stellaria media*	Common Chickweed	*												
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak													
	Casuarina glauca	Swamp Oak				40	20	40	17					30	20
Chenopodiaceae	*Chenopodium album*	Fat Hen	*												
	Einadia hastata	Berry Saltbush													
	Einadia trigonos	Fishweed		1	50										
Commelinaceae	*Commelina cyanea*	Commelina		0.1	20					0.2	10				
	Tradescantia fluminensis	Trad	*	50	1000 +										
Convolvulaceae	*Dichondra repens*	Kidney Weed		0.1	30					1	100	2	150		
	Ipomoea indica	Morning Glory	*	10	100										
Crassulaceae	*Crassula ovata*	Jade Plant	*												
Cupressaceae	*Cupressus spp.*		*												
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	*			2	30								
	Machaerina spp.														
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern													
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower													
Doryanthaceae	*Doryanthes excelsa*	Gymea Lily													
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash		2	1										
Euphorbiaceae	*Euphorbia maculata*														

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
	Homalanthus populifolius					0.5	2			0.1	5				
	Ricinus communis	Castor Oil Plant	*												
Fabaceae (Caesalpinioideae)	*Senna pendula*		*			0.1	1							1	10
Fabaceae (Faboideae)	*Erythrina x sykesii*	Coral tree	*												
	Glycine tabacina	Variable Glycine										0.1	20		
	Hardenbergia violaceae														
	Indigofera australis	Australian Indigo													
	Medicago polymorpha	Burr Medic	*			0.1	5								
	Robinia pseudoacacia	Black Locust	*												
	Robinia spp.		*												
	Trifolium repens	White Clover	*												
	Trifolium spp.		*												
	Vicia sativa	Common vetch	*					0.1	15						
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle													
	Acacia falcata														
	Acacia fimbriata	Fringed Wattle													
	Acacia floribunda	White Sally													
	Acacia linifolia	White Wattle		2	3			1	2						
	Acacia longifolia					5	10								
	Acacia parramattensis	Parramatta Wattle													
Fumariaceae	*Fumaria officinalis*		*	0.2	50										
Geraniaceae	*Geranium homeanum*			0.1	10										
Hamamelidaceae	*Liquidambar styraciflua*	Sweetgum	*												
	Juncus kraussii	Sea Rush													
	Juncus usitatus														
Lamiaceae	*Westringia fruticosa*	Coastal Rosemary													
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	*			5	1								
Lomandraceae	*Lomandra confertifolia*	Matrush													

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
	Lomandra longifolia	Spiny-headed Mat-rush		1.5	5									2	12
Magnoliaceae	*Magnolia spp.*		*												
Malaceae	*Photinia spp.*		*												
Malvaceae	*Brachychiton acerifolius*	Illawarra Flame Tree													
	Malva parviflora	Small-flowered Mallow													
	Modiola caroliniana	Red-flowered Mallow	*			0.2	15								
	Sida rhombifolia	Paddy's Lucerne	*	0.2	5	10	100	1	10	0.5	2			0.2	20
Meliaceae	*Melia azedarach*	White Cedar		2	4									0.3	2
Moraceae	*Ficus elastica*		*												
	Ficus macrophylla														
	Ficus rubiginosa	Port Jackson Fig								1	1				
Mytraceae	*Angophora bakeri*	Narrow-leaved Apple													
	Angophora costata	Sydney Red Gum		5	1										
	Angophora floribunda	Rough-barked Apple								0.5	20				
	Backhousia citriodora														
	Callistemon citrinus	Crimson Bottlebrush													
	Callistemon spp.														
	Callistemon viminalis	Weeping Bottlebrush													
	Corymbia citriodora	Lemon-scented Gum													
	Corymbia maculata	Spotted Gum												25	6
	Eucalyptus acmenioides	White Mahogany													
	Eucalyptus bauerana	Blue Box													
	Eucalyptus beyeri														
	Eucalyptus botryoides	Bangalay													
	Eucalyptus crebra	Narrow-leaved Ironbark													
	Eucalyptus fibrosa	Red Ironbark													
	Eucalyptus globoidea	White Stringybark													
	eucalyptus globulus														

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
	Eucalyptus grandis	Flooded Gum													
	Eucalyptus microcarpa	Western Grey Box								7	6				
	Eucalyptus microcorys	Tallowwood													
	Eucalyptus moluccana	Grey Box													
	Eucalyptus pilularis	Blackbutt		25	4										
	Eucalyptus punctata	Grey Gum										10	2	25	7
	Eucalyptus robusta	Swamp Mahogany													
	Eucalyptus saligna	Sydney Blue Gum													
	Eucalyptus tereticornis	Forest Red Gum								8	5	25	2		
	Eucalyptus viminalis	Ribbon Gum													
	Kunzea ambigua	Tick Bush													
	Leptospermum polygalifolium	Tantoon													
	Lophostemon confertus	Brush Box													
	Melaleuca decora			4	5										
	Melaleuca linariifolia	Flax-leaved Paperbark													
	Melaleuca quinquenervia	Broad-leaved Paperbark													
	Melaleuca spp.														
	Melaleuca styphelioides	Prickly-leaved Tea Tree													
	Syncarpia glomulifera	Turpentine		10	5										
	Syzygium floribundum	Weeping Lilly Pilly													
	Tristaniopsis laurina	Kanooka													
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	*	0.1	2					5	5			1	5
Oleaceae	*Fraxinus spp.*		*												
	Ligustrum lucidum	Large-leaved Privet	*							3	6			1	1
	Olea europaea subsp. cuspidata	African Olive													
Oxalidaceae	*Oxalis incarnata*		*	0.1	5										
	Oxalis spp.											0.1	50		

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
Passifloraceae	*Passiflora spp.*		*												
Phormiaceae	*Dianella caerulea*	Blue Flax-lily													
	Dianella caerulea var. producta			8	75									0.3	3
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush		1	2					1	3				
	Glochidion ferdinandi	Cheese Tree				2	10			2	20			5	12
Phytolaccaceae	*Phytolacca octandra*	Inkweed	*			0.2	1								
Pinaceae	*Pinus radiata*	Radiata Pine	*												
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn								1	2				
	Pittosporum revolutum	Rough Fruit Pittosporum		5	3										
	Pittosporum undulatum	Sweet Pittosporum		15	5										
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*									0.5	50		
Platanaceae	*Platanus orientalis*		*												
Poaceae	*Avena sativa*	Oats	*												
	Briza minor	Shivery Grass	*												
	Bromus catharticus	Prairie Grass	*											5	30
	Cenchrus clandestinus	Kikuyu Grass	*					45	8000			40	1000		
	Cenchrus setaceus	Fountain Grass	*												
	Chloris gayana	Rhodes Grass	*			3	50	35	500						
	Cynodon dactylon	Common Couch										20	1000		
	Dactylis glomerata	Cocksfoot													
	Digitaria ciliaris	Summer Grass	*			0.5	30								
	Echinopogon caespitosus	Bushy Hedgehog-grass		0.2	40										
	Ehrharta erecta	Panic Veldtgrass	*	10	100					5	200			70	1000 +
	Eleusine indica	Crowsfoot Grass													
	Eragrostis curvula	African Lovegrass	*									1	20		
	Imperata cylindrica	Blady Grass								10	200				
	Microlaena stipoides	Weeping Grass													

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
	Oplismenus aemulus			1.5	75					3	100				
	Paspalum dilatatum	Paspalum	*			0.5	20	0.2	20			0.1	10		
	Paspalum spp.		*												
	Paspalum urvillei	Vasey Grass	*												
	Phalaris canariensis	Canary Grass	*					0.1	10						
	Setaria parviflora		*			0.1	5								
	Sporobolus africanus	Parramatta Grass	*												
	Sporobolus spp.	Rat's Tail Couch													
	Stenotaphrum secundatum	Buffalo Grass	*									15	1000		
	Themeda triandra														
Podocarpaceae	*Podocarpus elatus*	Plum Pine												5	1
Polygonaceae	*Acetosa sagittata*	Rambling Dock	*							1	10				
	Persicaria decipiens	Slender Knotweed				5	100								
	Persicaria lapathifolia	Pale Knotweed													
	Polygonum aviculare	Wireweed													
	Rumex sagittatus	Rambling Dock	*			5	200								
Portulacaceae	*Portulaca spp.*														
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*			0.1	10					0.1	20		
Proteaceae	*Banksia ericifolia*	Heath-leaved Banksia													
	Banksia integrifolia	Coast Banksia													
	Banksia spinulosa	Hairpin Banksia													
	Grevillea robusta	Silky Oak												1	1
	Grevillea spp.														
	Hakea sericea	Needlebush													
Rosaceae	*Prunus cerasifera*	Cherry Plum	*												
	Rubus fruticosus	Blackberry complex	*			0.1	3								
Rubiaceae	*Galium aparine*	Goosegrass	*					1	15						
	Richardia spp.		*									0.1	10		

Family	Scientific name	Common name	Exotic *	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6	
				C	A	C	A	C	A	C	A	C	A	C	A
Rutaceae	*Murraya paniculata*		*							0.5	1				
Salicaceae	*Populus spp.*		*												
Sapindaceae	*Acer negundo*	Box Elder	*												
	Cardiospermum grandiflorum	Balloon Vine	*												
	Cupaniopsis anacardioides	Tuckeroo										1	1		
	Dodonaea triquetra	Large-leaf Hop-bush								1	1				
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush	*			0.1	1								
	Solanum nigrum	Black-berry Nightshade	*	0.1	2			2	5	0.1	3			0.1	3
	Solanum sisymbriifolium		*			10	20								
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi				10	300								
Ulmaceae	*Celtis sinensis*	Japanese Hackberry	*	0.5	1					1	1			5	20
	Trema tomentosa	Native Peach		0.5	1										
	Ulmus parvifolia	Chinese Elm	*												
Urticaceae	*Parietaria judaica*	Pellitory	*					8	100					10	120
Verbenaceae	*Citharexylum spinosum*														
	Lantana camara	Lantana	*			2	5							10	11
	Verbena bonariensis	Purpletop	*					2	10						
Vitaceae	*Cayratia clematidea*	Native Grape				0.1	5							0.2	20
Zamiaceae	*Macrozamia communis*	Burrawang													

Family	Scientific name	Common name	Exotic	PNV (street trees)	PNV (suburban parks)	PNV (Olympic Park)	Avoided land
Acanthaceae	*Avicennia marina*	Grey Mangrove					X
Adoxaceae	*Viburnum spp.*			X			
Aizoaceae	*Tetragonia tetragonoides*	New Zealand Spinach					X
Amaranthaceae	*Alternanthera nana*	Hairy Joyweed		X			
	Amaranthus viridis	Green Amaranth				X	
Anacardiaceae	*Schinus molle*	Pepper Tree		X			
Apiaceae	*Centella asiatica*	Indian Pennywort					X
Apocynaceae	*Araujia sericiflora*	Moth Vine	*				X
	Nerium oleander	Oleander		X			
	Parsonsia straminea	Common Silkpod					X
	Plumeria spp.	Frangipani		X			
Araceae	*Zantedeschia aethiopica*	Arum Lily	*				
Araliaceae	*Hedera helix*	English Ivy			X		
Araucariaceae	*Agathis robusta*	Queensland Kauri					X
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	*	X			X
	Syagrus romanzoffiana	Cocos Palm			X		
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	*				X
Asteraceae	*Ageratina adenophora*	Crofton Weed	*	X			
	Bidens pilosa	Cobbler's Pegs	*			X	X
	Cirsium vulgare	Spear Thistle	*			X	X
	Conyza bonariensis	Flaxleaf Fleabane	*	X		X	
	Gamochaeta spp.		*				
	Hypochaeris albiflora	White Flatweed	*	X			X
	Hypochoeris radicata	Catsear	*				
	Lactuca serriola	Prickly Lettuce					X
	Ozothamnus diosmifolius	White Dogwood					X
	Sonchus oleraceus	Common Sowthistle	*			X	X

	Taraxacum officinale	Dandelion	*	X				
Basellaceae	*Anredera cordifolia*	Madeira Vine	*					X
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda		X	X			
	Pandorea pandorana	Wonga Wonga Vine						
Brassicaceae	*Brassica spp.*	Brassica		X				X
	Lepidium spp.			X				
Campanulaceae	*Lobelia purpurascens*	Whiteroot						X
Caryophyllaceae	*Stellaria media*	Common Chickweed		X				
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak						X
	Casuarina glauca	Swamp Oak		X	X	X		X
Chenopodiaceae	*Chenopodium album*	Fat Hen		X				
	Einadia hastata	Berry Saltbush						X
	Einadia trigonos	Fishweed		X				X
Commelinaceae	*Commelina cyanea*	Native Wandering Jew						X
	Tradescantia fluminensis	Wandering Jew	*					X
Convolvulaceae	*Dichondra repens*	Kidney Weed						X
	Ipomoea indica	Morning Glory	*					X
Crassulaceae	*Crassula ovata*	Jade Plant			X			
Cupressaceae	*Cupressus spp.*			X				
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	*					
	Machaerina spp.							X
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern						X
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower			X			
Doryanthaceae	*Doryanthes excelsa*	Gymea Lily		X	X			
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash						X
Euphorbiaceae	*Chamaesyce maculata*					X		
	Homalanthus populifolius							X
	Ricinus communis	Castor Oil Plant		X				
Fabaceae (Caesalpinioideae)	*Senna pendula*		*	X				X
Fabaceae (Faboideae)	*Erythrina x sykesii*	Coral tree		X				
	Glycine tabacina	Variable Glycine						

	Hardenbergia spp.							X
	Indigofera australis	Australian Indigo						X
	Medicago polymorpha	Burr Medic	*	X				
	Robinia pseudoacacia	Black Locust		X				
	Robinia spp.			X				
	Trifolium repens	White Clover		X				
	Trifolium spp.							X
	Vicia sativa	Common vetch	*					
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle						X
	Acacia falcata							X
	Acacia fimbriata	Fringed Wattle					X	
	Acacia floribunda	White Sally		X				
	Acacia linifolia	White Wattle		X		X	X	X
	Acacia longifolia						X	X
	Acacia parramattensis	Parramatta Wattle						X
Fumariaceae	*Fumaria officinalis*		*					X
Geraniaceae	*Geranium homeanum*							X
Hamamelidaceae	*Liquidambar styraciflua*	Sweetgum		X				
Juncaceae	*Juncus kraussii*	Sea Rush						X
	Juncus usitatus							X
Lamiaceae	*Westringia fruticosa*	Coastal Rosemary				X		
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	*	X		X	X	X
Lomandraceae	*Lomandra confertifolia*	Matrush		X				
	Lomandra longifolia	Spiny-headed Mat-rush				X	X	X
Magnoliaceae	*Magnolia spp.*			X				
Malaceae	*Photinia spp.*			X				
Malvaceae	*Brachychiton acerifolius*	Illawarra Flame Tree		X				
	Malva parviflora	Small-flowered Mallow			X			
	Modiola caroliniana	Red-flowered Mallow	*					
	Sida rhombifolia	Paddy's Lucerne	*		X			X
Meliaceae	*Melia azedarach*	White Cedar						X

Moraceae	*Ficus elastica*		X					
	Ficus macrophylla				X			X
	Ficus rubiginosa	Port Jackson Fig	X		X			X
Myrtaceae	*Angophora bakeri*	Narrow-leaved Apple						X
	Angophora costata	Sydney Red Gum			X			X
	Angophora floribunda	Rough-barked Apple		X	X			
	Backhousia citriodora			X				
	Callistemon citrinus	Crimson Bottlebrush		X				X
	Callistemon spp.							X
	Callistemon viminalis	Weeping Bottlebrush		X	X			
	Corymbia citriodora	Lemon-scented Gum		X	X			
	Corymbia maculata	Spotted Gum		X	X		X	X
	Eucalyptus acmenioides	White Mahogany					X	
	Eucalyptus bauerana	Blue Box						X
	Eucalyptus beyeri							X
	Eucalyptus botryoides	Bangalay					X	X
	Eucalyptus crebra	Narrow-leaved Ironbark					X	X
	Eucalyptus fibrosa	Red Ironbark			X		X	X
	Eucalyptus globoidea	White Stringybark		X				
	Eucalyptus globulus			X				
	Eucalyptus grandis	Flooded Gum			X			X
	Eucalyptus microcarpa	Western Grey Box						
	Eucalyptus microcorys	Tallowwood		X	X		X	X
	Eucalyptus moluccana	Grey Box			X			X
	Eucalyptus pilularis	Blackbutt						X
	Eucalyptus punctata	Grey Gum			X		X	X
	Eucalyptus robusta	Swamp Mahogany			X		X	
	Eucalyptus saligna	Sydney Blue Gum			X			
	Eucalyptus tereticornis	Forest Red Gum		X	X		X	X
	Eucalyptus viminalis	Ribbon Gum		X				
	Kunzea ambigua	Tick Bush						X

	Leptospermum polygalifolium	Tantoon				X				X
	Lophostemon confertus	Brush Box			X	X				X
	Melaleuca decora									X
	Melaleuca linariifolia	Flax-leaved Paperbark			X					X
	Melaleuca quinquenervia	Broad-leaved Paperbark			X	X		X		X
	Melaleuca spp.									X
	Melaleuca styphelioides	Prickly-leaved Tea Tree			X	X		X		X
	Syncarpia glomulifera	Turpentine				X				X
	Syzygium floribundum	Weeping Lilly Pilly			X					
	Tristaniopsis laurina	Kanooka			X					
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	*							X
Oleaceae	*Fraxinus spp.*			X		X				
	Ligustrum lucidum	Large-leaved Privet	*							X
	Olea europaea subsp. cuspidata	African Olive		X						X
Oxalidaceae	*Oxalis incarnata*		*							X
	Oxalis spp.									
Passifloraceae	*Passiflora spp.*									X
Phormiaceae	*Dianella caerulea*	Blue Flax-lily				X		X		X
	Dianella caerulea var. producta									
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush								X
	Glochidion ferdinandi	Cheese Tree				X				X
Phytolaccaceae	*Phytolacca octandra*	Inkweed	*							
Pinaceae	*Pinus radiata*	Radiata Pine								X
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn								X
	Pittosporum revolutum	Rough Fruit Pittosporum								X
	Pittosporum undulatum	Sweet Pittosporum		X						X
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	X						X
Platanaceae	*Platanus orientalis*			X						
Poaceae	*Avena sativa*	Oats								X
	Briza minor	Shivery Grass						X		
	Bromus catharticus	Prairie Grass	*							X

	Cenchrus clandestinus	Kikuyu Grass	*		X	X	X	X
	Cenchrus setaceus	Fountain Grass			X	X	X	
	Chloris gayana	Rhodes Grass	*				X	X
	Cynodon dactylon	Common Couch			X	X		X
	Dactylis glomerata	Cocksfoot			X			
	Digitaria ciliaris	Summer Grass	*		X		X	
	Echinopogon caespitosus	Bushy Hedgehog-grass						X
	Ehrharta erecta	Panic Veldtgrass	*		X		X	X
	Eleusine indica	Crowsfoot Grass			X			
	Eragrostis curvula	African Lovegrass	*				X	X
	Imperata cylindrica	Blady Grass						X
	Microlaena stipoides	Weeping Grass						X
	Oplismenus aemulus							X
	Paspalum dilatatum	Paspalum	*		X		X	
	Paspalum spp.							X
	Paspalum urvillei	Vasey Grass			X			
	Phalaris canariensis	Canary Grass	*					
	Setaria parviflora		*		X		X	
	Sporobolus africanus	Parramatta Grass				X	X	
	Sporobolus spp.	Rat's Tail Couch						X
	Stenotaphrum secundatum	Buffalo Grass	*					
	Themeda triandra							X
Podocarpaceae	*Podocarpus elatus*	Plum Pine						X
Polygonaceae	*Acetosa sagittata*	Rambling Dock	*					
	Persicaria decipiens	Slender Knotweed						
	Persicaria lapathifolia	Pale Knotweed		X				
	Polygonum aviculare	Wireweed		X				
	Rumex sagittatus	Rambling Dock	*					
Portulacaceae	*Portulaca spp.*			X				
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*					
Proteaceae	*Banksia ericifolia*	Heath-leaved Banksia				X		

	Banksia integrifolia	Coast Banksia		X	X			X
	Banksia spinulosa	Hairpin Banksia		X				
	Grevillea robusta	Silky Oak			X			X
	Grevillea spp.				X			
	Hakea sericea	Needlebush						X
Rosaceae	*prunus cerasifera*	Cherry Plum		X				
	Rubus fruticosus	Blackberry complex	*	X				
Rubiaceae	*Galium aparine*	Goosegrass	*					
	Richardia spp.		*					
Rutaceae	*Murraya paniculata*		*	X				
Salicaceae	*Populus spp.*			X				
Sapindaceae	*Acer negundo*	Box Elder		X				
	Cardiospermum grandiflorum	Balloon Vine		X				X
	Cupaniopsis anacardioides	Tuckeroo			X		X	X
	Dodonaea triquetra	Large-leaf Hop-bush						X
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush	*					
	Solanum nigrum	Black-berry Nightshade	*	X			X	X
	Solanum sisymbriifolium		*	X				
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi			X			
Ulmaceae	*Celtis sinensis*	Japanese Hackberry	*	X				X
	Trema tomentosa	Native Peach						X
	Ulmus parvifolia	Chinese Elm				X		
Urticaceae	*Parietaria judaica*	Pellitory	*					X
Verbenaceae	*Citharexylum spinosum*				X			
	Lantana camara	Lantana	*			X		X
	Verbena bonariensis	Purpletop	*			X	X	X
Vitaceae	*Cayratia clematidea*	Native Grape						X
Zamiaceae	*Macrozamia communis*	Burrawang			X			

APPENDIX H Ultrasonic recorder results

Microbat Call Identification Report

Prepared for ("Client"):	Arcadis Australia Pacific
Survey location/project name:	Meadowbank, Dundas, Rosehill
Survey dates:	18th December 2024 – 13th January 2025
Client project reference:	30234546
Job no.:	ARC-2502
Report date:	3 February 2025

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Methods

Data received

Balance! Environmental received 12,097 ultrasonic acoustic files (WAV files) recorded on two Anabat Chorus detectors and one Anabat Swift unit. The data were recorded at three sites, with each site sampled by a single detector for 3-25 consecutive nights (see **Table 1**).

Call analysis and species identification

Call analysis was performed in *Anabat Insight* (v2.1.3; Titley Scientific, Brisbane). All WAV files were first processed with a generic noise filter to exclude files with only non-bat noise from further analysis. Files that passed the noise filter were then run through a Decision Tree Analysis to group and label similar calls based on zero-crossing analysis metrics (e.g. characteristic frequency (Fc), pulse duration (Dur) and time between pulses (TBC)). Species present in each Decision Tree group were then confirmed by manually comparing call spectrograms and derived metrics with those of regionally relevant reference calls and published call descriptions (Pennay *et al*. 2004).

Where a Decision Tree group contained a large volume of files, the manual call confirmation process continued only until all potential constituent species were identified. The remaining calls in the group were surplus to identification requirements and simply retained group labels.

The likelihood of species' presence on site was confirmed by referring to the *BatMap* application (Australasian Bat Society 2021) and other published distributional information (e.g. Churchill 2008; Baker & Gynther 2023).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/. Species nomenclature follows Armstrong *et al.* (2020).

Table 1 Anabat deployment details, Dundas, Meadowbank & Rosehill, December 2024.

Coordinates derived by averaging the nightly GPS metadata stored in WAV files.

Detector	Location	Latitude	Longitude	First night	Last night	Total WAV files	No. WAV with calls
Chorus01	Dundas	-33.8031	151.0319	18-Dec	20-Dec	4015	2952
Chorus02	Meadowbank	-33.8189	151.0866	18-Dec	04-Jan	5751	2666
Swift	Rosehill	-33.8211	151.0292	18-Dec	13-Jan	2331	1650

Results & Discussion

Noise filtering removed 4829 WAV files from further consideration. Some 482 individual bat calls, within 444 WAV files, were required to identify all species present in the dataset. The other 6824 WAV files were surplus to identification requirements (>99% of these files contained calls from just one species – *Chalinolobus gouldii*).

Seven taxa were reliably identified from 433 calls detected across the three sites, including:

- *Chalinolobus gouldii*
- *Chalinolobus morio*
- *Falsistrellus tasmaniensis*
- *Miniopterus australis*
- *Miniopterus orianae oceanensis*
- *Austronomus australis*
- *Ozimops ridei*

Thirty unresolved calls represented at least one and potentially three additional species – *Myotis macropus* and/or *Nyctophilus geoffroyi* and/or *N. gouldi* – that were not otherwise recognised in the dataset. The similarities between these species' low-intensity, steep, near-linear FM calls make it difficult to differentiate *M. macropus* calls from those of the *Nyctophilus* spp.; however, when actively foraging, *M. macropus* generally produces calls with erratic changes in pulse-shapes, and sequences often include approach- and capture-phase calls, which are generally absent in *Nyctophilus* calls. On this occasion, no such "typical" *M. macropus* foraging calls were detected, and all observed calls had mixed or intermediate pulse characteristics and metrics, which precluded reliable species attribution.

Table 2 lists species detected at each site; and spectrograms of each identified call type appear in **Appendix 1**.

Table 2 Bats recorded during the Dundas, Meadowbank and Rosehill surveys, December 2024.

♦ = definitely present - at least one call from the site was attributed unequivocally to the species

□ = possibly present - calls like those of the species were recorded but could not be positively identified

Detector:	**Chorus01**	**Chorus02**	**Swift**
Location:	Dundas	Meadowbank	Rosehill
Chalinolobus gouldii	♦	♦	♦
Chalinolobus morio	♦		
Falsistrellus tasmaniensis	♦		
Myotis macropus	□	□	□
Nyctophilus geoffroyi / N. gouldii	□	□	□
Miniopterus australis	♦	♦	
Miniopterus orianae oceanensis		♦	♦
Austronomus australis	♦		♦
Ozimops ridei	♦	□	♦

References

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2020). *A current taxonomic list of Australian Chiroptera.* Version 2020-06-09. http://ausbats.org.au/species-list/4593775065.

Australasian Bat Society (2021). *BatMap* - http://ausbats.org.au/batmap; Accessed 23/5/2024.

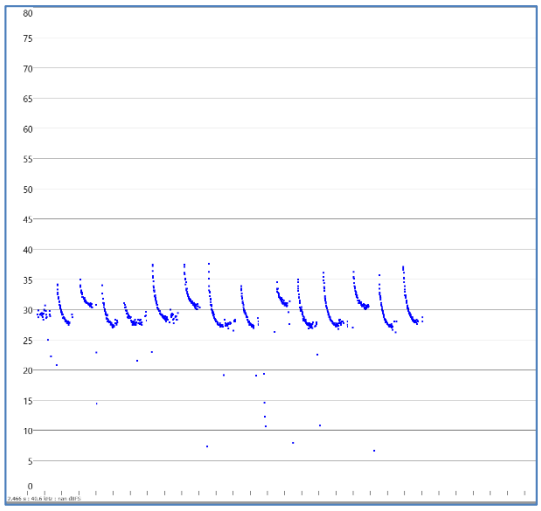
Baker, A.M. and Gynther, I.C. (editors) (2023). *Strahan's Mammals of Australia*. Fourth Edition; Reed New Holland Publishers; Sydney.

Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.

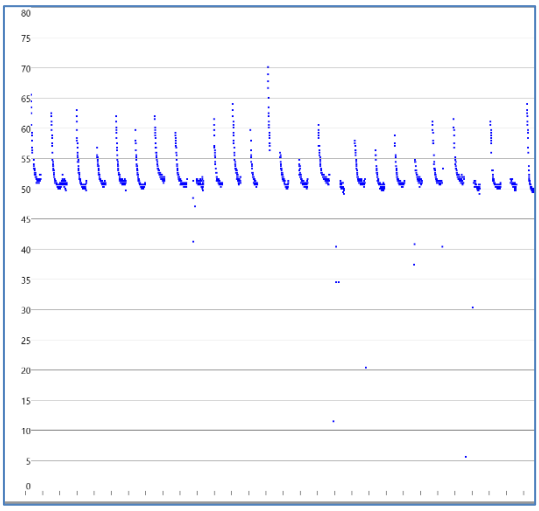
Pennay, M., Law, B., and Reinhold, L. (2004). *Bat calls of New South Wales: Region based guide to echolocation calls of Microchiropteran bats*. NSW Department of Environment and Conservation, Hurstville.

Reardon, T. (2003). Standards in bat detector based surveys. Australasian Bat Society Newsletter 20, 41-43.

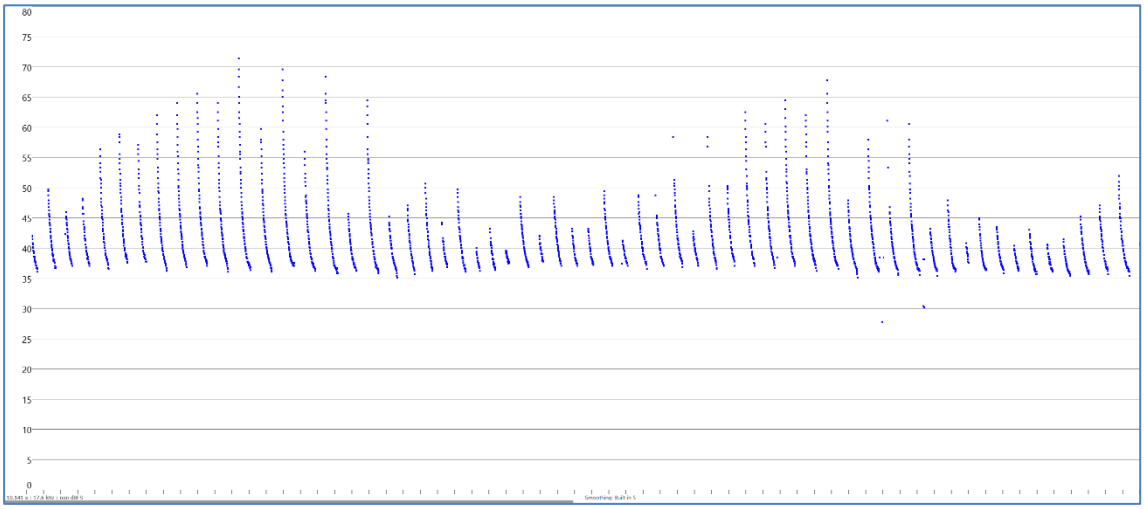
Appendix 1 Representative bat-calls: Dundas, Meadowbank & Rosehill surveys, December 2024.
X-axis (time)=10 msec per tick; time between pulses compressed



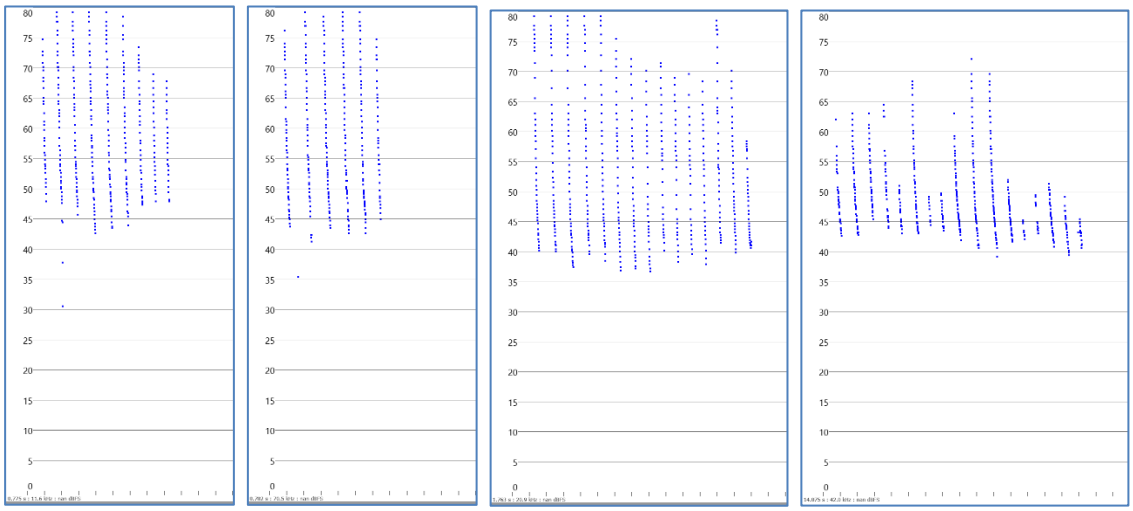
Chalinolobus gouldii



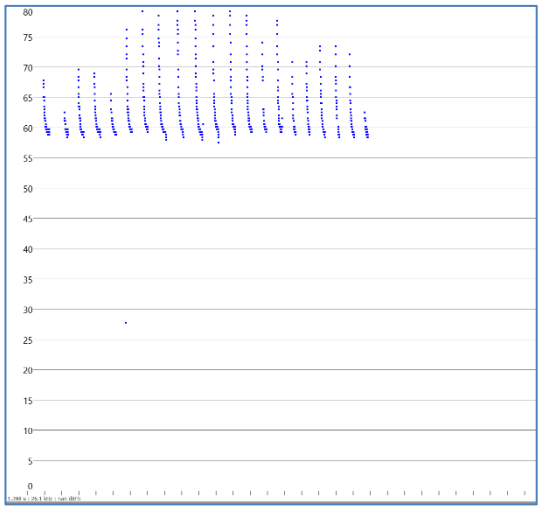
Chalinolobus morio



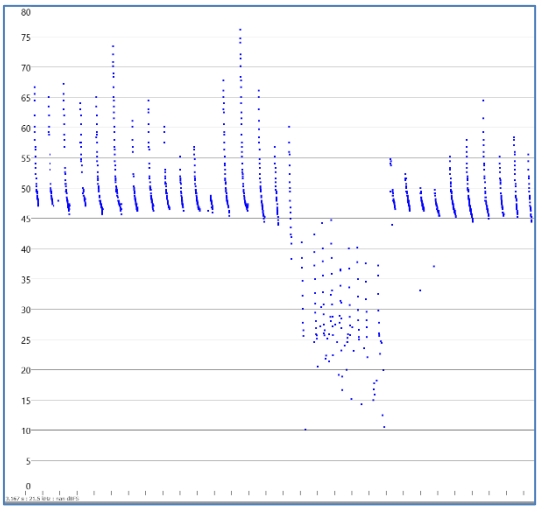
Falsistrellus tasmaniensis



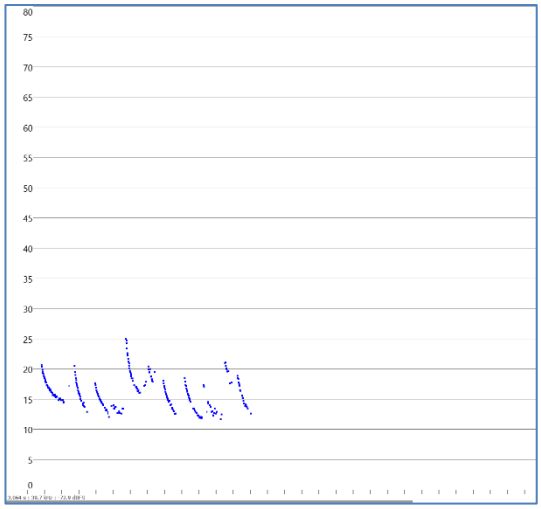
Myotis macropus or *Nyctophilus geoffroyi* or *N. gouldii*



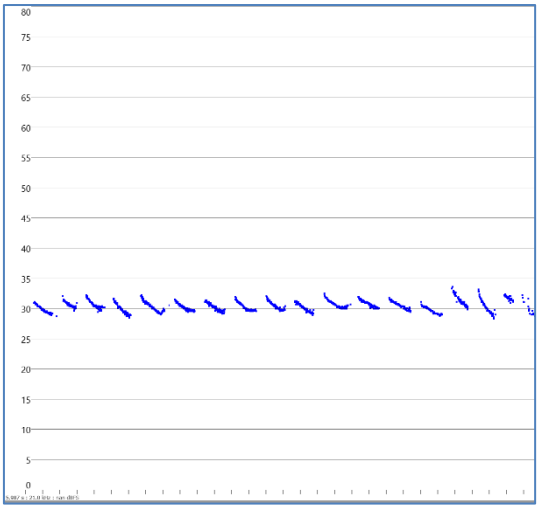
Miniopterus australis



Miniopterus orianae oceanensis



Austronomus australis



Ozimops ridei

APPENDIX I Correspondence with CPHR

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

From: [redacted]
Sent: Tuesday, 17 June 2025 2:07 PM
To: Jill Berwick [redacted]
Cc: [redacted]
Subject: [External] Request for a Pre-lodgement Meeting - Greater Parramatta and Olympic Peninsular Water Cycle Management Project (SSI 74258485)

CAUTION: This email originated from outside the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hello Jill

Thank you for your request for advice on Greater Parramatta and Olympic Peninsular Water Cycle Management Project (SSI 74258485) and specifically the proposed assessment approach for the Bar-tailed Godwit/Curlew Sandpiper.

CPHR supports the proposed approach to “assess impacts to these species using ‘prescribed impacts’ to describe the impacts to the species’ habitats in adjacent tidal mudflats and the muddy margins of wetland vegetation that are outside the subject land.” If Sydney Water has any further questions, please contact CPHR via Greater Sydney Region Planning Unit Mailbox: rog.gsrplanning@environment.nsw.gov.au. CPHR is also open to a meeting if required.

CHPR does not have any comments to make at this stage on soils and water. CPHR has contacted NPWS regarding the request for a meeting. In the interim, for information please see the attached guidelines for development adjoining national parks https://www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/development-guidelines.

Your message of appreciation has been passed on to the Water, Floodplain and Coasts Team.

Regards

Susan

[redacted]
Senior Team Leader Planning, Greater Sydney
Regional Delivery
Conservation Programs, Heritage and Regulation
Department of Climate Change
Energy, the Environment and Water

[redacted] [redacted]

dcceew.nsw.gov.au

Level 14, 4 Parramatta Square,
Parramatta

I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

[redacted]
Senior Conservation Planning Officer – Greater Sydney Branch

Regional Delivery
Conservation Programs, Heritage and Regulation Group
Department of Climate Change, Energy, the Environment and Water
[redacted]
4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150
Working days Monday to Friday
dcceew.nsw.gov.au

From the 20 January 2025 the Biodiversity, Conservation and Science Group became the Conservation Programs, Heritage and Regulation Group.

From Major Projects Portal 28 May 2025

Hello
Sydney Water is progressing the EIS for this project (Greater Parramatta and Olympic Peninsular Water Cycle Management Project (SSI 74258485)). We would appreciate a meeting to discuss some queries raised by our biodiversity specialists, Arcadis on some work we are doing within Parramatta River that is within the Important Habitat Mapping. I have included the details below.
I have also provided a summary of other relevant aspects specified in the SEARs as relevant to BCS and would be happy to discuss those separately with relevant members of your team.
At this stage, we would like to meet as soon as possible to discuss our approach to the species identified in the Important Habitat Mapping and seek any feedback you may have.

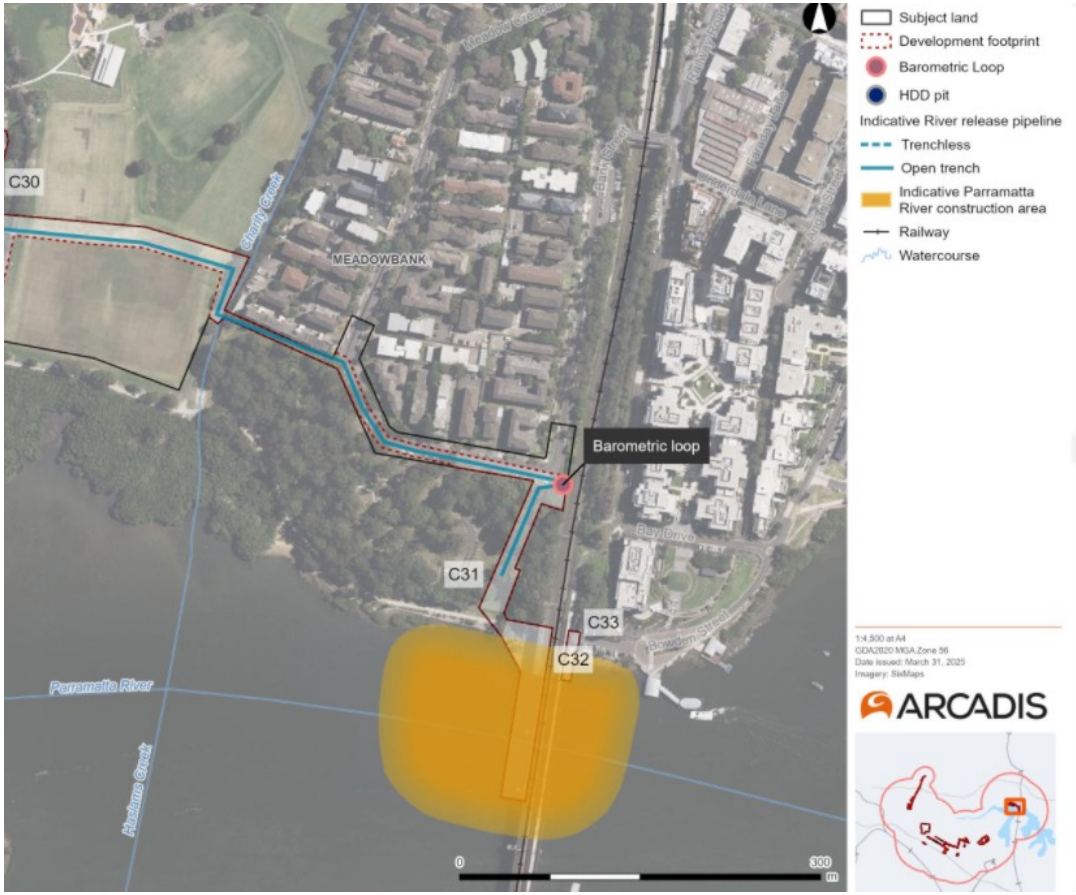
Greater Parramatta and Olympic Peninsular Water Cycle Management Project (SSI 74258485)

Sydney Water proposes to build and operate a new water resource recovery facility (WRRF) at Camellia–Rosehill with associated infrastructure to provide wastewater services to the Greater Parramatta and Olympic Peninsula (GPOP) growth area. Sydney Water has engaged Arcadis to prepare a Biodiversity Development Assessment Report (BDAR) for the area potentially impacted by the Project. The new WRRF will produce high quality treated water using advanced treatment for release into the Parramatta River. An issue has arisen that we would be interested in obtaining feedback from BCS on.

Bar-tailed Godwit/Curlew Sandpiper Important Habitat Mapping

The construction of the river release pipeline requires the use of a floating barge. Eight smaller sized pipes would be placed on the bed of the river, with concrete mattresses (or similar) laid over to hold the pipes in place. An approximate construction 'footprint' (within the Parramatta River) has been highlighted by Sydney Water. It is noted that the Parramatta River is mapped on the Important Habitat Map (BAM-C) for Migratory shorebirds (Bar-tailed Godwit and Curlew Sandpiper). As no impacts to native vegetation / vegetation zones will occur in this area, the species polygon cannot be clipped to anything to generate credits. The construction impacts are also considered temporary in nature. It is estimated that construction of the pipelines within the water would be over one full weekend, with some works on the following few weekends. Our suggested approach is to assess impacts to these species using 'prescribed impacts' to describe the

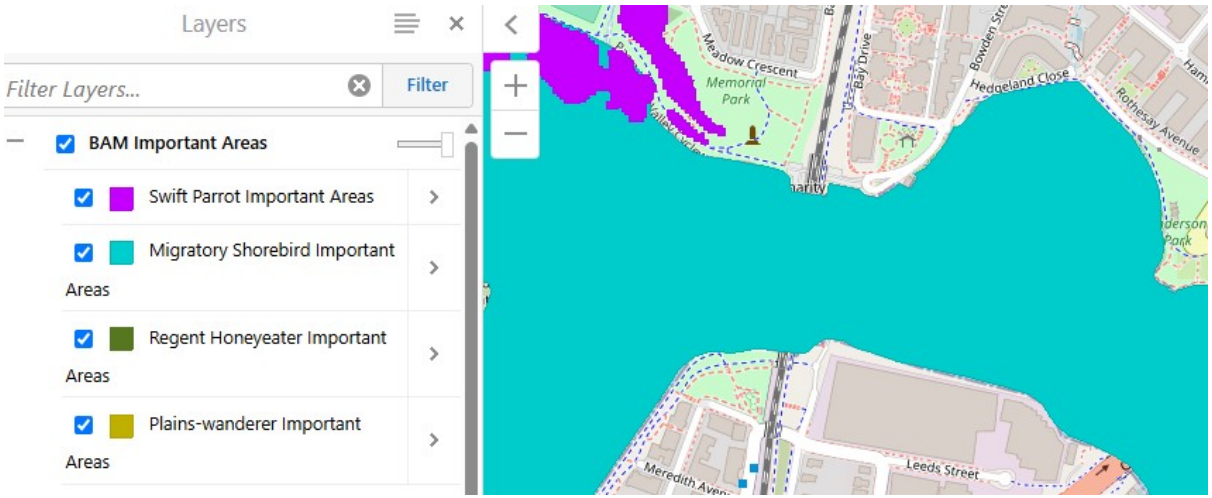
impacts to the species' habitats in adjacent tidal mudflats and the muddy margins of wetland vegetation that are outside the subject land. We are seeking guidance on whether this approach is appropriate. The below figures have been attached for convenience.



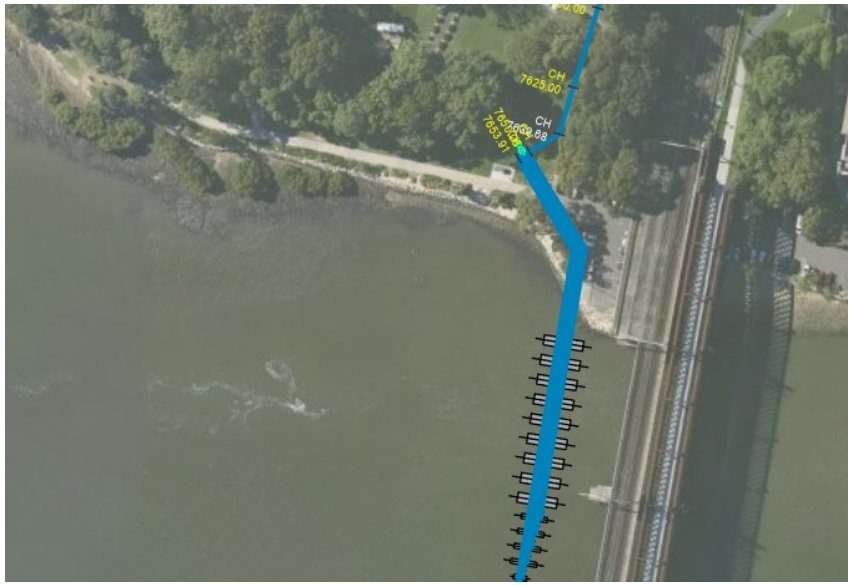
Subject land
Development footprint
Barometric Loop
HDD pit
Indicative River release pipeline
Trenchless
Open trench
Indicative Parramatta River construction area
Railway
Watercourse

1:4,500 at A4
GDA2020 MGA Zone 56
Date issued: March 31, 2025
Imagery: tileMaps

ARCADIS


Layers
Filter Layers...
Filter
BAM Important Areas
Swift Parrot Important Areas
Migratory Shorebird Important Areas
Regent Honeyeater Important Areas
Plains-wanderer Important Areas
Meadow Crescent
Memorial Park
Bay Drive
Hedgeland Close
Rothesay Avenue
Leeds Street





Proposed biodiversity agenda

- Project overview
- Bar-tailed Godwit/Curlew Sandpiper Important Habitat Mapping

Other matters relevant to BCS

- Water and soils - we have engaged Aurecon, Jacobs and Arcadis to assess various aspects of these topics. We have discussed the set up of the models with DCCEW but have not yet progressed to a point where we have enough detail about potential impacts to share. However, we would appreciate understanding if there are any specific aspects related to water and soils you would like to be consulted about in advance of the EIS, and we can arrange a time at a later date to do this.
- Lands managed by National Parks and Wildlife Service - we do not propose direct impacts on National Parks land, including the Newington Nature Reserve. We are proposing to use trenchless construction methods for the pipelines under Narrawang Wetlands and Hill Road, and in the vicinity of Haslams Creek and Nuwi Wetlands. We are happy to provide a briefing now about our plans in this area and understand any specific issues you may have associated with construction and operational activities in the vicinity these areas.

- Flooding - we are engaging with BCS regarding the flood models and different scenarios identified for the assessment. We have appreciated the input from the BCS/CPHR team.

If you would like to contact me directly my details are [redacted]
Regards,
Jill Berwick
Environmental Assessment Team Manager

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