

RP03

Biodiversity Assessment Report

Sydney Water

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Document prepared by:

Aurecon Australasia Pty Ltd

ABN 54 005 139 873

Level 11, 73 Miller Street
North Sydney 2060 Australia

PO Box 1319

North Sydney NSW 2059
Australia

T +61 2 9465 5599

F +61 2 9465 5598

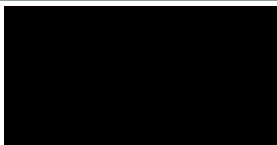
E sydney@aurecongroup.com

W aurecongroup.com

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Author signature		Approver signature	
Name	Catherine Stanislaus	Name	Justin Sullivan
Title	Ecological Consultant	Title	Associate (Senior Ecologist)

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Glossary

Term	Definition
AOBV	Area of Biodiversity Value
BAR	Biodiversity Assessment Report
BC Act	Biodiversity Conservation Act
BDAR	Biodiversity Development Assessment Report
BV mapping	Biodiversity Values mapping
Construction Corridor	The Study Area proposed by the JV
EPBC Act	<i>Environment Planning and Biodiversity Conservation Act 1999</i>
EP&A Act	<i>Environment Planning and Assessment Act 1979</i>
FM Act	<i>Fisheries Management Act 1991</i>
GDE	Groundwater Dependent Ecosystem
Environmental Impact Area	The Impact Area proposed by the JH alignment
HDD	Horizontal Directional Drilling
JV	McConnell Dowell Gamuda Joint Venture
KFH	Key Fish Habitat
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
PMST	Protected Matters Search Tool
RP03	Reinstated Project 03
RPZ	Root Protection Zone
SIS	Species Impact Statement
SME	Subject Matter Expert
TEC	Threatened Ecological Community
TPZ	Tree Protection Zone
WoNS	Weeds of National Significance

Executive Summary

Sydney Water are proposing to reinstate an existing watermain (RP03) running between the pumping station in Ryde and Roland Avenue, Warrawee (~10 km) ('the Project').

Key findings of this Biodiversity Assessment Report (BAR) are provided as follows:

- The desktop review identified potential presence of 106 threatened species, 16 migratory species and 11 threatened ecological communities (TECs).
- The Project will intersect with one creek mapped as KFH (Key Fish Habitat) - Devlin's Creek which forms Lane Cove River.
- The Study Area intersects with two terrestrial Ground Dependent Ecosystems (GDEs) - Coastal Sandstone Ridgetop Woodland and GDE-Hinterland Sandstone Gully Forest and the Project is located within the Greater Metropolitan Region groundwater management area.
- Native vegetation present in the Impact Area may be suitable dispersal, sheltering, foraging and breeding habitat for native species, including potential occasional and seasonal habitat for threatened species.
- Five threatened species are considered to have a moderate likelihood of occurrence within the Study Area:
 - Little Lorikeet (*Parvipsitta pusilla*) (Vulnerable under the *Biodiversity Conservation Act 2016* (BC Act))
 - Little Bent-winged Bat (*Miniopterus australis*) (Vulnerable under the BC Act)
 - Large Bent-winged Bat (*Miniopterus orianae oceanensis*) (Vulnerable under the BC Act)
 - Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable under the BC Act and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).
 - Powerful Owl (*Ninox strenua*) (Vulnerable under the BC Act)
- Subsequently Significant Impact Assessments have been completed in Appendix F. Based on the outcomes of the Test of Significance and Assessments of Significance, the Project is not expected to result in a significant impact on these threatened species.
- The field assessment did not identify any threatened flora within the Study Area.
- The Study Area supported large areas of non-native vegetation, though four native Plant Community Types (PCTs) were identified within the Impact Area, namely:
 - PCT 3262: Sydney Turpentine Ironbark Forest
 - PCT 3259: Sydney Coastal Shale-Sandstone Forest
 - PCT 3595: Sydney Coastal Sandstone Gully Forest
 - PCT 3592: Sydney Coastal Enriched Sandstone Forest.
- Some areas of PCTs conformed to TECs listed under the Commonwealth EPBC Act and NSW BC Act, namely:
 - EPBC Act and BC Act Critically Endangered TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion.
 - BC Act Duffys Forest Ecological Community in the Sydney Basin Bioregion
- Subsequently Significant Impact Assessments have been completed in Appendix F. Based on the outcomes of the Test of Significance and Assessments of Significance, the Project is not expected to result in a significant impact on these threatened ecological communities.

- As impacts are assessed as non-significant, non-statutory offsets are required, in accordance with the Sydney Water Biodiversity Offset Guide (Sydney Water Corporation, 2024) (the Guide).
- Potential indirect impacts on threatened biodiversity and triggering of key threatening processes could occur as result of the Project. Safeguards and mitigation actions have been provided; their implementation would assist avoiding indirect impacts.

1 Introduction

1.1 Project background

Sydney Water are proposing to reinstate an existing watermain running between the pumping station in Ryde and Roland Avenue, Warrawee (~10 km) ('the Project'). The reinstated pipeline (RP03) watermain was installed in the 1930s and taken out of service in 2014 due to its poor condition and failure risk. The works are required to increase the capacity of the water distribution system for servicing the uptake in drinking water demand within the Prospect Water System, particularly as the North Shore is projected to grow. It is also helpful for improving resilience of the Prospect North System by providing a contingency supply from the Ryde System.

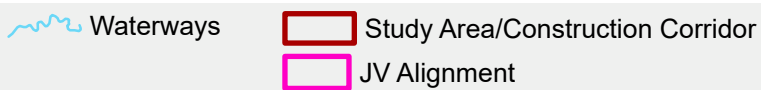
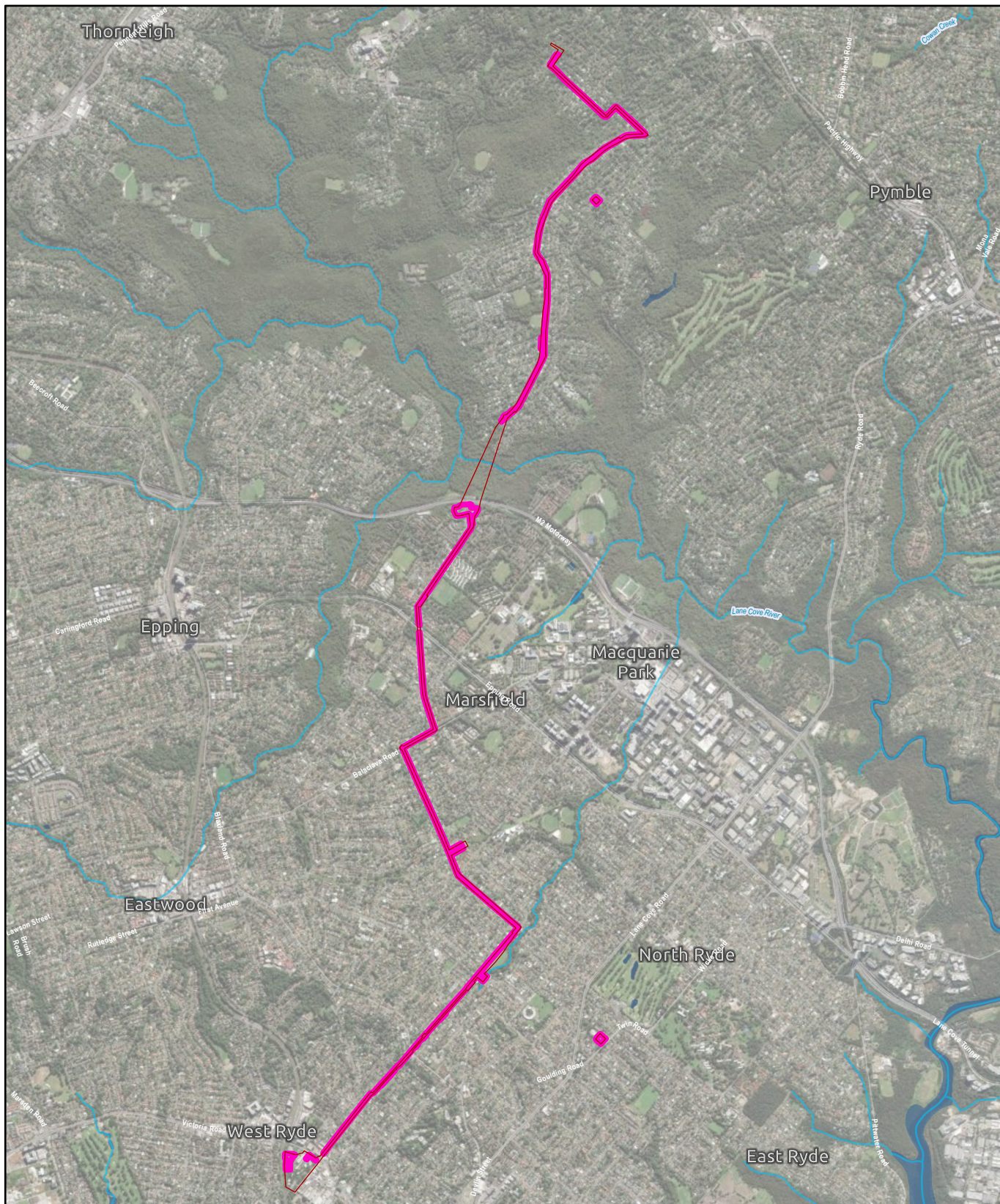
1.2 Project location and details

The Project is located across multiple suburbs including West Ryde, Denistone East, Marsfield and South Turramurra (Figure 1-1). Table 1-1 provides further details on the location of the Project, and Table 1-2 provides the property details including address and lot number.

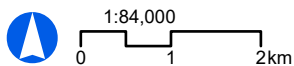
Table 1-1. Project administrative details

Project details	Description
Address	Refer to Table 1-2 a full property list.
Study Area	The alignment proposed by the McConnell Dowell Gamuda Joint Venture (the JV) which includes trenched areas along the road, HDD underbore sections along reserves or National Parks, HDD pits, Compound areas, Laydown areas, easement areas, temporary access tracks, and the Construction corridor.
Impact Area	The Impact Area proposed by JV, which includes Compound areas and Direct Pipe Excavation Areas located at Vimiera Rd, Marsfield.
Locality	The area within a 10 km radius around the Study Area boundary used for review of existing threatened species records.
Location	The Project will be located across multiple suburbs in North-west Sydney including West Ryde, Denistone East, Marsfield and South Turramurra. These suburbs have mixed-use land zonings from residential and commercial core to C2- Environmental Conservation area and RE1-Public recreation. Areas of the alignment vary between planted street vegetation in dense suburban areas to remnant bushland patches in areas adjacent or within National Parks or Reserves. The laydown areas are located in either parks or reserves within the locality, including Twin Creeks Reserve, Santa Rosa Park, Kotara Park, Weerona Reserve, Bradley Reserve and within several other street reserves.
LGA	City of Ryde and Ku-ring-gai Council

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Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

RP03 Biodiversity Assessment Report

Figure 1: Study Area and Impact Area

Table 1-2. List of Properties within the Study Area

Property Address	Suburb	Project Component	Site assessed or Desktop assessed
Ryde Pumping Station	West Ryde	Site Compound and Laydown Trenching activities from Ryde Pumping Station and excavation of micro-tunnel launch shaft for Victoria Road crossing	Site assessment completed
Victoria Rd to Goodwin Rd	West Ryde	Tree Protection Zones will be established around trees in each working areas to minimise impact.	Site assessment completed
Goodwin St to Benson Lane	West Ryde	Trenching works in existing easement	Site assessment completed
Blaxland Rd to North Road	Ryde	Trenching works in existing easement	Site assessment completed
Blaxland Rd to Quarry Rd	Ryde	Construction Corridor and Impact Area	Site assessment completed
Bridge Road to Vimiera Road	Ryde	Tree Protection Zones will be established around trees in each working areas to minimise impact.	Site assessment completed
Vimiera Rd	Marsfield	Construction Corridor, Corridor Impact Area (areas of tree removal) HDD Excavation Zone	Site assessment completed
Santa Rosa Park	Ryde	Construction Corridor and Impact Area	Site assessment completed
Bridge Rd to Abuklea Rd	Epping	Construction Corridor and Impact Area	Site assessment completed
13 Danbury Cl,	Marsfield	Construction Corridor and Compounds	Site assessment completed
Balaclava Rd,	Eastwood	Construction Corridor and Impact Area	Site assessment completed
Agincourt Rd,	Marsfield	Construction Corridor, Compounds and Impact Area	Site assessment completed
Dayman Pl	Marsfield	Construction Corridor, and Impact Area	Site assessment completed
Marsfield Park	Marsfield	Construction Corridor, and Impact Area	Site assessment completed
Lane Cove National Park- Underbored section	Lane Cove	Construction Corridor, and Impact Area	Desktop assessment completed
Kissing Point Road	South Turramurra	Construction Corridor, Compounds and Impact Area	Site assessment completed
Monteith Street	Turramurra	Construction Corridor, and Impact Area	Site assessment completed
Rothwell Rd	Turramurra	Construction Corridor, and Impact Area	Site assessment completed
Roland Avenue	Wahroonga	Construction Corridor, and Impact Area	Site assessment completed

1607-1625 Pacific Highway	Wahroonga	Construction Corridor, Compounds and Impact Area	Site assessment completed and Desktop assessment completed (cross-checked historical data to confirm the presence of PCT where the alignment joins Ada Avenue).
Acacia Close	Turramurra	Construction Corridor	Site assessment completed
Roland Avenue	Wahroonga	Construction Corridor, and Impact Area	Site assessment completed
1607-1625 Pacific Highway	Wahroonga	Construction Corridor, Compounds and Impact Area	Site assessment completed and Desktop assessment completed (cross-checked historical data to confirm the presence of PCT where the alignment joins Ada Avenue).
Acacia Close	Turramurra	Construction Corridor	Site assessment completed

1.2.1 Purpose of the assessment

The purpose of the BAR is to provide an assessment of the ecological values at the Study Area, including an assessment of any potential impacts to native vegetation and/or significant flora, fauna and ecological communities. This report identifies the environmental approvals that may be triggered under Commonwealth and State legislation. This report also provides identification of any key risk areas of the Study Area, and recommendations for locating the Project infrastructure to avoid impacts, as well as mitigation measures to manage any residual impacts on ecological values.

The scope of the BAR is to:

- Undertake a review of existing ecological information for the Study Area, including preparation of database searches for native vegetation, flora and fauna
- Undertake an ecological field assessment to determine the type, extent and quality of native vegetation and fauna habitat present in the Study Area
- Identify any significant ecological values (including threatened species or communities) that have potential to occur in the Study Area
- Provide mapping of native vegetation and any records of habitat for threatened flora, fauna and ecological communities recorded during the ecological field assessment
- Provide assessment of the likelihood of occurrence for threatened flora and fauna listed on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or *Biodiversity Conservation and Biodiversity Act 2016* (BC Act), including determination of whether any additional targeted surveys are required
- Outline the potential legislative implications of the Project under both the EPBC Act, BC Act and *Environmental Planning and Assessment Act 1979* (EP&A Act)
- Provide recommendations to assist with the Project design and locating of the Project infrastructure
- Provide recommended mitigation measures to manage residual impacts to ecological values.

1.3 Limitations

The outcomes of this report are limited to the biodiversity assessment undertaken for the Study Area and immediate surrounds. This report is limited to the scope defined in Section 1.1. Should further information become available regarding the conditions at the Study Area, the Planning Partnership reserves the right to review the report in the context of the additional information. If the Impact Area is changed (e.g., if the extent is larger or the location moved), additional survey will be required to assess biodiversity values and impacts outside of the Study Area previously surveyed.

Certain sites within the Study Area were not able to be accessed during field assessment or were considered unsafe to access. These areas were assessed visually from adjoining/nearby accessible locations, with vegetation ground-truthed from a distance. Namely, one private land section on Vimiera Rd Marsfield, was inaccessible due to a locked gate, therefore vegetation was assessed over the fence, from a road running parallel to the site.

Biodiversity site assessments can be undertaken at any time of year, however seasonal and daily variations can result in some flora and fauna not being detectable at certain times. Particularly, many flowering plant species are only detectable when producing flowers or fruits. In general, spring is considered the optimal period to undertake biodiversity assessments in NSW. Nonetheless, the autumn timing of the field assessment is considered appropriate to ascertain the extent and condition of native vegetation and habitat in the Study Area.

2 Legislative and policy context

2.1 Commonwealth and NSW state legislation

Commonwealth and NSW State Legislation and State Environmental Planning Policy relevant to the Project are outlined in Table 2-1.

Table 2-1. Relevant biodiversity legislation

Legislation or policy	Details	Relevance to the Project
Commonwealth legislation		
EPBC Act	The EPBC Act is Commonwealth legislation that provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, termed Matters of National Environmental Significance (MNES). Under the EPBC Act, an action that has, will have, or is likely to have, a significant impact on a MNES must be referred to the Commonwealth Minister for Environment. The Minister will then determine whether the proposed action requires formal assessment and approval under the EPBC Act.	This BAR has been prepared to determine whether threatened species and/or ecological communities listed under the EPBC Act are considered likely to occur within the Study Area, and if so, whether the Project is likely to result in a significant impact to these values. Consequently, the BAR will outline whether an EPBC Act referral is required.
State legislation		
EP&A Act	The EP&A Act establishes the system of environmental planning and assessment in NSW. This Project is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as SWC, which do not require development consent under Part 4 of the Act. In accordance with Section 5.5 of the EP&A Act, SWC, as the proponent and determining authority, must examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by the Project (via a REF). Under Part 5 of the EP&A Act, an activity will likely result in a significant impact if: It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the ToS (Section 7.3 of the BC Act) It is carried out in a declared Area of Outstanding Biodiversity Value (AOBV). If it is determined that an activity is likely to significantly affect threatened species or ecological communities the preparation of a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) would be required (if the proponent elects to participate in the Biodiversity Offset Scheme).	This BAR forms part of the REF being prepared for the Project and assesses the biodiversity impacts of the Project to meet the requirements of the EP&A Act.

BC Act	The BC Act establishes a framework for assessing and offsetting biodiversity impacts from proposed development. It provides for: ■ Threatened species and ecological communities ■ AOBV (previously critical habitat under the Threatened Species Conservation Act 1995) ■ Key Threatening Processes ■ Private land conservation agreements ■ The Biodiversity Offsets Scheme ■ Biodiversity assessment requirements ■ Biodiversity certification of land. Section 7.3 of the BC Act states that a test should be used to determine whether a proposed development or activity is 'likely to significantly affect threatened species.' Section 7.8 specifies that if an activity under Division 5.1 of the EP&A Act is likely to significantly affect threatened species, then a SIS or a BDAR is required to be prepared.	This BAR has been prepared to determine whether threatened species and/or ecological communities listed under the BC Act are considered likely to occur within the Study Area, and if so, whether the Project is likely to result in a significant impact to these values. Consequently, the BAR will outline whether a SIS or BDAR is required.
<i>Fisheries Management Act 1994</i> (FM Act)	The FM Act aims to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. Part 7A Division 4 of the FM Act prohibits, without a licence or permit, activities that damage habitats or harm threatened species, populations or ecological communities.	This BAR will determine whether the Project will result in activities that damage habitats or harm threatened species, populations or ecological communities listed under the FM Act. Consequently, the BAR will outline whether a licence or permit is required for the Project.
<i>Biosecurity Act 2015</i>	The <i>Biosecurity Act 2015</i> covers all biosecurity risks, including pest animals, plant diseases and weeds and introduces the legally enforceable concept of a general biosecurity duty. The Biosecurity Act divides NSW into regions based on combined LGAs and priority weeds for a region. Some weeds are managed at a State level as they form part of a broader containment strategy. The legislation also compliments listed as Weeds of National Significance (WoNS). Under Clause 22 of the Act, SWC has a duty to ensure that, so far as is reasonably practicable, potential biosecurity risks from the Project are prevented, eliminated or minimised.	This BAR will determine whether any priority weeds are located within the Study Area which need to be managed by SWC.

3 Methodology

3.1 Desktop assessment

The database searches undertaken provided a shortlist of the potential flora, fauna and ecological communities that may occur within the locality.

The following reports were reviewed:

- RP03 Ground Water Zone of Influence, prepared by McConnell Dowell Gamuda Joint Venture for Sydney Water, April 2025

The following databases were reviewed to inform the assessment:

- Commonwealth Protected Matters Search Tool (PMST) (Commonwealth DCCEE, 2025)
- Commonwealth National Atlas of Groundwater Dependent Ecosystems (GDE) (Commonwealth of Australia and Bureau of Meteorology, 2025)
- NSW Government BioNet Atlas database and BioNet Vegetation Classification (State Government of NSW and NSW DPE, 2025b; State Government of NSW and NSW DPE, 2025c)
- NSW Government existing vegetation mapping (State Government of NSW and NSW DCCEE, 2025)
- NSW Government Fisheries NSW Spatial Data Portal (State Government of NSW and NSW DPI and Regional Development, 2025)
- NSW Government WeedWise and Priority weeds Greater Sydney database (State Government of NSW and NSW DPI, 2025)
- NSW Government Areas of Outstanding Biodiversity Value (State Government of NSW and Environment and Heritage, 2025).

3.1.1 Likelihood of occurrence analysis for threatened flora and fauna

The likelihood of occurrence of all threatened flora and fauna species collated in the database search was considered for the Study Area. This assessment includes a 10km buffer, which covers off on all Impact Areas. The following threatened species were considered as part of this assessment:

- Flora listed as threatened under the EPBC Act
- Fauna listed as threatened and/or migratory under the EPBC Act

Each of these species were considered against the suitability of habitat, to determine their likelihood of occurrence in the Study Area. The likelihood of a species occurring within the Study Area was classified as 'Negligible', 'Low', 'Moderate' or 'High' based on the consideration of:

- The presence/absence of previous records in the search region (as returned from the database search)
- The known habitat requirements and distribution of the species
- The suitability of habitat in the Study Area (based on the findings of the overview field assessment, and previous reports for the site).

The likelihood of occurrence of ecological communities are also considered in this report. Details of the ranking criteria used to determine likelihood of occurrence of threatened flora and fauna in the Study Area is provided in Table 3-1 and Table 3-2 respectively. Those determined to have a moderate or higher likelihood of occurrence in the Study Area are considered further and discussed in Section 5.2.4.

Table 3-1. Likelihood of occurrence criteria for threatened flora species

Likelihood of Occurrence	Criteria
High	Recent records of the species in the local vicinity (i.e., within the last 10 years)
	Known resident in the area based on site observations, database records or expert advice and/or the Study Area contains high quality habitat
Moderate	Previous reputable records of the species in the local vicinity and/or the Study Area contains high quality habitat
Low	Limited previous records of the species in the local vicinity; and/or the Study Area contains poor or limited habitat. May also be considered low if other environmental factors are present such as fragmented or isolated habitat.
Negligible	No suitable habitat and/or the Study Area falls outside the known species range.

Table 3-2. Likelihood of occurrence criteria for threatened and migratory fauna species

Likelihood of Occurrence	Criteria
High	Known resident in the area based on site observations, database records or expert advice
	Recent reputable records (within 5 years) of the species in the local area
	The Study Area contains the species preferred habitat
Moderate	The species is likely to visit the Study Area regularly (i.e. at least seasonally)
	Previous reputable records of the species in the local area
	The Study Area contains some characteristics of the species preferred habitat
Low	The species is likely to visit the Study Area occasionally or opportunistically whilst en-route to more suitable areas
	There are only limited areas or historical records of the species in the local area (>20 years old)
	The Study Area contains few or no characteristics of the species preferred habitat
Negligible	No previous records of the species in the local area
	Previous records of the species exist in the local area but >30 years old
	The species may fly over the area when moving between areas of more suitable habitat
	Out of the known species range
	No suitable habitat present within the Study Area
	Species is known to be regionally extinct

3.2 Field assessment methodology

The ecological field assessment was undertaken over a period of seven days between 13 March to 13 May 2025.

The assessment included:

- Plant Community Type (PCT) identification and mapping
- Threatened Ecological Community (TEC) identification and condition mapping

- GIS mapping of remnant native trees along the alignment
- Identification of trees containing specific habitat values (hollows, nests and stags etc.)
- Priority weed identification
- Incidental fauna records
- Threatened species habitat suitability assessments.

3.3 Impact assessment and mitigation requirements

As outlined in Table 2-1, under Part 5 of the EP&A Act, Sydney Water must assess the environmental impact of all its activities. Sydney Water must seek to avoid, minimise, and mitigate these impacts. Residual impacts resulting from Sydney Water activities, must be offset as follows:

Non-statutory impacts are non-significant impacts on native vegetation, trees, threatened biodiversity (i.e., TECs, threatened species, habitat of threatened species) or MNES. Non-statutory impacts can be offset based on Sydney Water's Biodiversity Offset Guide (Sydney Water, 2024).

Statutory impacts are likely, predicted or known significant impacts on threatened biodiversity and MNES. Those impacts need to be offset in accordance with the BC Act and EPBC Act.

3.3.1 Non-statutory impacts

Non-significant residual impacts must be offset based on Sydney Water's Biodiversity Offset Guide ('the Guide') (Sydney Water, 2024). Non-significant impacts apply to:

- Minor Impact: localised impacts, such as removal of an individual isolated tree (e.g. street tree or garden planting), or a small amount (< 100 m²) of native vegetation removal (e.g. around a maintenance hole).
- Moderate Impact: larger scale impacts (> 100 m²), that are not considered significant (e.g. removal of native vegetation associated with new infrastructure projects).

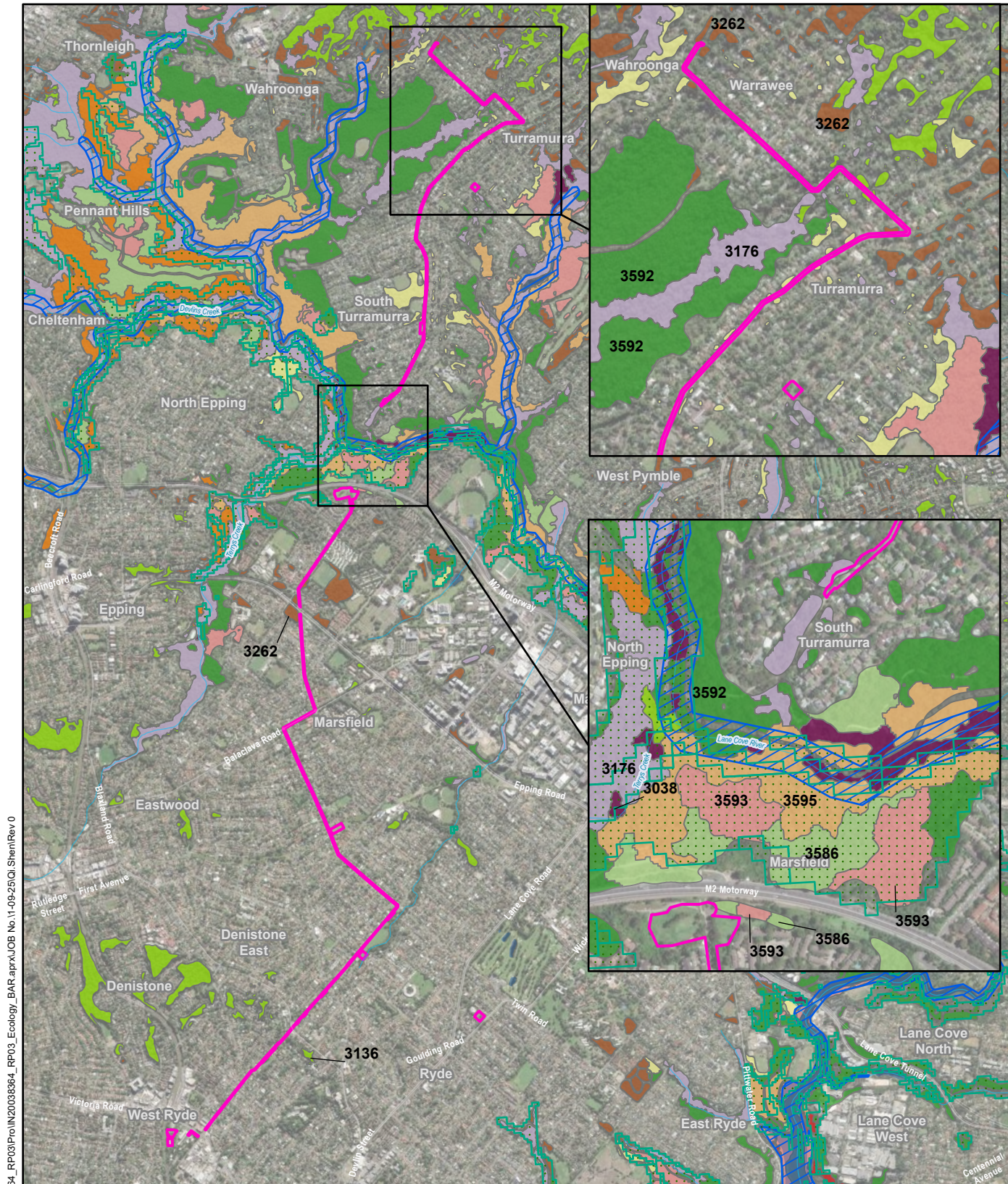
Where minor and moderate residual impacts are identified, residual impacts must be offset in accordance with the offset multipliers provided in the Guide (Sydney Water, 2024).

3.3.2 Statutory impacts

Where impacts on threatened biodiversity (i.e., TECs, threatened species or their habitat) are likely to occur, an Assessment of Significance is undertaken to evaluate if the impacts resulting from the Project would be significant. Assessment of significance is undertaken based on:

- Test of Significance for threatened biodiversity listed under the BC Act and based on the criteria listed in Office of Environment and Heritage Threatened Species Test of Significance Guidelines (OEH, 2018). If a project is predicted to result in significant impacts on threatened biodiversity, a BDAR in accordance with the Biodiversity Assessment Method is required and offsets as per Biodiversity Offsets Scheme apply.
- Significant Impact Assessment for MNES listed under the EPBC Act based on the significant impact criteria for each MNES as per the Significant impact guidelines 1.1: MNES (DEWHA, 2013). If a project is predicted to result in significant impacts on MNES, a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is required for approval. Where required, offsets on MNES must meet the EPBC Act Environmental Offsets Policy. There are nine MNES consisting of:
 - World Heritage Properties
 - National Heritage Places
 - Wetlands of International Importance
 - TECs and threatened species
 - Migratory Birds

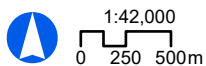
- Marine areas
- The Great Barrier Reef Marine Park
- Nuclear Actions
- A water resource, in relation to coal seam gas development and large coal mining development.



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- | |
|--|
| <p> JV Alignment</p> <p> Key Fish Habitat</p> <p> Waterways</p> <p> Groundwater dependent ecosystem (terrestrial)</p> <p>Plant Community Types (SVTM)</p> <p> 3028, Illawarra Escarpment Warm Temperate Rainforest</p> <p> 3038, Sydney Coastal Coachwood Gallery Rainforest</p> <p> 3039, Sydney Coastal Lilly Pilly-Palm Gallery Rainforest</p> <p> 3040, Sydney Coastal Foreshores Gully Rainforest</p> <p> 3136, Blue Gum High Forest</p> <p> 3153, Illawarra Escarpment Bangalay x Blue Gum Wet Forest</p> <p> 3176, Sydney Enriched Sandstone Moist Forest</p> <p> 3259, Sydney Coastal Shale-Sandstone Forest</p> <p> 3262, Sydney Turpentine Ironbark Forest</p> <p> 3586, Northern Sydney Scribbly Gum Woodland</p> <p> 3592, Sydney Coastal Enriched Sandstone Forest</p> <p> 3593, Sydney Coastal Sandstone Bloodwood Shrub Forest</p> <p> 3594, Sydney Coastal Sandstone Foreshores Forest</p> <p> 3595, Sydney Coastal Sandstone Gully Forest</p> <p> 3621, Sydney Hinterland Turpentine-Apple Gully Forest</p> <p> 3807, Northern Sydney Heath-Mallee</p> <p> 3916, Sandstone Cliff Soak</p> <p> 3963, Estuarine Reedland</p> <p> 4027, Estuarine Swamp Oak-Mangrove Forest</p> <p> 4028, Estuarine Swamp Oak Twig-rush Forest</p> <p> 4086, Sydney Coastal Sandstone Riparian Scrub</p> <p> 4091, Grey Mangrove-River Mangrove Forest</p> <p> 4097, Samphire Saltmarsh</p> <p> 4103, Sporobolus virginicus Saltmarsh</p> |
|--|

Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

4 Results

4.1 Desktop assessment

4.1.1 EPBC Act Matters of National Environmental Significance

Table 4-1 provides the summary of potential MNES within the Locality (refer to Appendix B – PMST search results).

Table 4-1. Potential MNES within the locality

MNES	Description	Further assessment
World Heritage Properties	None	N/A
National Heritage Places	Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	Within the buffer area only. No further assessment required.
Wetlands of International Importance (<i>Ramsar Wetlands</i>)	None	N/A
Great Barrier Reef Marine Park	None	N/A
Commonwealth Marine Area	None	N/A
TECs	- Blue Gum High Forest of the Sydney Basin Bioregion - Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion - Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and Southeast Queensland ecological community - Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland - Coastal Upland Swamps in the Sydney Basin Bioregion - Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion - River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria - Shale Sandstone Transition Forest in the Sydney Basin Bioregion - Subtropical and Temperate Coastal Saltmarsh Community - Turpentine-Ironbark Forest of the Sydney Basin Bioregion - Western Sydney Dry Rainforest and Moist Woodland on Shale.	Refer to Section 5.2.3 for further details.

MNES	Description	Further assessment																																				
Threatened Species	A total of 106 threatened flora and fauna species were predicted to occur within the 10km search area, as follows:	Refer to Appendix G – Likelihood of occurrence or likelihood of occurrence of threatened species within the Study Area.																																				
	<table><tr><th>Group</th><th>Vulnerable</th><th>Endangered</th><th>Critically Endangered</th></tr><tr><td>Flora</td><td>20</td><td>13</td><td>3</td></tr><tr><td colspan="4">Fauna</td></tr><tr><td>Birds</td><td>28</td><td>14</td><td>4</td></tr><tr><td>Fish</td><td>2</td><td>1</td><td>N/A</td></tr><tr><td>Frog</td><td>2</td><td>1</td><td>N/A</td></tr><tr><td>Mammal</td><td>5</td><td>5</td><td>N/A</td></tr><tr><td>Snail</td><td>N/A</td><td>1</td><td>N/A</td></tr><tr><td>Reptile</td><td>3</td><td>3</td><td>N/A</td></tr></table>		Group	Vulnerable	Endangered	Critically Endangered	Flora	20	13	3	Fauna				Birds	28	14	4	Fish	2	1	N/A	Frog	2	1	N/A	Mammal	5	5	N/A	Snail	N/A	1	N/A	Reptile	3	3	N/A
	Group		Vulnerable	Endangered	Critically Endangered																																	
	Flora		20	13	3																																	
	Fauna																																					
	Birds		28	14	4																																	
	Fish		2	1	N/A																																	
	Frog		2	1	N/A																																	
	Mammal		5	5	N/A																																	
	Snail		N/A	1	N/A																																	
Reptile	3	3	N/A																																			
Migratory Species	A total of 16 migratory species were predicted to occur in the locality, including: ■ 20 migratory marine and terrestrial birds ■ Eight migratory marine species ■ Three migratory terrestrial species ■ 25 migratory wetland birds.	Refer to Appendix G – Likelihood of occurrence for likelihood of occurrence of migratory species within the Study Area.																																				

4.1.2 Threatened species

A review of BioNet (*State Government of NSW and NSW DPE, 2025b*) returned 24 listed threatened flora species and 51 threatened fauna species (including three amphibia, 33 birds, 14 mammals and one gastropod), previously recorded within 10kms of the Study Area.

The combined review of relevant databases (PMST (Commonwealth DCCEEW, 2025) and BioNet (State Government of NSW and NSW DPE, 2025b) informed the species assessed within the likelihood of Occurrence. Details of each of these species' habitat requirements as well as an analysis of the likelihood of occurrence in the Study Area is provided in Appendix G – Likelihood of occurrence.

Five threatened species are considered to have a moderate likelihood of occurrence within the Study Area (refer to Table 4-2).

Table 4-2. Threatened species with a moderate likelihood of occurrence

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence
Birds				
<i>Parvipsitta pusilla</i>	Little Lorikeet	V	-	Moderate
<i>Ninox strenua</i>	Powerful Owl	V	-	Moderate
Mammals				
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-	Moderate
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	Moderate
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Moderate

4.1.3 Existing mapped vegetation

The NSW state vegetation mapping (State Government of NSW and NSW DCCEEW, 2025) indicates that seven PCTs are mapped in the Study Area. These PCTs are potentially analogous with two EPBC Act listed TECs, and five BC Act listed TECs (NSW Government, 2024b) (refer to Table 4-3).

Table 4-3. PCTs and potentially analogous TECs mapped within the Study Area (State Government of NSW and NSW DCCEEW, 2025; State Government of NSW and NSW DPE, 2025c)

PCT ID	PCT Name	Potentially analogous TECs		
		Act	TEC Name	TEC Status
3262	Sydney Turpentine Ironbark Forest	BC Act	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered
		EPBC Act	Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered
3593	Sydney Coastal Sandstone Bloodwood Shrub Forest	BC Act	Duffys Forest Ecological Community in the Sydney Basin Bioregion	Endangered
		EPBC Act	Not applicable	Not applicable
3038	Sydney Coastal Coachwood Gallery Rainforest	BC Act	Not applicable	Not applicable
		EPBC Act	Not applicable	Not applicable
3176	Sydney Enriched Sandstone Moist Forest	BC Act	Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion	Not applicable
		EPBC Act	Not applicable	Not applicable
3259	Sydney Coastal Shale-Sandstone Forest	BC Act	Duffys Forest Ecological Community in the Sydney Basin Bioregion	Endangered
		EPBC Act	Not applicable	Not applicable
3136	Blue Gum High Forest	BC Act	Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered
		EPBC Act	Blue Gum High Forest of the Sydney Basin Bioregion	Critically Endangered
3592	Sydney Coastal Enriched Sandstone Forest	BC Act	Not applicable	Not applicable
		EPBC Act	Not applicable	Not applicable
3595	Sydney Coastal Sandstone Gully Forest	BC Act	Not applicable	Not applicable
		EPBC Act	Not applicable	Not applicable

Refer to Figure 3-1 for the desktop assessment results for all Impact Areas.

4.1.4 Areas of Outstanding Biodiversity Value

An Area of Outstanding Biodiversity Value (AOBV) is a special area with irreplaceable biodiversity values that are important to NSW, Australia, and are potentially significant on a global level. AOBV are identified and detailed in both Part 3 of the BC Regulation 2017 and Part 3 of the BC Act 2016.

The Study Area does not intersect or contain any AOBV.

4.1.5 NSW Biodiversity Values Map and Threshold Tool

The Biodiversity Values Map (State Government of NSW and NSW DPE, 2024a) identifies land with high biodiversity value, such as native vegetation, threatened species habitat and creek lines, that is particularly sensitive to impacts from development. The map can be used as a guide to assist in determining whether a Project would exceed the Biodiversity Offset Scheme threshold. The threshold has two elements:

- Whether the amount of native vegetation being cleared exceeds a threshold area
- Whether the impacts occur on an area mapped as containing high biodiversity value (State Government of NSW and NSW DPE, 2024a).

Some sections of the Study Area are mapped as:

- Biodiverse Riparian land
- Threatened species or communities with potential for serious and irreversible impacts.
- Further details on Impacts to Biodiversity Values are addressed in Section 5.2.5 and Section 6.2.5.

4.1.6 Groundwater Dependent Ecosystems

The Study Area is associated with the following Aquatic, Terrestrial and Subterranean GDEs.

- **Aquatic GDE:** The Study Area does not intersect with any Aquatic GDE's.
- **Terrestrial GDE:** The Study Area intersects with two terrestrial GDE-Coastal Sandstone Ridgetop Woodland and GDE-Hinterland Sandstone Gully Forest.
- **Subterranean GDE:** The subterranean GDE map shows that the Study Area is part of the Greater Metropolitan Region, which has a water sharing plan under the Water Management Act 2000. The Greater Metropolitan Region Groundwater Sources map indicates that the subterranean groundwater at the Study Area is sourced from the Sydney Basin Central Groundwater Source (Commonwealth of Australia and Bureau of Meteorology, 2025).

According to JV ground water extraction volumes, there will be no potential GDE impacts resulting from the Project, however there are impacts to groundwater volumes, resulting from extraction and drawdown.

Further details on impacts to groundwater volumes and GDE's are outlined in 6.2.6.

4.1.7 Key Fish Habitat

The NSW Department of Primary Industries Fisheries spatial data portal (State Government of NSW and NSW DPI and Regional Development, 2025) indicates that Devlin's Creek which forms Lane Cove River intersects with the alignment north of the M2 motorway. This aquatic habitat is mapped as Key Fish Habitat. However, this section of the alignment will involve HDD under bored methods of construction, so there will be no direct impacts to this aquatic habitat.

Further details on Impacts to these aquatic habitats are addressed in Section 4.2.7 and Section 9.2.

4.2 Field assessment results

4.2.1 General site description

The Study Area comprised of planted amenity vegetation along road corridors in areas of the alignment in West Ryde, East Denistone and Marsfield. This vegetation includes planted mature Eucalyptus trees and ornamental shrubs and forbs in front gardens. Laydown areas were in local parks and reserves and contained small patches of remnant bushland.

Northern areas of the alignment within South Turramurra, and Wahroonga, had larger areas of remnant bushland, consisting of native canopy and midstory species. Tall mature Eucalyptus trees were abundantly present along streetscapes and within reserves. Trees commonly observed include Sydney Red Gum

(*Angophora costata*), Red Bloodwood (*Corymbia gummifera*), Blackbutt (*Eucalyptus pilularis*) and Blue Gum (*Eucalyptus saligna*). For a full list of tree species recorded, refer to Appendix E – Tree species.

Only one main river system intersects with the alignment - Lane Cove River, and smaller local creeks were present however in an eroded and degraded condition.

The Study Area has been subjected to varying degrees of disturbance from historic clearing for residential, commercial and recreational purposes. Subsequently, weed invasion was present along the whole alignment, especially along the road corridors. It was also present within reserves and parks where walking paths and tracks creates edge effects and subsequently supports weed growth.

4.2.2 Planted streetscapes

Vegetation along the road corridors primarily consisted of planted native trees. Native trees that were commonly observed include Sydney Red Gum (*Angophora costata*), Grey Gum (*Eucalyptus punctata*) Spotted Gum (*Corymbia maculata*) and Turpentine (*Syncarpia glomulifera*). Planted Banksia and Melaleucas were also present along streets, providing suitable feeding and foraging habitat for birds and small mammals. The ground cover along the road frequently included mowed lawns, alongside planted ornamental shrubs and forbs in front gardens.

4.2.3 Remnant native bushland areas

Remnant vegetation refers to patches or areas of native vegetation that have survived clearing, disturbance, or land use change and remain as original or near-original ecological communities within a landscape. Areas of remnant native bushland were present primarily in the northern sections of the alignment including in Twin Creeks reserve, along Kissing Point Rd, David Martin reserve and Agincourt Rd Marsfield which supports a conservation area of Sydney-Turpentine Ironbark Forest. In these areas, canopy species includes Sydney Red Gum (*Angophora costata*), Blue Gum (*Eucalyptus saligna*), Blackbutt (*Eucalyptus pilularis*), and Stringybark sp. such as Brown Stringybark (*Eucalyptus capitellata*). Mid-storey species frequently included Sweet Pittosporum (*Pittosporum undulatum*), Sydney Green Wattle (*Acacia parramattensis*), and Hairpin Banksia (*Banksia spinulosa*). Native ground cover species present includes Weeping Grass (*Microlaena stipoides*), Scurvy Weed (*Commelina cyanea*) and Pastel Flower (*Pseuderanthemum variable*). Weed encroachment was also present in these reserves and included Purple- top Vervain (*Verbena bonariensis*), Cobbler's Pegs (*Bidens pilosa*), and Easter Cassia (*Senna pendula*). For a full list of flora species, refer to Appendix C – Flora list.



Photo 1. Remnant bushland along the RP03 alignment for both Options 1 and 2



Photo 2. Planted Street trees along the RP03 alignment for both Options 1 and 2

4.2.4 Plant Community Types

The vegetation observed within the Study Area varied between planted/urban exotic vegetation and native remnant vegetation. Four native PCTs, were identified within the Impact Area.

These vegetation zones are:

- PCT 3262: Sydney Turpentine Ironbark Forest
- PCT 3259: Sydney Coastal Shale-Sandstone Forest
- PCT 3595: Sydney Coastal Sandstone Gully Forest
- PCT 3592: Sydney Coastal Enriched Sandstone Forest.

A summary of vegetation zones within the Impact Area is provided in Table 4-4 to Table 4-8. The proposed impacts to these vegetation zones resulting from the Project are provided in Table 5-1 and Table 5-2.

Refer to Figure 4-1 for the Ground-truthed ecological values within the Impact Areas.

Table 4-4. PCT 3262: Sydney Turpentine Ironbark Forest

Sydney Turpentine Ironbark Forest	
PCT ID:	3262
PCT Scientific name	Sydney Turpentine Ironbark Forest
Vegetation formation	Wet Sclerophyll Forests
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Associated TEC	BC Act CE Listed Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion
This PCT was predominantly observed at Agincourt Rd, Marsfield. Located within a conservation area in Stewart Park Marsfield, the canopy was dominated by Sydney Red Gum (<i>Angophora costata</i>), Turpentine (<i>Syncarpia glomulifera</i>), and Blackbutt (<i>Eucalyptus pilularis</i>). The midstorey included Sweet Pittosporum (<i>Pittosporum undulatum</i>) and the ground cover included natives such as Weeping grass (<i>Microlaena stipodes</i>) and Pastel flower (<i>Pseuderanthemum variabile</i>) and non-natives including Asparagus weed (<i>Asparagus aethiopicus</i>) and Paspalum (<i>Paspalum dilatatum</i>).	
	

Table 4-5. PCT 3259: Sydney Coastal Shale-Sandstone Forest

Sydney Coastal Shale-Sandstone Forest	
PCT ID:	3259
PCT Scientific name	Sydney Coastal Shale-Sandstone Forest
Vegetation formation	Wet Sclerophyll Forests
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Associated TEC	BC Act Listed E (Part) Duffys Forest Ecological Community in the Sydney Basin Bioregion
Present in northern patches along the alignment such as at Auluba reserve, on Kissing Point Rd in South Turrumurra. The canopy was dominated by Red Bloodwood (<i>Corymbia gummifera</i>) and Sydney Red Gum (<i>Angophora costata</i>). Mid-storey species present includes Hairpin Banksia (<i>Banksia spinulosa</i>) and Silky hakea (<i>Hakea sericea</i>). Native species in the ground cover included Weeping grass (<i>Microlaena stipoides</i>).	



Table 4-6. PCT 3595: Sydney Coastal Sandstone Gully Forest

Sydney Coastal Sandstone Gully Forest	
PCT ID:	3595
PCT Scientific name	Sydney Coastal Sandstone Gully Forest
Vegetation formation	Dry Sclerophyll Forests
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Associated TEC	No Associated TEC's
Located in patches along the alignment including 346 Kissing Point Rd in South Turramurra. Canopy species present includes Mountain Ash (<i>Eucalyptus piperita</i>) and Brown Stringybark (<i>Eucalyptus capitellata</i>). Midstorey species include Lilly Pilly (<i>Acmena smithii</i>) and the ground cover includes Scurvy Weed (<i>Commelina cyanea</i>) and Cobbler's Pegs (<i>Bidens Pilosa</i>).	
 	

Table 4-7. PCT 3592: Sydney Coastal Enriched Sandstone Forest

Sydney Coastal Enriched Sandstone Forest	
PCT ID:	3592
PCT Scientific name	Sydney Coastal Enriched Sandstone Forest
Vegetation formation	Dry Sclerophyll Forests

Sydney Coastal Enriched Sandstone Forest

Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Associated TEC	No Associated TEC's

Located in remnant bushland patches along the alignment including Vimiera Rd Marsfield and Rothwell Rd, Turramurra. Canopy species present include Smooth-barked Apple (*Angophora costata*), Red Bloodwood (*Corymbia gummifera*), and Blackbutt (*Eucalyptus pilularis*). Mid-storey species present includes Sweet Pittosporum (*Pittosporum undulatum*) and Old Man Banksia (*Banksia serrata*). The ground cover was often dominated by weeds such as Lantana (*Lantana camara*).



4.2.5 Threatened Ecological Communities

Ground-truthing of native vegetation within the Impact Area identified four vegetation communities. The associated BC and EPBC Act vegetation communities are listed below:

- EPBC Act and BC Act Listed Critically Endangered TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion.
- BC Act Endangered TEC Duffys Forest Ecological Community in the Sydney Basin Bioregion.

A summary of TEC's within the Impact Area are provided in Table 4-9 to Table 4-11. The proposed impacts to these TEC's resulting from the Project are shown Table 5-2 and Table 6-2. Refer to Figure 4-1, for the Ground-truthed ecological values within all Impact Areas.

Sydney Turpentine Ironbark Forest

The most notable Study Area containing PCT 3262, was located within Stewart Park on Agincourt Rd in Marsfield. The park is located at the intersection of Epping Road and Vimiera Road in Marsfield and is a notable green space within the City of Ryde. This park is particularly significant for preserving remnants of the Sydney Turpentine–Ironbark Forest, an endangered ecological community native to the Sydney region.

Upon assessment of the ground-truthed vegetation and site conditions against the BC Act NSW Scientific Committee criteria for the plant community- Sydney Turpentine Ironbark Forest, it was concluded that several criteria are satisfied and therefore the **BC Act TEC does apply**. This includes the presence of a combination of the dominant canopy species for this PCT including Turpentine (*Syncarpia glomulifera*) and Sydney Red Gum (*Angophora costata*). Midstory native species present includes Sweet Pittosporum (*Pittosporum undulatum*) and ground cover species includes Weeping Grass (*Microlaena stipoides*) and Pastel Flower (*Pseuderanthemum variabile*). Due to the presence of characteristic native species at all vegetation levels, a Test of Significance has been completed.

Based on the conservation advice for the EPBC Act TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion and the criteria for a good condition patch, it was determined that the **EPBC Act TEC does apply**. Subsequently an Assessment of Significance has been completed.

Table 4-8. Sydney Turpentine Ironbark Forest - Key diagnostic characteristics and condition class (DAWE, 2020)

NSW Scientific Committee- final determination (BC ACT)	Assessment
Key diagnostic characteristic	
Characterised by an assemblage of diagnostic species	Yes - meets criteria
Includes vegetation occurring on the Hornsby Plateau, the eastern Cumberland Lowlands and the northern Woronora Plateau physiographic regions.	Yes - meets criteria
Remnants of Sydney Turpentine-Ironbark Forest are subject to ongoing invasion by an extensive range of naturalised plant species. Weed invasion is exacerbated by the proximity of remnants to areas of rural and urban development and the associated influx of both weed propagules from gardens and nutrients contained in stormwater runoff, dumped garden	Yes - meets criteria
Condition thresholds (EPBC Act)	
Good condition is generally determined as: - the vegetation has some characteristic components from all structural layers (<i>tree canopy, small tree/shrub midstory, and understorey</i>); - and the tree canopy cover is greater than 10%; and - and the patch size is greater than one hectare.	Yes - meets all of the criteria.

Sydney Coastal Shale-Sandstone Forest

The Study Area containing PCT 3259 was present in patches along the alignment and most notably at David Martin Reserve, Woollahra.

Upon assessment of the ground-truthed vegetation and site conditions against the BC Act NSW Scientific Committee criteria for the plant community Duffys Forest Ecological Community in the Sydney Basin Bioregion, it was concluded that several criteria are satisfied and therefore the **BC Act TEC does apply**. This includes the presence of several characteristic canopy species including Sydney Red Gum (*Angophora costata*) and Red Bloodwood (*Corymbia gummifera*). Mid-storey diagnostic species present includes Silky Hakea (*Hakea sericea*) and Hairpin Banksia (*Banksia spinulosa*). One ground cover diagnostic species, Weeping Grass (*Microlaena stipoides*) was also present. Due to the presence of characteristic native species at all vegetation levels, a Test of Significance has been completed.

There is no associated EPBC Act listing for this PCT. Therefore, an Assessment of Significance has not been completed.

Table 4-9. Sydney Coastal Shale-Sandstone Forest - Key diagnostic characteristics

NSW Scientific Committee- final determination (BC ACT)	Assessment
Key diagnostic characteristic	
Duffys Forest Ecological Community is the accepted name for the ecological community that occurs on the ridgetops, plateaus, upper slopes and occasionally mid slopes on Hawkesbury sandstone geology, typically in association with laterite soils and soils derived from shale and laminite lenses. It has the structural form predominantly of open-forest to woodland. The Duffys Forest Ecological Community has been reported from the Warringah, Pittwater, Kuring-gai, Hornsby and Manly Local Government Areas, although it may occur elsewhere in the Sydney Basin Bioregion.	Yes - meets criteria

NSW Scientific Committee- final determination (BC ACT)	Assessment
Duffys Forest Ecological Community is characterised by the following assemblage of vascular plant species - Duffys Forest ecological community in the Sydney Basin Bioregion - endangered ecological community listing Final determination 2002 Environment and Heritage	Yes - meets criteria

Sydney Coastal Sandstone Gully Forest

PCT 3595 was present in patches along northern sections of the alignment including at 346 Kissing Point Rd, South Turrumurra. Canopy species present includes Mountain Ash (*Eucalyptus piperita*) and Brown Stringybark (*Eucalyptus capitellata*). Midstorey species include Lilly Pilly (*Acmena smithii*) and the ground cover includes Scurvy Weed (*Commelina cyanea*) and Cobbler's Pegs (*Bidens Pilosa*). The following PCT is not associated with any BC or EPBC Act listings. Subsequently a BC Act Test of Significance and EPBC Act Assessment of Significance have not been completed.

Sydney Coastal Enriched Sandstone Forest

PCT 3592 was present in patches along the alignment, most notably at 250 Vimiera Rd Marsfield, often in a degraded low-quality condition. This is most likely due to edge effects and weed invasion. Canopy species present includes Smooth-barked Apple (*Angophora costata*), Red Bloodwood (*Corymbia gummifera*) and Spotted Gum (*Corymbia maculata*). Midstorey species present include Sweet Pittosporum (*Pittosporum undulatum*), Sydney Golden Wattle (*Acacia longifolia*), and Rice-flower (*Ozothamnus diosmifolius*), and the ground cover was highly weedy including species such as Lantana (*Lantana camara*), Rhodes Grass (*Chloris gayana*) and Chinese Privet (*Ligustrum sinense*). The following PCT is not associated with any BC or EPBC Act listings. Subsequently a BC Act Test of Significance and EPBC Act Assessment of Significance have not been completed.

4.2.6 Priority weeds

Under Schedule 1 of the Biosecurity Act, all private landowners, occupiers, public authorities and councils are required to control weeds on their land. Several priority weeds were identified within the Impact Area for both Options 1 and 2, all of which are WoNS (refer to Table 4-12).

Table 4-10. Priority Weeds in the Study Area for both Option 1 and 2

Species	WoNS	Duty (State Government of NSW and NSW DPI, 2025)
Lantana (<i>Lantana camara</i>)	✓	General Biosecurity Duty All pest plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (<i>or ought to know</i>) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Asparagus fern (<i>Asparagus virgatus</i>)	✓	General Biosecurity Duty All pest plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (<i>or ought to know</i>) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable

Species	WoNS	Duty (State Government of NSW and NSW DPI, 2025)
Fireweed (<i>Senecio madagascariensis</i>)	✓	General Biosecurity Duty All pest plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Blackberry (<i>Rubus fruticosus</i>)	✓	General Biosecurity Duty All pest plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

4.2.7 Habitat features

Common bird species were seen foraging in the area during the field assessment, including Galah (*Eolophus roseicapilla*), Sulphur-crested Cockatoo (*Cacatua galerita*) and Australian White Ibis (*Threskiornis Molucca*) (refer to Appendix D – Fauna list for full list of fauna species identified within the Study Area during field assessment). Based on the fragmented condition of the vegetation within the Study Area, and the availability of more suitable remnant vegetation in the surrounding areas, it is not considered likely that highly mobile fauna (e.g., birds, flying mammals) would permanently inhabit the vegetation or rely on it as sole source of foraging, nesting, or roosting habitat.

Fauna habitats present include:

- Native vegetation canopy and stags – provides temporal perching and roosting habitat for transient and mobile species (e.g., birds, small reptiles, mammals). For a full list of habitat values within the Impact Area refer to Table 4-11.
- Native vegetation hollow-bearing trees – provides sheltering and breeding habitat for transient and mobile species (e.g., birds, small mammals, reptiles). For a full list of habitat values within the Impact Area refer to Table 4-11.
- Tree nests – provides sheltering habitat for juveniles and adults of transient and mobile species (e.g., birds, small reptiles, mammals). For a full list of habitat values within the Impact Area refer to Table 4-11.

Refer to Figure 4-1 for the Ground-truthed ecological values.

Table 4-11. Habitat values within Options 1 and 2

Habitat Features	Total present along the alignment
Nest	1
Roost/Potential Roost (includes Culverts)	2
Waterbody/Watercourse (includes Culverts)	0
Hollow	11

Aquatic habitat

There is limited aquatic habitat within the Study Area, with there being several degraded watercourses within the Impact Area. Due to their lack of connectivity to larger quality watercourses, and their presence within a predominantly urban landscape, it is unlikely that this habitat would permanently support amphibian or fish species.

There is one area classified as Key Fish Habitat along the alignment at Devlin's Creek which connects to Lane Cover River. However, as HDD under boring methods of construction will be used, the potential for

direct disturbance to the habitat is minimised. HDD is a trenchless technology that allows for the installation of pipelines beneath watercourses without the need for open excavation. This approach significantly reduces the risk of sedimentation and habitat degradation that can occur with traditional open-cut methods. Mitigation measures are also recommended in Section 9.2.

4.2.8 Threatened species

Threatened flora

No threatened flora species were recorded within the Impact Area. Given the high level of disturbance, and the extensive establishment of weeds and non-native species throughout the Impact Area, it is unlikely that threatened flora would successfully re-establish. Therefore, it is considered unlikely that the vegetation zones within the Study Area would provide suitable habitat for threatened flora species.

Threatened fauna

A likelihood of occurrence assessment was undertaken for predicted species from the BioNet Atlas (Appendix A – BioNet search results) and the PMST report (Appendix B – PMST search results). This assessment includes a 10km buffer, which covers off on all Impact Areas for Options 1 and 2. A total of five threatened fauna species were assessed as having a moderate Likelihood of occurrence within the locality:

- Little Lorikeet (*Parvipsitta pusilla*) (Vulnerable BC Act)
- Little Bent-winged Bat (*Miniopterus australis*) (Vulnerable BC Act)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) (Vulnerable BC Act)
- Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable BC Act and EPBC Act)
- Powerful Owl (*Ninox strenua*) (Vulnerable BC Act).

Further details are provided in Table 4-14 below.

Table 4-12. Revised Likelihood of Occurrence assessment

Scientific Name	Common Name	Justification	Likelihood of Occurrence rating
Birds			
<i>Parvipsitta pusilla</i>	Little Lorikeet	Habitat for the Little Lorikeet was observed within the Study Area. The species primarily feeds and forages in the canopy of open Eucalyptus forest and woodland, which also include <i>Angophora</i> , <i>Melaleuca</i> and other native tree species. The species also nests in proximity to feeding areas, mainly in the hollows in the limb of smooth-barked Eucalyptus (small hollows). The Study Area supports patches of remnant native vegetation, especially in areas including Vimiera Rd Marsfield and Twin Creeks Reserve. There are also numerous street feed and habitat trees within South Turramurra. Small hollows were abundantly observed in mature Eucalyptus trees throughout the alignment.	Moderate
<i>Ninox strenua</i>	Powerful Owl	Several small-large hollows were identified within remnant bushland patches in the Study Area, and the species is known to inhabit and thrive in urban and disturbed areas. The species is also likely to fly over or forage whilst travelling to more suitable habitat in surrounding areas such as at Lane Cove National Park (where the species is known to occur) or Kuringai Chase National Park.	Moderate
Mammals			

Scientific Name	Common Name	Justification	Likelihood of Occurrence rating
<i>Miniopterus australis</i>	Little Bent Winged Bat	Habitat for the Little Bent Winged Bat was observed within the Study Area. The species habitat includes wet and dry sclerophyll forest, including Melaleuca swamps and banksia scrub. The species is also known to roost in tree hollows and culverts.	Moderate
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Planted and remnant Melaleuca trees and Banksia habitat is abundant throughout the Study Area, particularly in reserves and streetscapes north of the alignment in South Turrumurra and Lane Cove. Kissing Point Rd also contained culverts which may provide suitable roosting habitat, and hollows were presents all along the alignment. Whilst the species prefers remnant native vegetation as habitat, it is well-adapted to urbanisation, as it often uses buildings, and tunnels to roost.	Moderate
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	There are several areas of suitable roosting habitat along the alignment such as buildings, culverts and tree hollows. Whilst the species prefers remnant native vegetation as habitat, it is well-adapted to urban and fragmented environments.	Moderate

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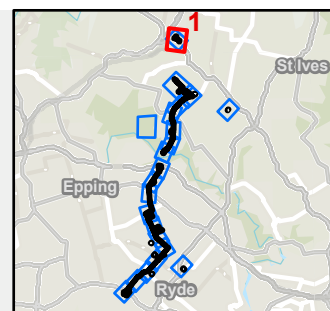
- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow

- Remnant Tree

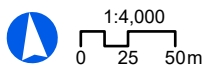
Native vegetation

Plant Community Type (PCT)

- Blue Gum High Forest (3136)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

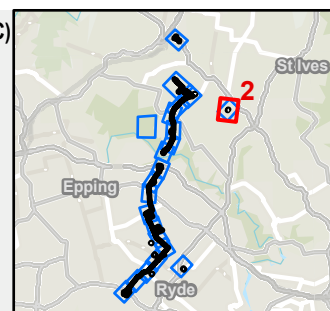
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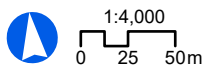
- Study Area
- Fauna Habitat**
- Hollow
- Remnant Tree

- Native vegetation**
- Plant Community Type (PCT)**
- Blue Gum High Forest (3136)

- Threatened Ecological Communities (TEC)**
- EPBC Act and BC Act

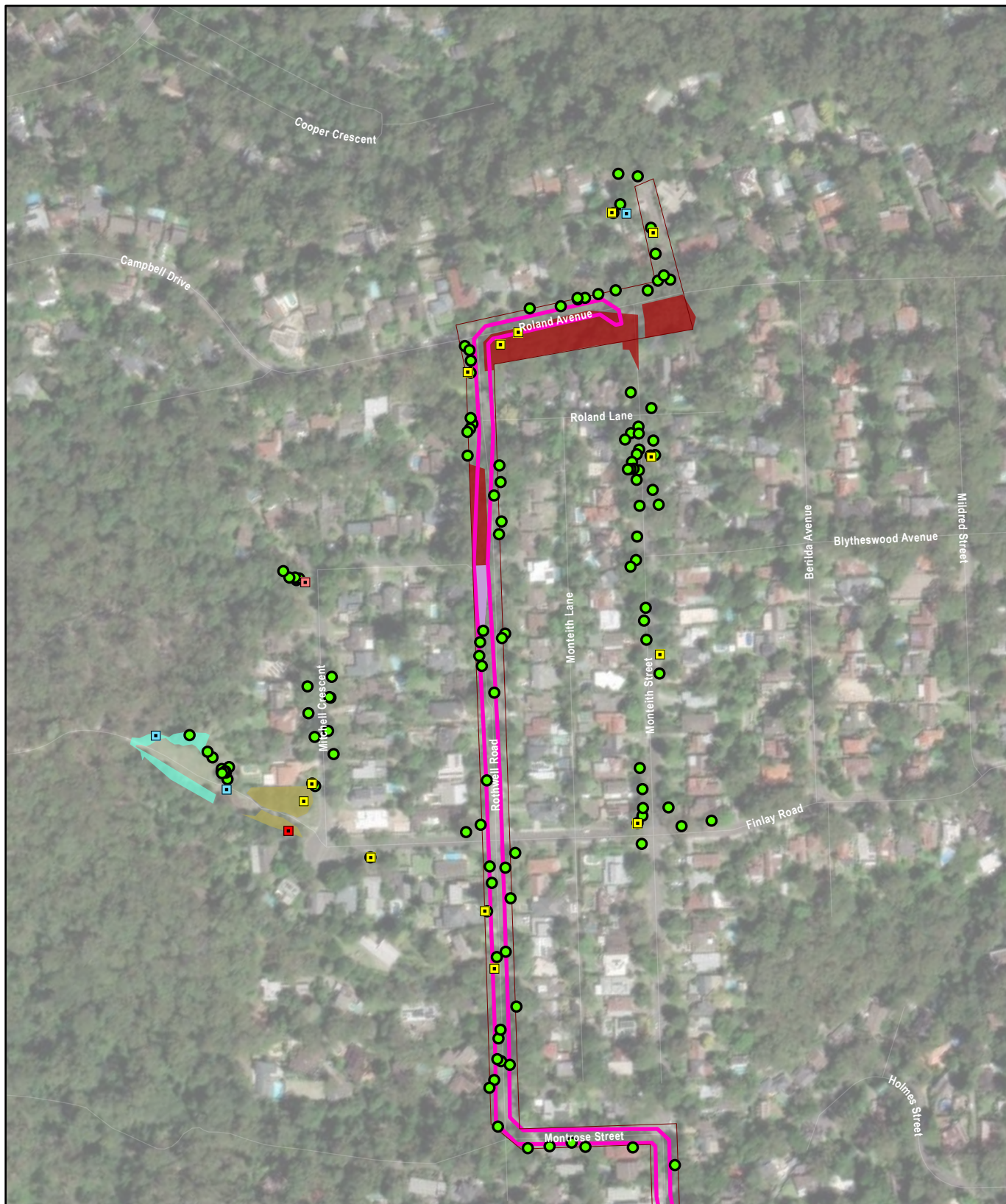


Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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- Study Area
- JV Alignment

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Culverts and unnamed tributaries
- Remnant Tree

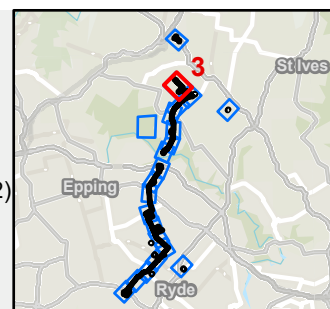
Native vegetation

Plant Community Type (PCT)

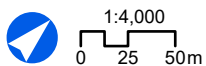
- Blue Gum High Forest (3136)
- Sydney Coastal Shale Sandstone Forest (3259)
- Sydney Coastal Enriched Sandstone Forest (3592)

Threatened Ecological Communities (TEC)

- BC Act



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

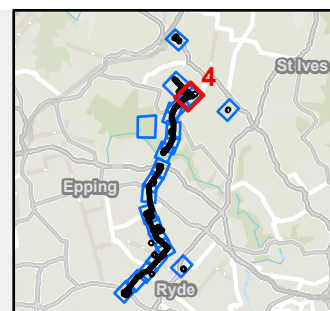


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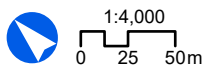
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- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow
- Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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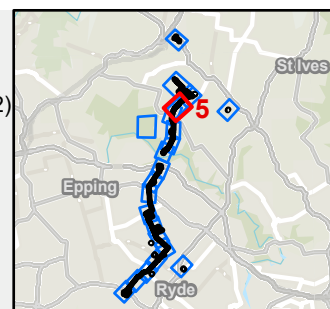
- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow
- Nest

● Remnant Tree

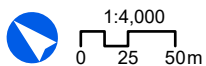
Native vegetation

Plant Community Type (PCT)

Sydney Coastal Enriched Sandstone Forest (3592)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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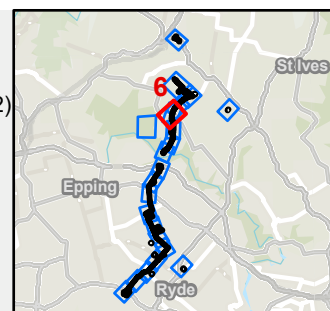
- Study Area
- JV Alignment
- Fauna Habitat
 - Hollow

Remnant Tree

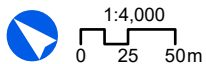
Native vegetation

Plant Community Type (PCT)

Sydney Coastal Enriched Sandstone Forest (3592)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

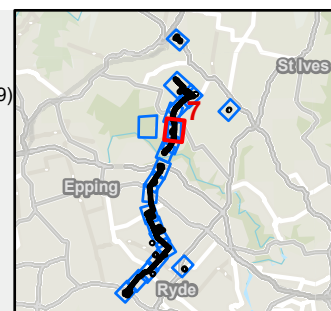


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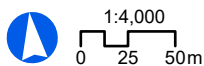
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- Study Area
- JV Alignment
- Fauna Habitat**
 - Hollow
 - Nest
 - Culverts and unnamed tributaries
- Remnant Tree
- Native vegetation**
 - Plant Community Type (PCT)
Sydney Coastal Shale Sandstone Forest (3259)
 - Threatened Ecological Communities (TEC)
BC Act



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

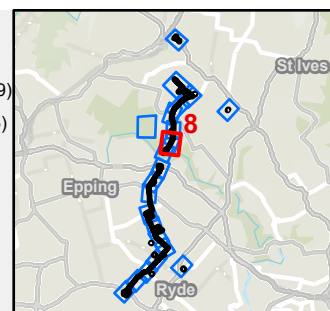


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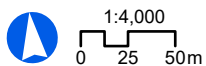
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- | | | |
|-----------------------|----------------------------------|--|
| Study Area | Culverts and unnamed tributaries | Native vegetation |
| JV Alignment | Remnant Tree | Plant Community Type (PCT) |
| Fauna Habitat | | Sydney Coastal Shale Sandstone Forest (3259) |
| Hollow | | Sydney Coastal Sandstone Gully Forest (3595) |
| Nest | | |
| Roost/potential roost | | |

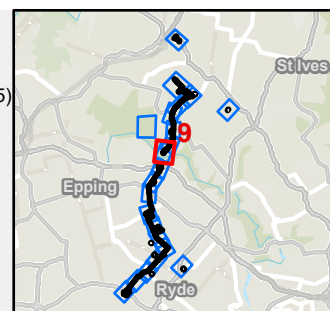
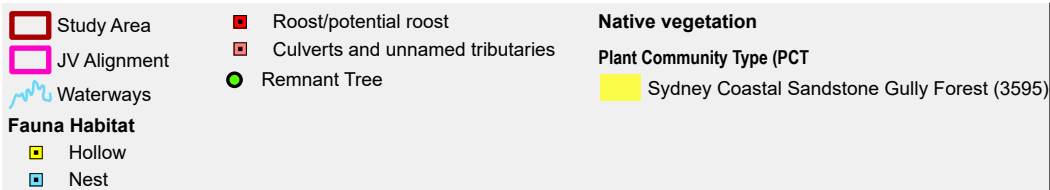


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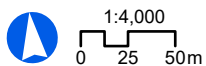


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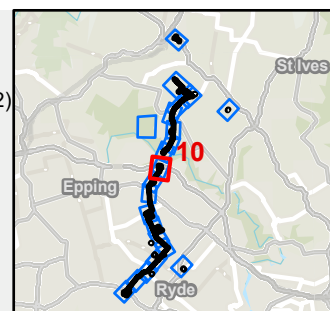


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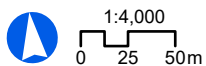
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- | | | |
|---|--|---|
| Study Area | ■ Roost/potential roost | Native vegetation |
| JV Alignment | ● Remnant Tree | Plant Community Type (PCT) |
| ~ Waterways | | Sydney Coastal Enriched Sandstone Forest (3592) |
| Fauna Habitat | | |
| Hollow | | |



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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- Study Area
- JV Alignment

Fauna Habitat

- Hollow
- Roost/potential roost
- Remnant Tree

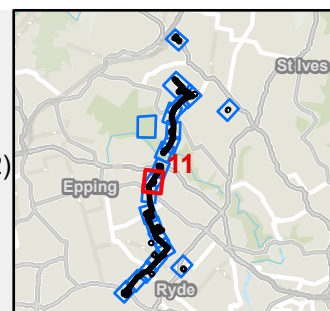
Native vegetation

Plant Community Type (PCT)

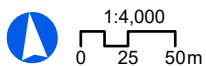
- Sydney Turpentine Ironbark Forest (3262)
- Sydney Coastal Enriched Sandstone Forest (3592)

Threatened Ecological Communities (TEC)

- EPBC Act and BC Act



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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- Study Area
- JV Alignment

Fauna Habitat

- Hollow
- Roost/potential roost
- Remnant Tree

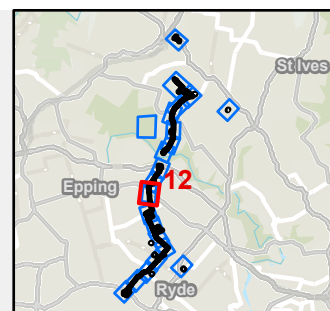
Native vegetation

Plant Community Type (PCT)

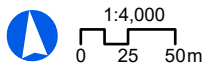
- Sydney Turpentine Ironbark Forest (3262)

Threatened Ecological Communities (TEC)

- EPBC Act and BC Act

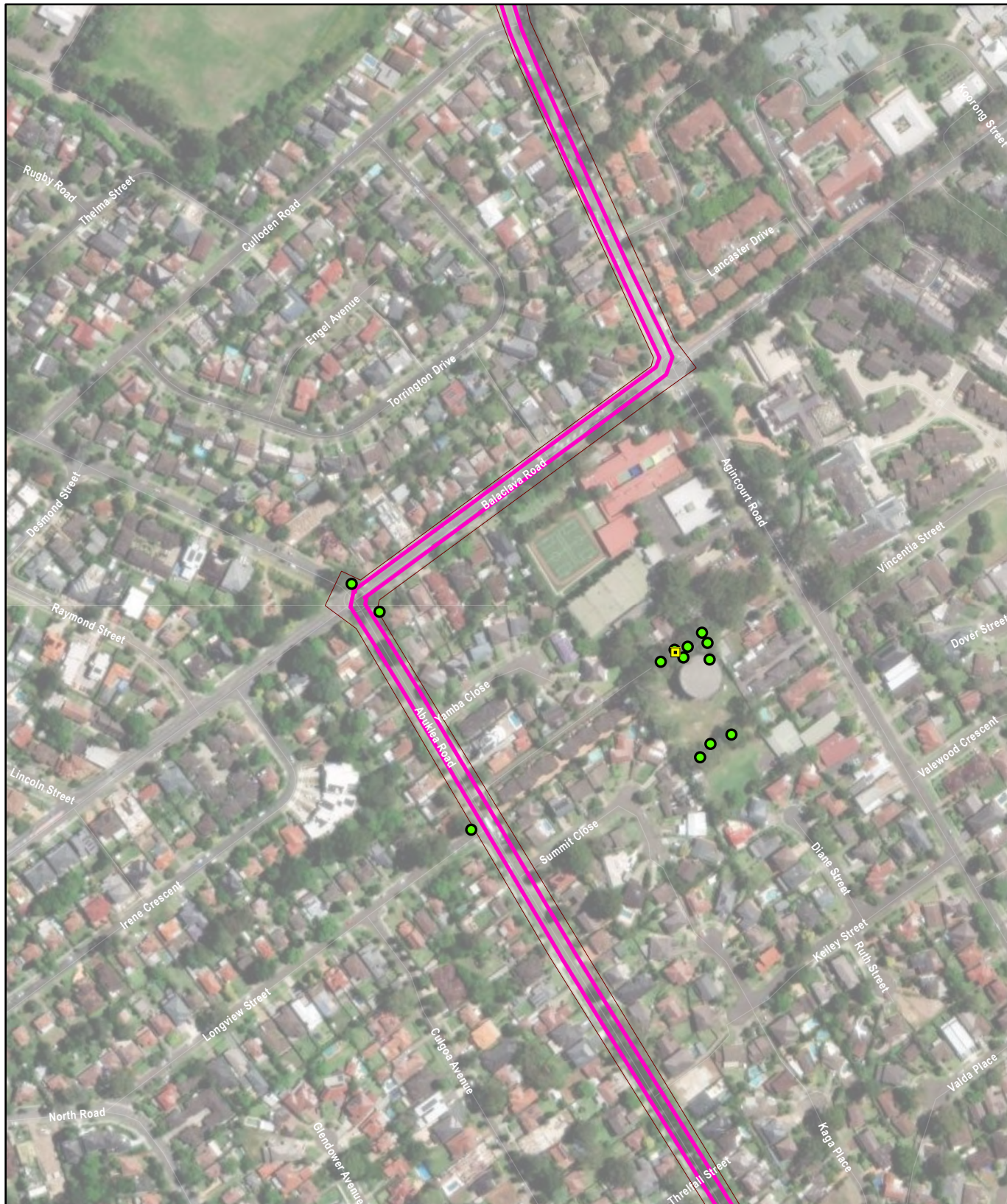


Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

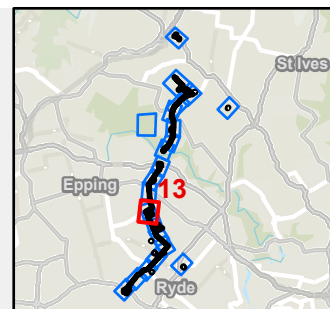


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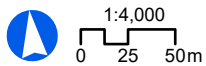
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- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow
- Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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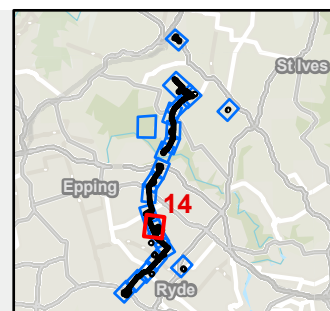
- Study Area
- JV Alignment
- Fauna Habitat**
 - Hollow
 - Nest

● Remnant Tree

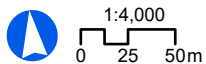
Native vegetation

Plant Community Type (PCT)

Blue Gum High Forest (3136)

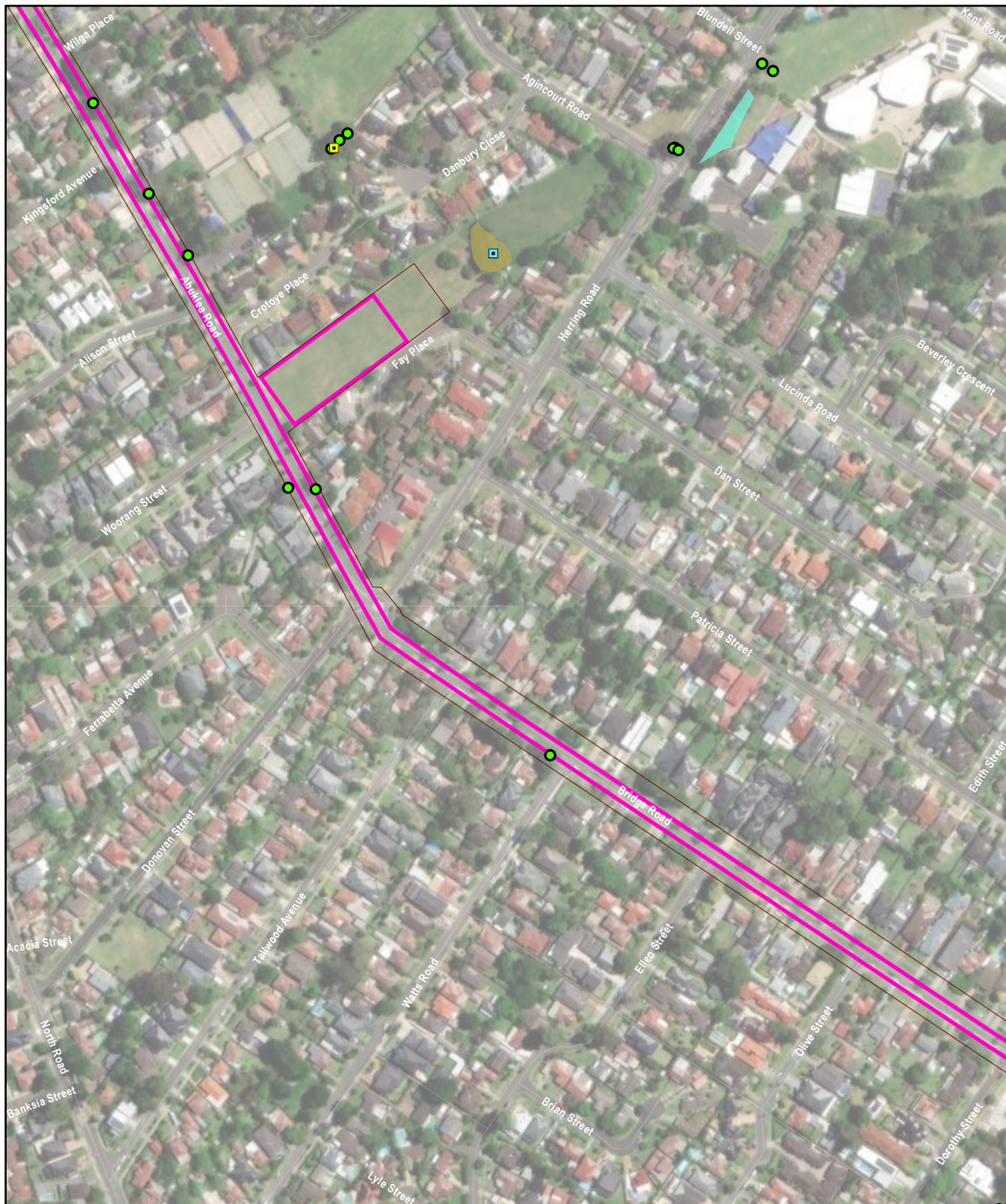


Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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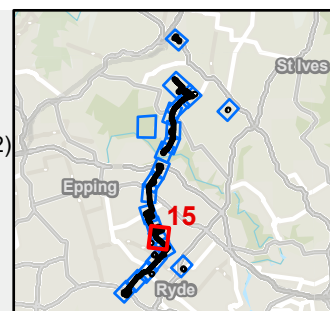
- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow
- Nest

● Remnant Tree

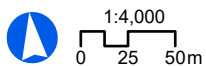
Native vegetation

Plant Community Type (PCT)

- Blue Gum High Forest (3136)
- Sydney Coastal Enriched Sandstone Forest (3592)

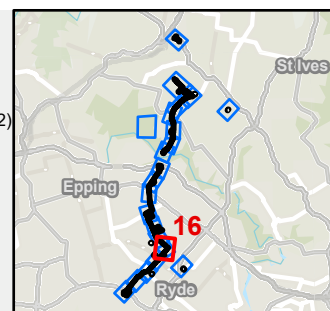
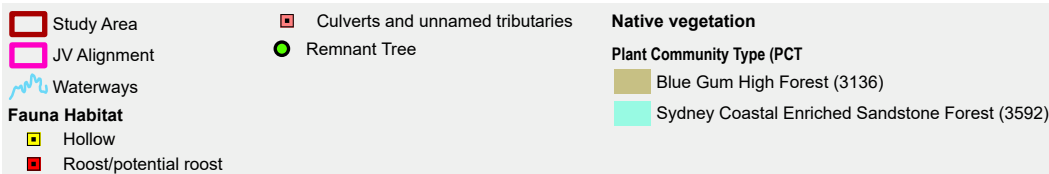


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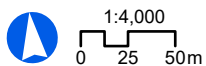


Projection: GDA2020 MGA Zone 56

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Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

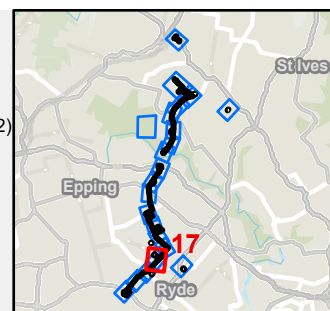


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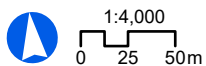
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- ▭ Study Area
- ▭ JV Alignment
- ~ Waterways
- Fauna Habitat**
 - ▭ Hollow
 - ▭ Culverts and unnamed tributaries
- Remnant Tree
- Native vegetation**
 - Plant Community Type (PCT)**
 - ▭ Blue Gum High Forest (3136)
 - ▭ Sydney Coastal Enriched Sandstone Forest (3592)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



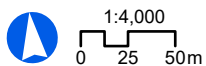
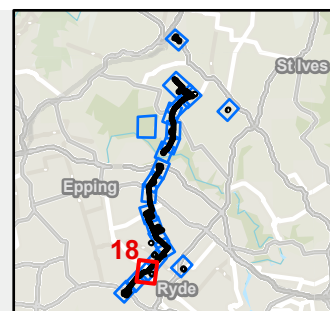
Projection: GDA2020 MGA Zone 56

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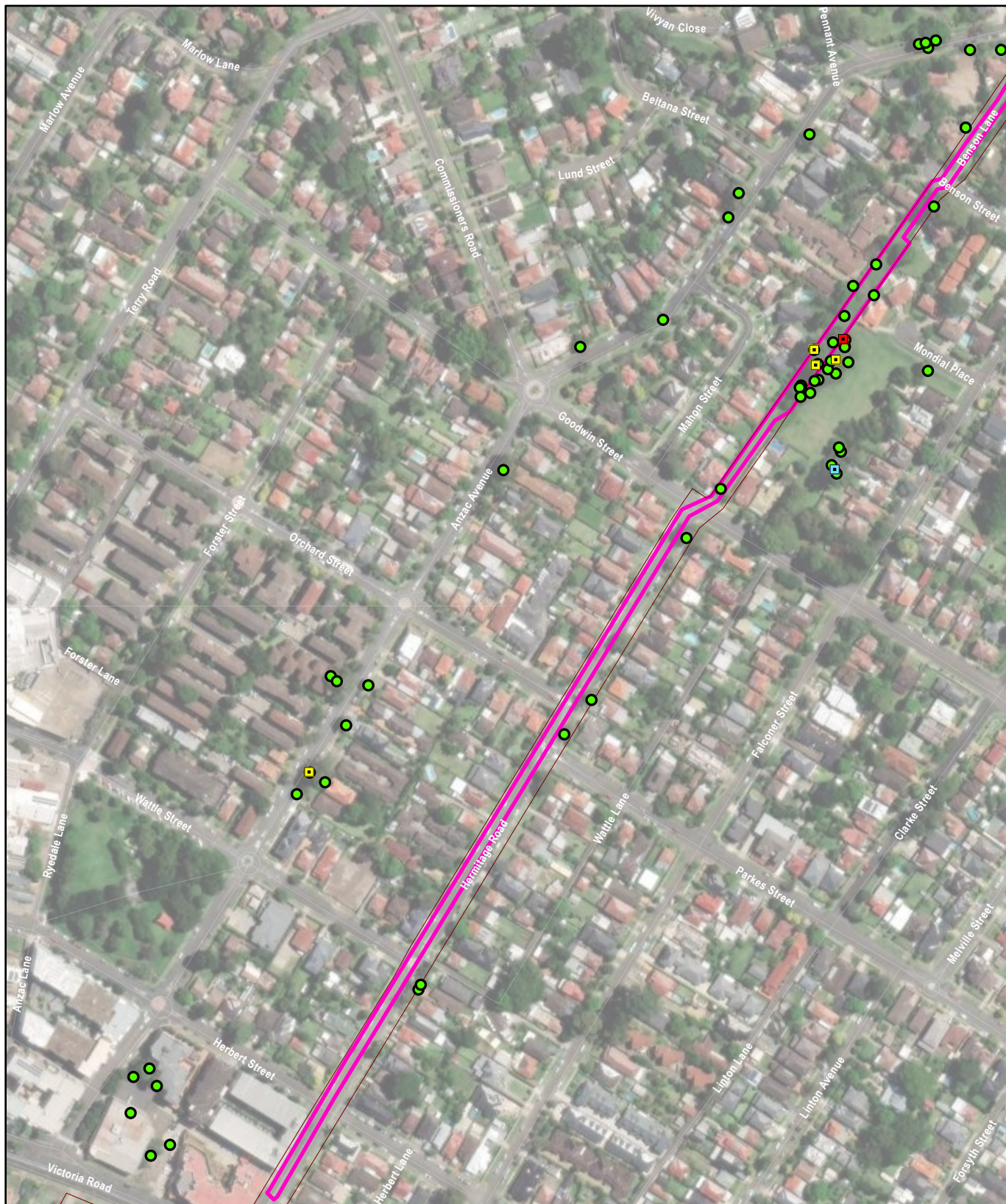
- Study Area
- JV Alignment
- Fauna Habitat**
 - Hollow
 - Nest
 - Roost/potential roost
 - Remnant Tree

Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



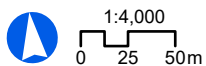
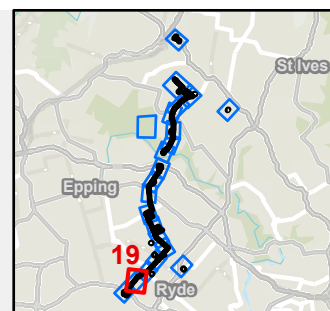
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- Study Area
- JV Alignment
- Fauna Habitat**
 - Hollow
 - Nest
 - Roost/potential roost
 - Remnant Tree

Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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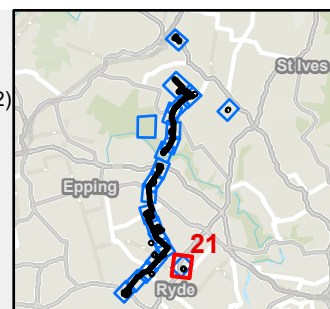
- Study Area
- JV Alignment
- Fauna Habitat**
 - Hollow
 - Roost/potential roost

● Remnant Tree

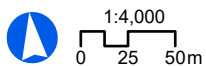
Native vegetation

Plant Community Type (PCT)

Sydney Coastal Enriched Sandstone Forest (3592)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

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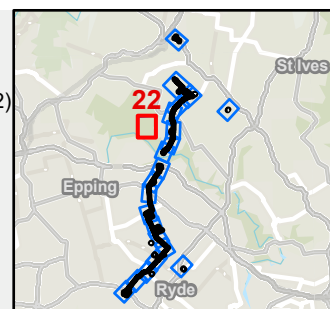
-  Waterways
- Fauna Habitat**
-  Hollow
 -  Nest

-  Roost/potential roost

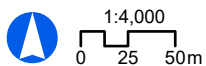
Native vegetation

Plant Community Type (PCT)

-  Sydney Coastal Enriched Sandstone Forest (3592)



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

5 Impact Assessment

5.1 Details of Proposed Development

Sydney Water are proposing to reinstate an existing watermain running between the pumping station in Ryde and Roland Avenue, Warrawee (~10 km). The JV Study Area and Impact Area includes:

- The Watermain Construction Corridor (Study Area)
- The Impact Area Compounds and Direct Pipe Excavation Area located at Vimiera Rd, Marsfield.
- HDD underbore sections along reserves or National Parks
- HDD pits
- Laydown areas
- Easement areas
- Temporary access tracks.

The proposed methodology includes a mix of trenched and trenchless construction for the pipeline. Refer to Figure 5-1 for Impacted Areas.

5.2 Direct impacts on ecological values

5.2.1 Native vegetation

Four native vegetation zones were identified in the Impact Area. Impacts to these PCT's are shown in Table 5-1.

Table 5-1. Native Vegetation Zones in the Impact Area

Native Vegetation zones	Impact Area area (ha)
PCT 3262: Sydney Turpentine Ironbark Forest	0.029
PCT 3259: Sydney Coastal Shale-Sandstone Forest	0.199
PCT 3595: Sydney Coastal Sandstone Gully Forest	0.130
PCT 3592: Sydney Coastal Enriched Sandstone Forest	0.300
PCT total	0.658
Total tree count	100

Additionally, there are 100 remnant native trees within the Impact Area that are proposed to be either directly (trimming or removal) or indirectly (TPZ or RPZ) impacted by the Project. For a full list of tree species, refer to Appendix E.

5.2.2 Habitat features

Refer to Table 4-11 for a full list of habitat values along the alignment.

5.2.3 Threatened Ecological Communities

Two BC Act listed TEC's and one EPBC Act listed TEC was ground-truthed in the Impact Area. Impacts to these TEC's are shown in Table 5-2.

Table 5-2. TEC's within the Impact Area

Ground-truthed Threatened Ecological Communities in the Impact Area	Impact Area (ha)
EPBC Act/BC Act Listed Critically Endangered TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion	0.026
BC Act Duffys Forest Ecological Community in the Sydney Basin Bioregion.	0.035

No other EPBC Act listed TECs, or BC Act listed TECs occur within the Impact Area.

5.2.4 Threatened species

No threatened fauna species were sighted during the field assessment. Overall, based on habitat availability, four threatened species were considered to have a moderate or higher likelihood of occurrence within the Study Area:

- Little Lorikeet (Vulnerable, BC Act)
- Little Bent Winged Bat (Vulnerable, BC Act)
- Large Bent Winged Bat (Vulnerable, BC Act)
- Grey-Headed Flying-Fox (Vulnerable BC Act and EPBC Act).

Subsequently Significant Impact Assessments have been completed in Appendix F. Based on the outcomes of the Test of Significance and Assessments of Significance, the Project is not expected to result in a significant impact on the identified threatened species for reasons listed below.

Little Lorikeet

The Little Lorikeet is a nomadic and opportunistic species, with movement patterns largely influenced by the availability of nectar resources. Due to its high mobility and capacity to exploit suitable habitats across a broad landscape, the species is likely to utilise higher-quality vegetation within surrounding reserves and protected areas, particularly Lane Cove National Park and Garigal National Park. As such, the Project is not anticipated to result in a significant impact on this species.

Little Bent-winged Bat and Large Bent-winged Bat

Both the Little Bent-winged Bat and the Large Bent-winged Bat exhibit a preference for natural, undisturbed environments. The Study Area is not considered critical habitat for these species, particularly given the availability of more suitable roosting and foraging habitat in adjacent areas, including Lane Cove National

Park and Garigal National Park. If marginal foraging areas are affected by the Project, these species are expected to migrate opportunistically to more favourable habitat. Therefore, the Project is not expected to have a significant impact on either species.

Grey-headed Flying-fox

The Grey-headed Flying-fox is a highly mobile species that typically requires high-quality foraging resources. Vegetation within the Study Area, located in an urban setting, provides only marginal foraging habitat. Given the abundance of more suitable habitat in nearby areas, it is likely that the species only occasionally utilises the Study Area. In the event of any impact to foraging resources, the species' mobility allows it to readily relocate to more suitable nearby areas. Consequently, the Project is not expected to result in a significant impact on the Grey-headed Flying-fox.

5.2.5 NSW Biodiversity values map and threshold tool

The Study Area encompasses vegetation identified on the NSW Biodiversity Values Map and assessed using the Threshold Tool (State Government of NSW and NSW DPE, 2024a). Small patches along the alignment, such as within Agincourt Road, Marsfield, support threatened species or communities that could be subject to serious and irreversible impacts.

This Biodiversity Assessment Report (BAR) concludes that the potential impacts on Threatened Ecological Communities (TECs) and other biodiversity values within the Study Area are unlikely to be significant. This determination is based on the adoption of underboring and trenchless construction methods in sensitive areas, such as Lane Cove National Park, and the minimal extent of vegetation trimming or removal required.

Consequently, and considering that Sydney Water is a self-determining authority under Part 5, Division 5.1 of the Environmental Planning and Assessment (EP&A) Act, the preparation of a Biodiversity Development Assessment Report (BDAR) is not recommended.

5.2.6 Groundwater dependent ecosystems

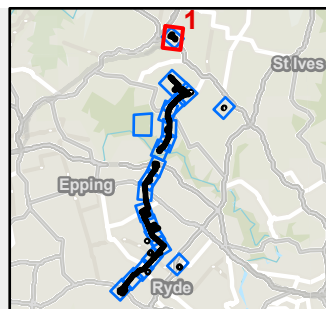
It is estimated that there will be the total extraction of 143, 000L across the entire alignment resulting in drawdown impacts. No GDE or ground water volume impacts are anticipated to occur from the Project.

Sydney Water is expected to have secured the necessary water supply works approval and/or water access licence for the dewatering of groundwater prior to the borehole drilling, particularly during the planned direct pipe excavation works at Vimiera Rd Marsfield. Depending on the identified contaminants and estimated volumes, Sydney Water plans to deploy a mobile treatment plant to process the groundwater. The treated water will undergo appropriate testing before being discharged into the stormwater system. If the test results meet environmental standards, the water may also be recycled for on-site dust suppression. Given that the water will not be reintroduced into the environment and stormwater discharge will be rigorously tested, no significant ecological impacts are anticipated from the groundwater drawdown. However, it is advisable to consult with a relevant hydrologist or SME expert prior to commencement to confirm these expectations.

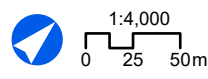
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- Study Area
- JV Alignment
- Native vegetation patch
- Fauna Habitat**
- Hollow
- Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

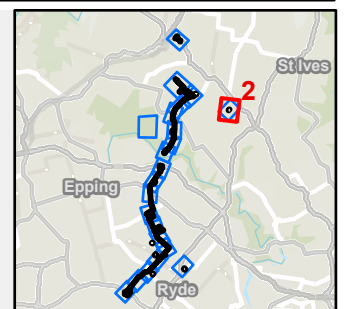


Projection: GDA2020 MGA Zone 56

Figure 5: Proposed development impacts from the RP03 project

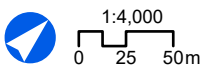


- Study Area
- Native vegetation patch
- Fauna Habitat**
- Hollow
- Remnant Tree



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Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

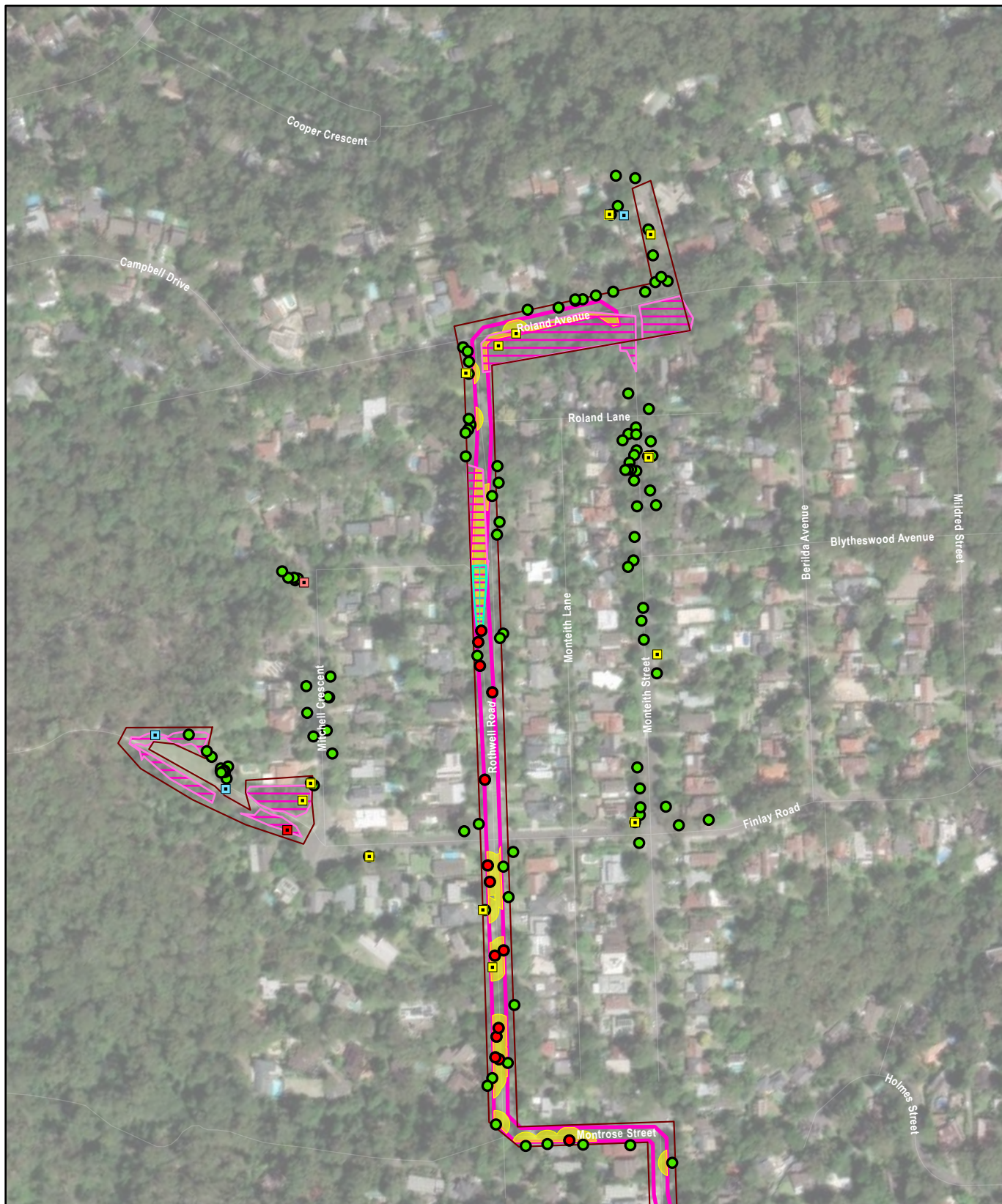


Projection: GDA2020 MGA Zone 56

RP03 **Biodiversity Assessment Report**

Figure 5: Proposed development impacts from the RP03 project

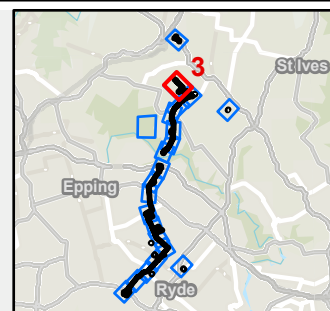
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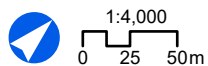
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- Impacted TEC

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Culverts and unnamed tributaries
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

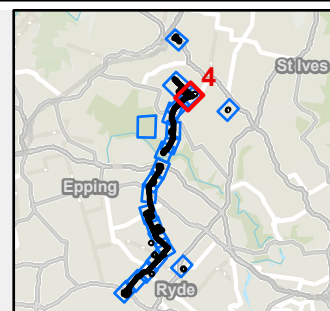
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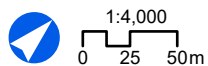
-  Study Area
-  JV Alignment
-  Impacted Native Vegetation Patch

Fauna Habitat

-  Hollow
-  Remnant Tree
-  Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

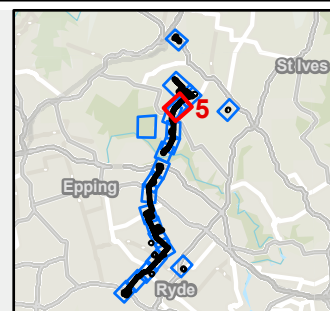
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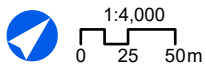
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch

Fauna Habitat

- Hollow
- Nest
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

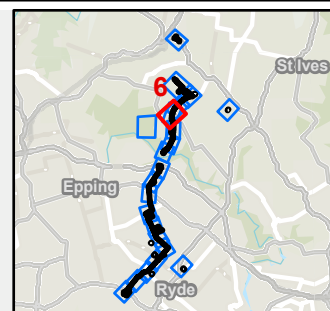
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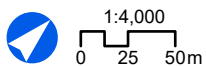
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch

Fauna Habitat

- Hollow
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

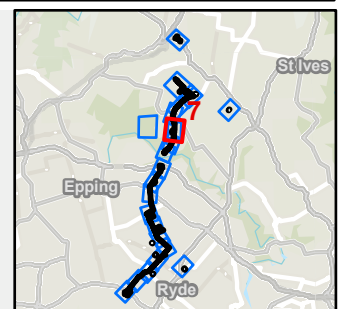
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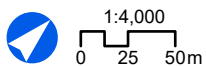
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- Impacted TEC

Fauna Habitat

- Hollow
- Nest
- Culverts and unnamed tributaries
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

RP03 **Biodiversity Assessment Report**

Figure 5: Proposed development impacts from the RP03 project

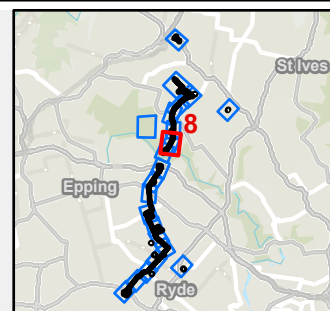
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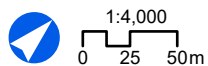
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Culverts and unnamed tributaries
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

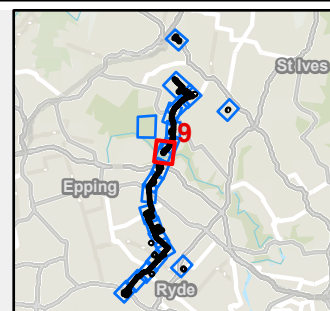
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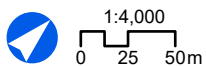
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- Lane Cove River

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Culverts and unnamed tributaries
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

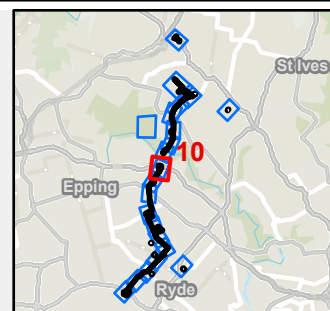
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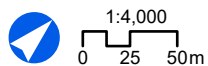
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- ~ Waterways

Fauna Habitat

- Hollow
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



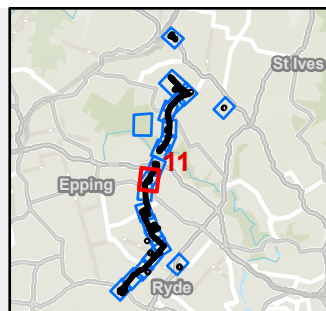
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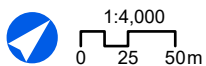


- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- Impacted TEC

- Fauna Habitat**
- Hollow
 - Roost/potential roost
 - Remnant Tree
 - Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

Figure 5: Proposed development impacts from the RP03 project

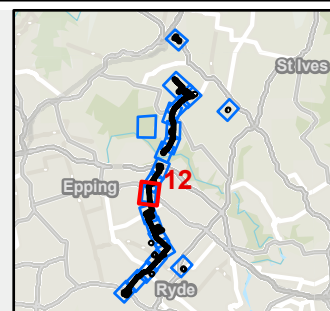
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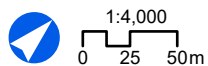
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- Impacted TEC

Fauna Habitat

- Hollow
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

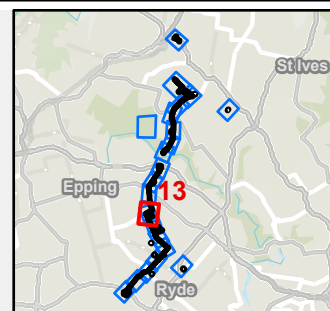


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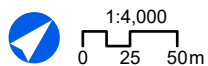
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- Study Area
- JV Alignment
- Fauna Habitat**
- Hollow
- Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

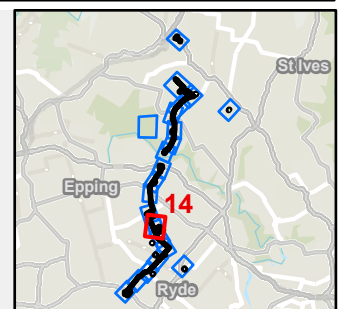
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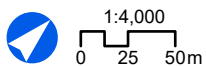
-  Study Area
-  JV Alignment
-  Impacted Native Vegetation Patch
-  Native vegetation patch

Fauna Habitat

-  Hollow
-  Nest
-  Remnant Tree

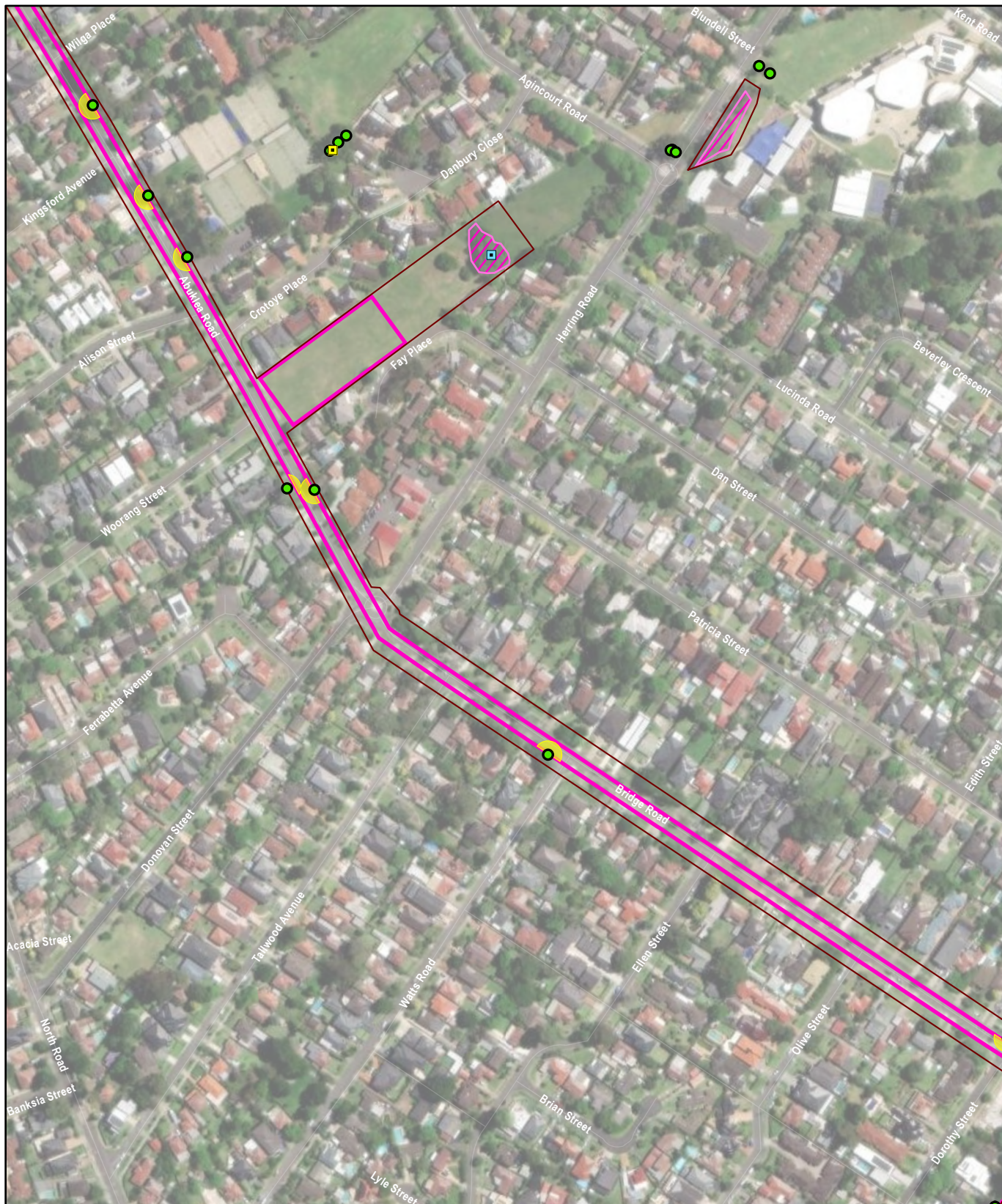


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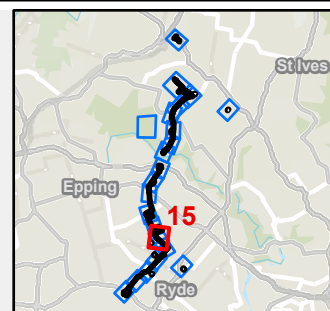
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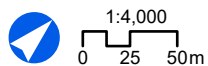
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



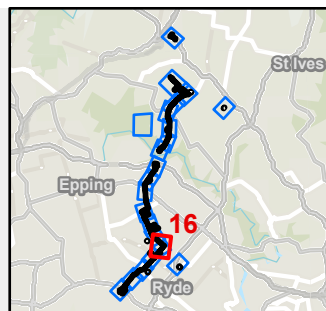
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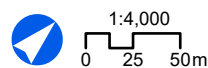


- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- ~~~~~ Waterways

- Fauna Habitat**
- Hollow
 - Roost/potential roost
 - Culverts and unnamed tributaries
 - Remnant Tree



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

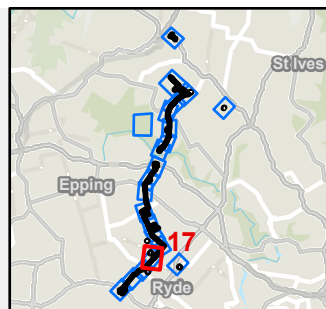
Figure 5: Proposed development impacts from the RP03 project

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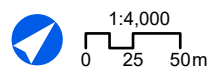


- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch
- ~ Waterways

- Fauna Habitat**
- Hollow
 - Culverts and unnamed tributaries
 - Remnant Tree
 - Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

Figure 5: Proposed development impacts from the RP03 project

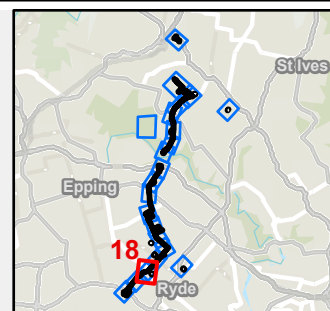
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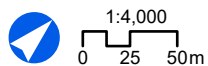
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

RP03 **Biodiversity Assessment Report**

Figure 5: Proposed development impacts from the RP03 project

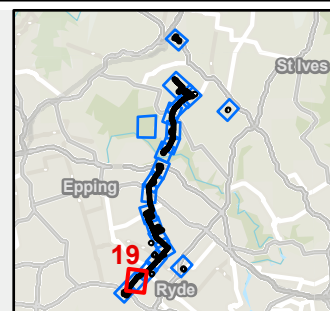
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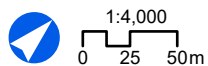
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

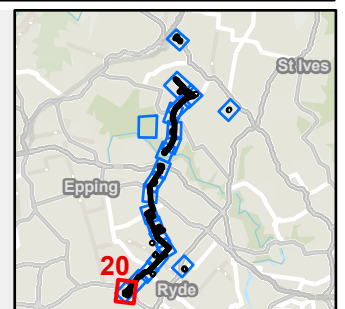
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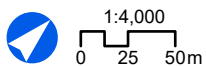
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch

Fauna Habitat

- Hollow
- Nest
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

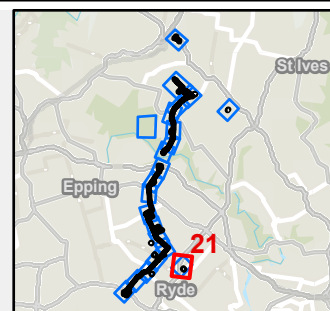
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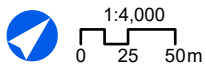
- Study Area
- JV Alignment
- Impacted Native Vegetation Patch
- Native vegetation patch

Fauna Habitat

- Hollow
- Roost/potential roost
- Remnant Tree
- Impacted Trees



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services

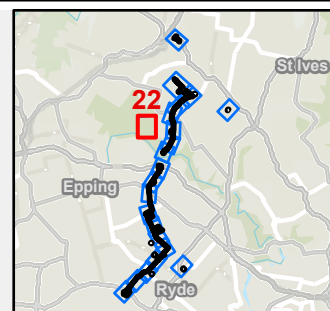


Projection: GDA2020 MGA Zone 56

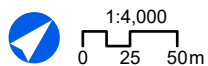
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-  Native vegetation patch
-  Waterways
- Fauna Habitat**
 -  Hollow
 -  Nest
 -  Roost/potential roost



Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Spatial Services



Projection: GDA2020 MGA Zone 56

6 Indirect impacts to ecological values

6.1 Wildlife connectivity and habitat fragmentation

The Impact Area exhibits limited wildlife connectivity, particularly within urbanised and heavily disturbed zones such as residential areas in and around West Ryde, Marsfield, and South Turramurra. These regions are highly fragmented due to the presence of major roads, housing, and commercial developments. Despite this, several bushland corridors and urban reserves—such as those in and near Twin Creeks Reserve and various parks along the proposed alignment—continue to provide important habitat for native species. To prevent significant impacts on key habitats, wildlife movement corridors for migratory birds and mammals, and overall vegetation connectivity, development in these sensitive areas should be carefully managed. Mitigation measures include retaining large trees and high-density proteaceae shrubs where possible, particularly along riparian corridors, to retain foraging resources, habitat and movement corridors.

Specific safeguards and mitigation strategies are detailed in Section 8.2.

6.2 Sedimentation and erosion

It is expected that excavation activities such as trenching would increase soil exposure and make the ground surface more susceptible to erosion during rainfall events. This could also heighten the chances of erosion and sediment transfer offsite. Erosion and sedimentation impacts can be controlled through implementation of the appropriate controls. This includes the installation of sediment fences, temporary scour protection and directing stockpiling away from drainage lines, waterways and drains. Safeguards and mitigation measures are outlined in Section 8.2.

6.3 Invasion and spread of weeds, pests, pathogens and diseases

There is high potential for weed species to be spread through the movement of construction vehicles and machinery, as well as the disturbance and transportation of soil in the area. An abundance of weeds (including WoNS) were recorded within the Study Area (as detailed in Appendix C – Flora list) and are at higher risk of further invading the local plant communities. The invasion and spread of weeds would be limited and managed with the implementation of the mitigation measures outlined in Section 9.2. If weeds are managed prior to work commencing, then this has the potential to reduce density and slow their spread into more contained areas.

Likewise, the highest risk of invasion and spread of pathogens such as *Phytophthora* (*Phytophthora cinnamomi*) and Myrtle Rust (*Uredo rangeli*) is via the importation of soils either on machinery or as fill (DPIE, 2020). Pathogens present a greater risk for areas where clearing is to occur, as the increased stress of edge effects may make some species more susceptible to disease. Safeguards and mitigation measures are outlined in Section 8.2.

6.4 Groundwater dependent ecosystems

High, medium and low probability GDEs are mapped in multiple locations relevant to the Impact Area (Commonwealth of Australia and Bureau of Meteorology, 2025).

The Study Area intersects with two terrestrial GDEs - Coastal Sandstone Ridgetop Woodland, and Hinterland Sandstone Gully Forest. The Study Area does not intersect with any aquatic GDE's.

Management actions to prevent indirect impacts to terrestrial GDE along the alignment, are to be implemented by Sydney Water. The Project would not extract subterranean groundwater. Any potential negative interactions with GDEs are confined to being temporary and localised in nature, there are not expected to be any substantial or significant impacts to GDEs.

Construction methodology must meet the objectives of the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 (NSW Department of Water 2023), in particular with objective (e) to help prevent structural damage to aquifers resulting from groundwater extraction and strategy (1) (b) manage the construction and use of water supply works to minimise impacts on highly priority groundwater-dependent ecosystems and groundwater quality, groundwater-dependent cultural significant areas, basic landholder rights, town water supply, and other licence holders. If there is any uncertainty around the potential for proposed mitigation measures to sufficiently prevent indirect impacts to retained native vegetation GDEs, ongoing monitoring is recommended for signs of impacts, combined with an adaptive management strategy to identify and rectify (and possibly offset) any potential unexpected impacts.

6.5 Noise and vibration

Project works are anticipated to have noise, and vibration impacts within its locality, which may affect both the surrounding community and local biodiversity. (Newport, Shorthouse, & Manning, 2014). Common fauna species, such as birds, bats, and amphibians, may experience stress, altered movement patterns, or avoidance of the area due to these disturbances.

Construction activities such as drilling, can generate elevated noise levels and ground vibrations that may disrupt the behaviour of wildlife. At Vimiera Road, it is expected that tunnelling will occur for a period of five months, with this section situated 80m from Lane Cove National Park. The Project works are separated from Lane Cove National Park by a highly- trafficked multi-lane motorway (M2 Motorway). Additionally, Lane Cove National Park is frequented by humans utilising walking tracks. The majority of noise from construction is predicted to be similar to or less than the ambient day time noise levels measured at Lane Cove National Park M2 Motorway would still largely dominate the ambient noise environment

A field assessment was undertaken on 12 June 2024, surveying Lane Cove National Park within 120 m of the Project works. Vegetation in this area consisted of previously disturbed regrowth with native canopy *Allocasuarina* species and small diameter eucalyptus trees (approximately 10 cm dbh), and dense understory of native and invasive species (*Lantana camara*); and native eucalypt forest and woodland. This area may constitute habitat for several native and threatened fauna species:

- Dense native forest and woodland with bushrock is likely to contain foraging and nesting resources for native and threatened birds, mammals and reptiles
- One small waterway/ culvert flowing east-west within a previously disturbed area, may comprise foraging habitat for native and threatened amphibians, birds, mammals and reptiles
- Small diameter hollows (approximately 10 cm diameter) with native *Eucalyptus* species and *Angophora* species trees, may comprise nesting habitat for native and threatened birds, and mammals such as microbats
- Roosting habitat (**Note:** not breeding habitat) for Powerful Owl, which are known to breed in Lane Cove National Park (State Government of NSW and NSW Department of Environment and Conservation, 2004). Powerful Owl's breed in large hollows (at least 0.5 m deep) in eucalyptus trees that are 80-240 cm diameter at breast height. Eucalyptus trees within the study area were < 80 cm dbh, and did not display large hollows (State Government of NSW and NSW Environment and Heritage, 2025). A potential Powerful Owl breeding hollow was identified outside of the Study Area, approximately 240 m from the noise and vibration source (33°45'45"S, 151°6'19"E). In line with relevant guidelines, including the Interim Construction Noise Guideline (ICNG) and Sydney Water's Noise Management Procedure (SWEMS0056), all reasonable and feasible noise and vibration mitigation measures will be implemented to minimise these impacts. These include restricting work to standard daytime hours where possible, using low-noise equipment and prioritising less vibration intensity methods, installing noise barriers/ a noise wall and taking advantage of natural barriers such as hills and slopes, and conducting pre-construction condition assessments of nearby structures. Where out-of-hours work is justified, additional safeguards and community notification protocols will be followed to reduce potential environmental and social impacts.

The field assessment surveyed fauna habitat within 120 m of the Project works. While Lane Cove National Park contains foraging, roosting, and nesting habitat for fauna species (including key features such as a waterway/ culvert, and small hollows), there is no suitable Powerful Owl breeding habitat within the area surveyed.

Given that the construction noise level is expected to be consistent with the current level experienced, and the M2 Motorway would still largely dominate the ambient noise environment, the project is not expected to result in significant indirect impacts from noise on Powerful Owl, or other native and threatened fauna within Lane Cove National Park.

7 Actions and offset requirements

7.1 Action requirements

Refer to Table 7-1 below for a summary of actions required under relevant environmental legislation and policy.

Table 7-1. Summary of actions required under relevant environmental legislation

Relevant legislation or policy	Impact Area 2.2
EPBC Act	The Project will impact 0.026 ha of EPBC Act Critically Endangered TEC Turpentine- Ironbark Forest of the Sydney Basin Bioregion. Subsequently an Assessment of Significance has been completed in Appendix F – Significant Impact Assessments. The Project is not likely to result in a significant impact to this EPBC Act listed TEC. One EPBC Act listed threatened fauna species, Grey- Headed Flying-Fox (<i>Pteropus poliocephalus</i>) was considered to have a moderate likelihood of occurrence within the Study Area. The Project is not likely to result in a significant impact to EPBC Act listed threatened fauna. No further action is required.
EP&A Act	No action required The Project is not likely to result in a significant impact to threatened species or ecological communities or their habitat. Additionally, it doesn't occur within an AOBV.
BC Act	The Project will impact 0.026 ha of BC Act Critically Endangered TEC Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion. Subsequently a Test of Significance has been completed in Appendix F – Significant Impact Assessments. The Project is not likely to result in a significant impact to this EPBC Act listed TEC. The Project will impact 0.035 ha of BC Act Duffys Forest Ecological Community in the Sydney Basin Bioregion. Subsequently a Test of Significance has been completed in Appendix F. The Project is not likely to result in a significant impact to this EPBC Act listed TEC. Five BC Act listed threatened fauna species, Little Lorikeet (<i>Parvipsitta pusilla</i>), Little Bent-winged Bat (<i>Miniopterus australis</i>), Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>) and Grey- headed Flying-fox (<i>Pteropus poliocephalus</i>), and Powerful Owl (<i>Ninox stenua</i>) were considered to have a moderate likelihood of occurrence within the Study Area. Subsequently Tests of Significance have been completed in Appendix F – Significant Impact Assessments. The Project is not likely to result in a significant impact to BC Act listed threatened fauna.
FM Act	No action required Notification is not required under Section 199 of the FM Act, as the works do not involve dredging (as defined under the Act) or impacts to any watercourse areas mapped as Key 'Fish Habitat'.
<i>Biosecurity Act 2015</i>	Action required Several environmental weeds were recorded within the Study Area. Although these weeds are not declared priority weeds, they still pose a risk to the surrounding vegetation and biodiversity. The use of plant machinery and equipment can act as a vector to introduce and spread existing and new weeds in the form of soil-stored seeds or reproductive vegetative materials including Lantana (<i>Lantana camara</i>) seeds. Spread of weeds off-site is possible if green waste is contaminated and not disposed of appropriately and used elsewhere. Appropriate weed management controls and safeguards should be created before to works start and adhered to throughout the works phase (see Table 9-1).

Relevant legislation or policy	Impact Area 2.2
<i>State Environmental Planning Policy (Precincts—Western Parkland City) 2021</i>	No action required Whilst there are areas of 'High Biodiversity Value' within the Impact Area for both Options, this Biodiversity Assessment Report (BAR) concludes that the potential impacts on Threatened Ecological Communities (TECs) and other biodiversity values within the Study Area are unlikely to be significant. This determination is based on the adoption of under boring and trenchless construction methods in sensitive areas, such as Lane Cove National Park, and the minimal extent of vegetation trimming or removal required. Consequently, and considering that Sydney Water is a self-determining authority under Part 5, Division 5.1 of the Environmental Planning and Assessment (EP&A) Act, the preparation of a Biodiversity Development Assessment Report (BDAR) is not recommended.

7.2 Offset requirements

Non-significant residual impacts must be offset based on the Guide (Sydney Water, 2024). Non-significant impacts apply to:

- **Minor Impact:** localised impacts, such as removal of an individual isolated tree (e.g. street tree or garden planting), or a small amount ($< 100 \text{ m}^2$) of native vegetation removal (e.g. around a maintenance hole).
- **Moderate Impact:** larger scale impacts ($> 100 \text{ m}^2$), that are not considered significant (e.g. removal of native vegetation associated with new infrastructure projects).

Table 7-2. Ecological values within the Impact Area requiring Sydney Water Offsets

Ecological value	Impact Area (ha)
PCT 3262: Sydney Turpentine Ironbark Forest	0.029
PCT 3259: Sydney Coastal Shale-Sandstone Forest	0.199
PCT 3592: Sydney Coastal Enriched Sandstone Forest	0.300
PCT 3595: Sydney Coastal Sandstone Gully Forest	0.130
Total PCT	0.658
EPBC Act/BC Act Critically Endangered TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion	0.026
BC Act Duffys Forest Ecological Community in the Sydney Basin Bioregion.	0.035
Total TEC	0.061
Trees	
Ecological value	Impact Area (ha)
Locally native/remnant tree	100 trees
Habitat Values	
Hollow-bearing tree	11 trees
According to the Guide, this is considered a moderate impact. Removal of non-threatened native vegetation with a moderate impact requires a 2:1 offset strategy, and removal of threatened native vegetation with a moderate impact requires a 3:1 offset strategy.	

Table 7-3. Non-statutory biodiversity impacts and offsets for the Project

Impact	Project Level of Impact	Impact Area				
		Biodiversity Value Impacted	Total Impact	Residual loss of biodiversity values resulting from works	Offset Multiplier	Offset required
Moderate impact: Larger scale impacts ($\geq 100 \text{ m}^2$), but that are not considered to be significant e.g., removal of native vegetation associated with new water infrastructure projects or more than one tree, or trees with hollows.	Yes	Non- threatened native vegetation	0.597ha	Trimming or removal of native vegetation	2:1	1.194ha
Moderate Impact: Larger scale impacts ($\geq 100 \text{ m}^2$), but that are not considered to be significant e.g., removal of native vegetation associated with new water infrastructure projects or more than one tree, or trees with hollows.	Yes	Threatened native vegetation	0.061ha	Trimming or removal of native vegetation	3:1	0.183ha
Moderate Impact: Larger scale impacts ($\geq 100 \text{ m}^2$), but that are not considered to be significant e.g., removal of native vegetation associated with new water infrastructure projects or more than one tree, or trees with hollows.	Yes	*Locally native trees	*89 trees	Direct impact- Trimming or removal of native vegetation Indirect- TPZ or RPZ impacts	3:1	267 trees to be re- planted
Moderate Impact: Larger scale impacts ($\geq 100 \text{ m}^2$), but that are not considered to be significant e.g., removal of native vegetation associated with new water infrastructure projects or more than one tree, or trees with hollows.	Yes	Direct- Trimming of trees containing habitat values or removal of habitat values Indirect- Impacts to the TPZ or RPZ	11	Trimming of trees containing habitat values or removal of habitat values	2:1	22 nestboxes or 11 salvaged hollows

*Assessment assumes worst-case scenario of the removal and/or trimming of all trees along the alignment. Several trees may only be indirectly impacted, pending final design. It is also recommended that tree impacts are to be reduced in final design.

8 Conclusion and recommendations

8.1 Conclusion

8.1.1 Project impacts include:

The Project would Impact fauna habitat features including:

- One nest
- Two roosting habitat areas (including stags and culverts)
- No waterbodies
- 11 hollow-bearing trees

The Project would impact, **0.597 ha** of **non-threatened native vegetation** including:

- 0.003 ha of Sydney Turpentine Ironbark Forest (0.029ha in total for this PCT, but 0.026ha is TEC)
- 0 ha of Blue Gum High Forest
- 0.164 ha of Sydney Coastal Shale-Sandstone Forest (0.199ha in total for this PCT, but 0.035ha is TEC)
- 0.130 ha of Sydney Coastal Sandstone Gully Forest
- 0.300 ha of Sydney Coastal Enriched Sandstone Forest.

The Project would Impact, **0.061 ha** of **threatened vegetation** including:

- Direct and indirect impacts to 0.026ha of EPBC Act/BC Act listed TEC Turpentine-Ironbark Forest of the Sydney Basin Bioregion
- Direct and indirect impacts to 0.035 ha of BC Act listed TEC Duffys Forest Ecological Community in the Sydney Basin Bioregion.

Furthermore, four threatened species have a moderate likelihood of occurrence within the Impact Area including:

- Little Lorikeet
- Little Bent-winged Bat
- Large Bent-winged Bat
- Grey-headed Flying-fox
- Powerful Owl.

These impacts will not have a significantly adverse impact on ecological communities or species such that local occurrence is likely to be placed at risk of extinction, on any habitat of a threatened species or ecological community, or on any areas of outstanding biodiversity values.

8.2 Safeguards and Mitigation measures

A number of key threatening processes have been identified potentially arising from the Project; however, recommendations are made to safeguard against any impacts to biodiversity arising from those key threatening processes (refer to Table 8-1).

Table 8-1. Safeguards and mitigation measures

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
Project-specific safeguards and mitigation measures			
Threatened fauna	Habitat features and connectivity: Retain large trees that are greater than or equal to 50 cm diameter at breast height (including dead trees but excluding noxious weeds) where possible and apply tree-protection measures for all vegetation to be retained. This is to provide ongoing roosting and foraging opportunities for fauna such as Little Lorikeet, Little Bent-Winged Bat, Large Bent-winged Bat and the Grey-headed Flying-fox. Retain areas of high density proteaceae shrubs where possible, particularly along riparian corridors, to retain foraging resources, habitat and movement corridors for the Eastern Pygmy-possum. Before any disturbance, all structures potentially providing habitat for microbats (bridges, culverts, mine shafts, storm water tunnels, old or derelict buildings) must be inspected by a qualified ecologist at an appropriate time of year. Where microbats are found, the structure providing habitat must not be affected, or a bat management plan must be prepared by a microbat specialist which allows for: ■ exclusion mechanisms to reduce the risk of direct physical harm to the microbats; and/or ■ supplementary habitat to compensate for lost habitat: and/or ■ regular inspections of structures and briefing of relevant construction staff. Pests: Before construction works begin, a pest control strategy must be prepared. This strategy must be implemented during construction and operation of the development. This strategy must include pest control methods that reduce the risk of secondary poisoning (for example, from Pindone or second-generation rodenticides) Human disturbance: Above-ground infrastructure must be set back from Grey-Headed Flying Fox camps (minimum 100 m where possible) and raptor – bird of prey – nests (minimum 100 m where possible) at a suitable distance. Operational management measures to minimise disturbance to populations and nests must also be implemented. Disease: Incorporate best-practice site hygiene protocols to manage the potential spread of pathogens, such as Phytophthora and myrtle rust.	Sydney Water/Contractor	Prior to and during construction

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
Threatened Ecological Communities	Habitat features and connectivity: When works are likely to have impacts on Sydney Turpentine- Ironbark Forest and Blue Gum High Forest in the Sydney Basin Bioregion, mitigation in accordance with best-practice guidelines (Best Practice guidelines for Sydney Turpentine-Ironbark Forest- State of NSW and Department of Environment and Climate Change NSW, November 2008, and Best Practice guidelines for Blue Gum High Forest- State of NSW and Department of Environment and Climate Change NSW, November 2008), will need to be adhered to. Disease: Incorporate best-practice site hygiene protocols to manage the potential spread of pathogens, such as Phytophthora and myrtle rust adjacent to potential habitat for TECs.	Sydney Water/Contractor	Prior to and during construction
Loss of native vegetation extent or trees	All direct impacts are to be offset as per Sydney Water Biodiversity Offset Guide (Sydney Water, 2024). Revegetated areas and trees planted must be monitored so that their survival until establishment is achieved. This will secure long-term offset.	Sydney Water/Contractor	Prior to and during construction
	If clearing of native vegetation is required outside the Impact Area, these areas will require additional assessment by an ecologist for potential impacts to TECs, threatened species and their habitats.	Sydney Water/Contractor	Prior to and during construction
Minimise risk of over clearing	Any native vegetation to be cleared within the Impact Area will be clearly identified and marked. Native vegetation to remain will be clearly delineated as No-Go-Zones to avoid risk of clearing. Clearing and No-Go-Zone maps to be prepared and approved by Sydney Water prior to works commencing. Signing stating No-Go-Zone to be placed in fences. All staff will be made aware of No-Go-Zones during induction and be provided with a map of No-Go-Zones.	Sydney Water/Contractor	Prior to and during construction
	Tree removal is to be confirmed by an arborist due to potential to retain these trees if impact to the Tree Protection Zone is minimal. Tree Protection Zone details are provided within the <i>Australian Standard 4970-2009 Protection of trees on development sites</i>.	Sydney Water/Contractor	Prior to and during construction

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
Introduction, establishment and/or spread of weeds	Weed management plan is to be developed and implemented by the contractor and approved by Sydney Water prior to works commencing. The plan will be established and implemented to avoid spread and establishment of weeds during construction. Measures will include: ■ All equipment and plant machinery to be appropriately cleaned before the start of works. ■ All priority weeds within the Impact Area are to be cleared and disposed of at a registered waste management facility. ■ If herbicide is to be used, this must be applied by a person trained to do so and that has a certificate of competency, or a statement of attainment issued by a registered training organisation. Herbicide will only be used in accordance with the label/permit. ■ Conduct toolbox talks to identify high risk priority weeds and weeds of national significance to on-site staff ■ Weed vegetation requiring clearing and removal should be disposed of at a registered waste management facility.	Sydney Water/Contractor	Prior to and during construction
Unexpected finds: Threatened flora, or injury or risk to native fauna, including threatened species	An unexpected finds protocol to be prepared by Sydney Water and implemented by the contractor if unexpected, threatened flora, or native fauna are found or discovered during works. Works must stop immediately upon an unexpected find occurrence, and the environment/site manager informed. An ecologist should be engaged to determine management action(s).	Sydney Water/Contractor	Prior to and during construction
Threatened fauna	Fauna spotter catcher required to be present during all construction works to avoid potential direct impacts to native species including the threatened species listed above. This includes impacts to any hollow-bearing trees, roost potential (stag) trees or works near watercourses and culverts.	Sydney Water/Contractor	Prior to and during construction
Indirect impacts to adjacent vegetation and waterways	A sedimentation and controls plan is to be prepared by the contractor and approved by Sydney Water prior to works starting to avoid indirect impacts due to runoff of building materials and/or water into adjacent vegetation and waterways.	Sydney Water/Contractor	Prior to and during construction
Introduction of pathogens into riparian areas and/or native vegetation	Introduction of pathogens in native vegetation can cause diseases. A hygiene protocol must be prepared by Sydney Water prior to works starting and implemented by the contractor during works to avoid introduction of pathogens in machinery, tools, PPE or imported soils.	Sydney Water/Contractor	Prior to and during construction
Sydney Water standard mitigation measures for flora and fauna			

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
4.1	Provided it is essential for delivering the project, Sydney Water's Project Manager can approve the following vegetation removal and tree trimming, without additional environmental assessment (but only after consultation with the Environmental and Community Representatives and affected landowners). Sydney considers vegetation removal in these circumstances has minimal environmental impact. Any minor: ■ vegetation trimming or ■ removal of exotic vegetation or ■ removal of planted native vegetation. where the vegetation is not a threatened species (including a characteristic species of a threatened community or population), heritage listed, in declared critical habitat or in a declared area of outstanding biodiversity value. Any removal of remnant vegetation where there is no net change to environmental impact (e.g., a different area of vegetation is removed but the total area is the same or less than assessed in the EIA). Written explanation of the application of this clause (including justification of the need for trimming or removal and any proposed revegetation) should be provided when seeking Project Manager approval. Any impacts to native vegetation and trees must be offset in accordance with the Biodiversity Offset Guideline (SWEMS0019.13).	Sydney Water	During construction
4.2	Offset residual impacts to native vegetation and trees in accordance with the Biodiversity Offset Guideline (SWEMS0019.13)	Sydney Water/Contractor	Prior to and during construction
4.3	If vegetation is highly sensitive, trimming or clearance cannot proceed without written authorisation from the Sydney Water Project Manager (in consultation with Environmental Representative). In sensitive areas where further assessment is required for any further trimming or removal of vegetation.	Sydney Water/Contractor	Prior to and during construction
4.4	Map and report native vegetation clearing greater than 0.01 ha in extent (<i>and any associated rehabilitation</i>) to the Sydney Water Environmental Representative. Track vegetation clearing as per SWEMS0015.26 Contractor Native Vegetation Clearing and Rehabilitation template. Refer to Native Vegetation Clearing and Rehabilitation Report template (SWEMS0015.26). Supporting documentation/evidence must be provided in the report including photos, marked up maps and GIS layers. If an ecologist is doing a preclearance survey they can provide GIS layers of the areas to be cleared.	Sydney Water/Contractor	Prior to and during construction
4.5	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 e.g., can be used to give the DC option to under bore, tie-back and trim rather than removal	Sydney Water/Contractor	Prior to and during construction

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
4.6	Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing.	Sydney Water/Contractor	Prior to and during construction
4.7	Adjust methodology (e.g., avoid area, hand excavate, implement exclusion fencing) to protect sensitive areas where possible (such as mature trees, known threatened species, populations or ecological communities).	Sydney Water/Contractor	Prior to and during construction
4.8	Protect trees in accordance with the requirements of <i>Australian Standard 4970-2009 for the Protection of Trees on Development Sites</i>. Do not damage tree roots unless absolutely necessary and engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone. Protect trees in accordance with the Program Delivery Guidance Standard 9.3 Biodiversity Management (EV-GS-003). Standard available in SWIM. The TPZ = trunk diameter (measured 1.4m above ground) x 12. PD Guidance standards on PMSP drive Env\01 Program Management\02 Plans & Procedures\DM Guidance Standards	Sydney Water/Contractor	Prior to and during construction
4.9	Carry all equipment into the work site by hand or trolley. Suitable for sensitive and constrained sites.	Sydney Water/Contractor	Prior to and during construction
4.10	Notify potentially affected residents of any tree removal. Need to negotiate with Project Manager at early planning stages of project. Liaise with Council and comms as needed to determine who is 'affected'.	Sydney Water/Contractor	Prior to and during construction
4.11	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. See Fauna Encounters on Construction Sites Factsheet if you need further guidance. CEMP to include contact details of appropriately licenced handler.	Sydney Water/Contractor	Prior to and during construction
4.12	Inspect vegetation for potential fauna prior to clearing or trimming. If fauna is present, or ecological assessment has determined high likelihood of native fauna presence (<i>including hollow bearing trees</i>), engage WIRES or a licenced ecologist to inspect and relocate fauna before works. See Fauna Encounters on Construction Sites Factsheet if you need further guidance.	Sydney Water/Contractor	Prior to and during construction
4.13	If native fauna is encountered on site, stop work and allow the fauna to move away unharassed. Engage WIRES or a licenced ecologist if assistance is required to move fauna. See Fauna Encounters on Construction Sites Factsheet if you need further guidance.	Sydney Water/Contractor	Prior to and during construction

Category/Impact	Mitigation requirements/Safeguard	Responsibility	Timing
4.17	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 implemented.	Sydney Water/Contractor	Prior to and during construction
4.18	If any damage occurs to vegetation outside of the disturbance corridor (as shown in the CEMP), notify the Sydney Water Project Manager and Environmental Representative so that appropriate remediation strategies can be developed.	Sydney Water/Contractor	Prior to and during construction
4.19	Manage biosecurity in accordance with: ■ <i>Biosecurity Act 2015</i>, including reporting new 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 <u>SWEMS0017</u>. If green waste is likely to contain herbicides or other chemical or physical contaminants (<i>including man-made and other foreign materials</i>), do not send for offsite recycling.	Sydney Water/Contractor	During construction
4.20	For works in council owned bushland and National Parks the Delivery Contractor will consult with Councils/NPWS to identify known plant pathogens or pests and management requirements. Prepare a Hygiene Management Plan if there is a risk of infestation and spread. Phytophthora and Myrtle Rust factsheets contain hygiene management measures.	Sydney Water/Contractor	Prior to construction
4.21	To prevent spread of weeds, wrap straw bales in geofabric to prevent seed spread. Use when works are in bushland or other sensitive areas, especially weed free bushland or National Parks.	Sydney Water/Contractor	During construction
4.22	Bag all plant parts and excavated topsoil that may be infested with weed propagules and dispose at a licensed waste disposal facility. Weed species that need to be bagged should be identified specifically. This would be through ecologist specialist study, or consultation with Council/ NPWS.	Sydney Water/Contractor	During construction
4.23	If replanting near Sydney Water pipelines refer to 'Which trees can damage wastewater pipes?' link from Sydney Water website to help identify suitable species.	Sydney Water/Contractor	During construction
4.24	In TOBAN period: ■ A Total Fire Ban Exemption is required for all non-essential work in TOBAN periods. ■ Staff and contractors should use the Sydney Water Total Fire Ban Exemption Framework to determine exemption permissibility and approval pathway.	Sydney Water/Contractor	During construction

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Appendix A – BioNet search results

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016),Commonwealth listed, CAMBA listed, JAMBA listed or ROKAMBA listed Entities in selected area [North: -33.72 West: 151.05 East: 151.15 South: -33.82] returned a total of 2,669 records of 75 species.

Table A- 1: Bionet Search results

Scientific Name	Common Name	NSW status	Comm. status	Records
Fauna				
Amphibians				
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V,P	V	3
<i>Litoria aurea</i>	Green and Golden Bell Frog	E1,P	V	6
<i>Pseudophryne australis</i>	Red-crowned Toadlet	V,P		72
Birds				
^^ <i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	E1,P,3	E	58
^^ <i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		7
^^ <i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		1
^^ <i>Ninox connivens</i>	Barking Owl	V,P,3		6
^^ <i>Ninox strenua</i>	Powerful Owl	V,P,3		824
^^ <i>Pandion cristatus</i>	Eastern Osprey	V,P,3		6
^^ <i>Polytelis swainsonii</i>	Superb Parrot	V,P,3	V	1
^^ <i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		2
^ <i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P,2	CE	4
^ <i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	V,P,2	V	1
^ <i>Falco hypoleucos</i>	Grey Falcon	V,P,2	V	1
<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	2
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	P	C,J,K	1
<i>Arenaria interpres</i>	Ruddy Turnstone	P	C,J,K	1

Scientific Name	Common Name	NSW status	Comm. status	Records
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		10
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1,P	E	1
<i>Cuculus optatus</i>	Oriental Cuckoo	P	C,J,K	3
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		3
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1,P		1
<i>Gallinago hardwickii</i>	Latham's Snipe	V,P	V,J,K	1
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		46
<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		7
<i>Hirundapus caudacutus</i>	White-throated Needletail	V,P	V,C,J,K	36
<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		2
<i>Lathamus discolor</i>	Swift Parrot	E1,P	CE	13
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (<i>eastern subspecies</i>)	V,P		6
<i>Numenius minutus</i>	Little Curlew	P	C,J,K	3
<i>Parvipsitta pusilla</i>	Little Lorikeet	V,P		14
<i>Petroica boodang</i>	Scarlet Robin	V,P		5
<i>Pluvialis squatarola</i>	Grey Plover	P	C,J,K	2
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V,P		4
<i>Sterna hirundo</i>	Common Tern	P	C,J,K	1
<i>Thalasseus bergii</i>	Crested Tern	P	J	6
Mammals				
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	4
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		1
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	E1,P	E	2
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		6
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		18
<i>Miniopterus australis</i>	Little Bent-winged Bat	V,P		95

Scientific Name	Common Name	NSW status	Comm. status	Records
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		218
<i>Myotis macropus</i>	Southern Myotis	V,P		23
<i>Petauroides volans</i>	Southern Greater Glider	E1,P	E	2
<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		2
<i>Phascolarctos cinereus</i>	Koala	E1,P	E	12
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	448
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		14
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		13
Invertebrates				
<i>Pommerhelix duralensis</i>	Dural Land Snail	E1	E	5
Flora				
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V,3		13
<i>Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E1,3		5
<i>Persoonia hirsuta</i>	Hairy Geebung	E1,P,3	E	3
<i>Prostanthera marifolia</i>	Seaforth Mintbush	E4A,3	CE	2
<i>Genoplesium baueri</i>	Bauer's Midge Orchid	E1,P,2	E	6
<i>Hibbertia spanantha</i>	Julian's Hibbertia	E4A,2	CE	30
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid	V,P,2	E	1
<i>Acacia clunies-rossiae</i>	Kanangra Wattle	V		1
<i>Acacia pubescens</i>	Downy Wattle	V	V	3
<i>Darwinia biflora</i>	N/A	V	V	308
<i>Darwinia peduncularis</i>	N/A	V		1
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	N/A	V		98

Scientific Name	Common Name	NSW status	Comm. status	Records
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	3
<i>Gaudium deanei</i>		V	V	13
<i>Haloragodendron lucasii</i>	N/A	E1	E	1
<i>Macadamia integrifolia</i>	Macadamia Nut		V	10
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	1
<i>Melaleuca deanei</i>	Deane's Paperbark	V	V	26
<i>Pimelea curviflora</i> <i>var. curviflora</i>		V	V	11
<i>Pomaderris prunifolia</i>	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government	E2		1
<i>Rhodamnia rubescens</i>	Scrub Turpentine	E4A	CE	11
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	V	V	20
<i>Tetratheca glandulosa</i>	N/A	V		76
<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	V		2

Key:

BC Act = *Biodiversity Conservation Act 2016*, EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*

Status: CE= Critically Endangered, E=Endangered, V=Vulnerable, P=Protected, Migratory agreements: J=Listed on Japan Australia Migratory Bird Agreement, K= Listed on Republic of Korea Australia Migratory Bird Agreement

Appendix B – PMST search results

Appendix C – Flora list

Table C- 1:Flora list for site survey

Scientific name	Common name	Origin	Conservation Status		WoNS
			EPBC Act	BC Act	Yes or No
<i>Acacia decurrens</i>	Black Wattle	Native	N/A	N/A	No
<i>Acacia elata</i>	The Cedar Wattle	Native	N/A	N/A	No
<i>Acacia irrorata</i>	Green Wattle	Native	N/A	N/A	No
<i>Acacia longifolia</i>	Long-leaved Wattle	Native	N/A	N/A	No
<i>Acacia parramattensis</i>	Parramatta Green Wattle	Native	N/A	N/A	No
<i>Angophora costata</i>	Sydney Red Gum	Native	N/A	N/A	No
<i>Asparagus aethiopicus</i>	Asparagus Fern	Exotic	N/A	N/A	Yes
<i>Araujia sericifera</i>	Moth Vine	Exotic	N/A	N/A	No
<i>Banksia spinulosa</i>	Hairpin Banksia	Native	N/A	N/A	No
<i>Callistemon sp</i>	Paperbark	Native	N/A	N/A	No
<i>Casuarina cunninghamiana</i>	River She-oak	Native	N/A	N/A	No
<i>Casuarina glauca</i>	Swamp Oak	Native	N/A	N/A	No
<i>Casuarina sp.</i>	She-oak	Native	N/A	N/A	No
<i>Chloris gayana</i>	Rhodes Grass	Exotic	N/A	N/A	No
<i>Cinnamomum camphora</i>	Camphor Tree	Exotic	N/A	N/A	No
<i>Commelina cyanea</i>	-	Native	N/A	N/A	No
<i>Corymbia gummifera</i>	Red Bloodwood	Native	N/A	N/A	No
<i>Corymbia maculata</i>	Spotted Gum	Native	N/A	N/A	No
<i>Epacris pulchella</i>	Wallum Heath	Native	N/A	N/A	No
<i>Ehrharta erecta</i>	Panic veldt grass	Native	N/A	N/A	No
<i>Eucalyptus capitellata</i>	Brown Stringybark	Native	N/A	N/A	No
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Native	N/A	N/A	No
<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Native	N/A	N/A	No
<i>Eucalyptus fibrosa</i>	Red Ironbark	Native	N/A	N/A	No
<i>Eucalyptus paniculata</i>	Grey Ironbark	Native	N/A	N/A	No
<i>Eucalyptus pilularis</i>	Blackbutt	Native	N/A	N/A	No
<i>Eucalyptus piperita</i>	Sydney Peppermint	Native	N/A	N/A	No
<i>Eucalyptus punctata</i>	Grey Gum	Native	N/A	N/A	No
<i>Eucalyptus saligna</i>	Blue Gum	Native	N/A	N/A	No
<i>Grevillea robusta</i>	Silky Oak tree	Native	N/A	N/A	No

Scientific name	Common name	Origin	Conservation Status		WoNS
			EPBC Act	BC Act	Yes or No
<i>Hakea sericea</i>	Silky Hakea	Native	N/A	N/A	No
<i>Lantana camara</i>	Lantana	Exotic	N/A	N/A	Yes
<i>Ligustrum sinense</i>	Narrow-leaf Privet	Exotic	N/A	N/A	No
<i>Lomandra longifolia</i>	Basket Grass	Native	N/A	N/A	No
<i>Melaleuca decora</i>	White Feather Honeymyrtle	Native	N/A	N/A	No
<i>Melaleuca styphelioides</i>	Prickly-leaved Paperbark	Native	N/A	N/A	No
<i>Microlaena stipoides</i>	Weeping Grass	Native	N/A	N/A	No
<i>Ozothamnus diosmifolius</i>	White Dogwood	Native	N/A	N/A	No
<i>Paspalum spp</i>		Native	N/A	N/A	No
<i>Pittosporum undulatum</i>	Sweet Pittosporum	Native	N/A	N/A	No
<i>Pseuderanthemum variable</i>	Pastel flower	Native	N/A	N/A	No
<i>Rubus fruticosus</i>	Blackberry	Exotic	N/A	N/A	Yes
<i>Senna pendula</i>	Easter Cassia	Exotic	N/A	N/A	No
<i>Senecio madagascariensis</i>	Fireweed	Exotic	N/A	N/A	Yes
<i>Solanum sisymbriifolium</i>	Sticky Nightshade	Exotic	N/A	N/A	No
<i>Syncarpia glomulifera</i>	Turpentine	Native	N/A	N/A	No
<i>Tradescantia fluminensis</i>	Trad	Exotic	N/A	N/A	No
<i>Verbena bonariensis</i>	Purpletop	Exotic	N/A	N/A	No

Appendix D – Fauna list

Table D- 1: Fauna list for site survey

Scientific name	Common name	Origin	Conservation Status		WoNS
			EPBC Act	BC Act	Yes or No
Birds					
<i>Cacatua galerita</i>	Sulphur-Crested Cockatoo	Native	Seen	N/A	N/A
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Native	Seen	N/A	N/A
<i>Gymnorhina tibicen</i>	Australian Magpie	Native	Seen	N/A	N/A
<i>Trichoglossus moluccanus</i>	Rainbow Lorikeets	Native	Seen	N/A	N/A
<i>Threskiornis molucca</i>	Australian White Ibis	Native	Seen	N/A	N/A
<i>Eolophus roseicapilla</i>	Galah	Native	Seen	N/A	N/A
<i>Manorina melanocephala</i>	Noisy Miner	Native	Seen	N/A	N/A
<i>Alectura lathami</i>	Australian Brush turkey	Native	Seen	N/A	N/A
<i>Alisterus scapularis</i>	Australian King-Parrot	Native	Seen	N/A	N/A
<i>Vanellus miles</i>	Masked Lapwing	Native	Seen	N/A	N/A

Appendix E – Tree species

Table E-1. Tree species list

Tree ID	Species
1	Blue Gum (<i>Eucalyptus saligna</i>)
2	Eucalyptus tree (<i>Eucalyptus sp</i>)
3	Eucalyptus tree (<i>Eucalyptus sp</i>)
4	Eucalyptus tree (<i>Eucalyptus sp</i>)
5	Eucalyptus tree (<i>Eucalyptus sp</i>)
6	Blue Gum (<i>Eucalyptus saligna</i>)
7	Eucalyptus tree (<i>Eucalyptus sp</i>)
8	Eucalyptus tree (<i>Eucalyptus sp</i>)
9	Rough-barked Apple (<i>Angophora floribunda</i>)
10	Rough-barked Apple (<i>Angophora floribunda</i>)
11	Eucalyptus tree (<i>Eucalyptus sp</i>)
12	Rough-barked Apple (<i>Angophora floribunda</i>)
13	Eucalyptus tree (<i>Eucalyptus sp</i>)
14	Callistemon tree (<i>Callistemon spp</i>)
15	Eucalyptus tree (<i>Eucalyptus sp</i>)
16	Auranticarpa rhombifolia
17	Turpentine (<i>Syncarpia glomulifera</i>)
18	Turpentine (<i>Syncarpia glomulifera</i>)
19	Turpentine (<i>Syncarpia glomulifera</i>)
20	Turpentine (<i>Syncarpia glomulifera</i>)
21	Turpentine (<i>Syncarpia glomulifera</i>)
22	Turpentine (<i>Syncarpia glomulifera</i>)
23	Turpentine (<i>Syncarpia glomulifera</i>)
24	Turpentine (<i>Syncarpia glomulifera</i>)
25	Turpentine (<i>Syncarpia glomulifera</i>)
26	Eucalyptus tree (<i>Eucalyptus sp</i>)
27	Rough-barked Apple (<i>Angophora floribunda</i>)
28	Broad-leaved Paperbark (<i>Melaleuca quinquenervia</i>)
29	Casuarina cunninghamiana
30	Eucalyptus tree (<i>Eucalyptus sp</i>)
31	Eucalyptus tree (<i>Eucalyptus sp</i>)

Tree ID	Species
32	Eucalyptus tree (<i>Eucalyptus sp</i>)
33	Eucalyptus tree (<i>Eucalyptus sp</i>)
34	Eucalyptus tree (<i>Eucalyptus sp</i>)
35	Blackbutt (<i>Eucalyptus pilularis</i>)
36	Smooth-barked Apple (<i>Angophora costata</i>)
37	Eucalyptus tree (<i>Eucalyptus sp</i>)
38	Blackbutt (<i>Eucalyptus pilularis</i>)
39	Eucalyptus tree (<i>Eucalyptus sp</i>)
40	Ironbark tree (<i>Ironbark spp</i>)
41	Smooth-barked Apple (<i>Angophora costata</i>)
42	Smooth-barked Apple (<i>Angophora costata</i>)
43	Red Bloodwood (<i>Corymbia gummifera</i>)
44	Eucalyptus tree (<i>Eucalyptus sp</i>)
45	Spotted Gum (<i>Corymbia maculata</i>)
46	Corymbia tree (<i>Corymbia spp</i>)
47	Eucalyptus tree (<i>Eucalyptus sp</i>)
48	Eucalyptus tree (<i>Eucalyptus sp</i>)
49	Eucalyptus tree (<i>Eucalyptus sp</i>)
50	Red Bloodwood (<i>Corymbia gummifera</i>)
51	Eucalyptus tree (<i>Eucalyptus sp</i>)
52	Melaleuca tree (<i>Melaleuca sp</i>)
53	Blackbutt (<i>Eucalyptus pilularis</i>)
54	Blackbutt (<i>Eucalyptus pilularis</i>)
55	Eucalyptus tree (<i>Eucalyptus sp</i>)
56	Blue Gum (<i>Eucalyptus saligna</i>)
57	Eucalyptus tree (<i>Eucalyptus sp</i>)
58	Red Bloodwood (<i>Corymbia gummifera</i>)
59	Eucalyptus tree (<i>Eucalyptus sp</i>)
60	Eucalyptus tree (<i>Eucalyptus sp</i>)
61	Smooth-barked Apple (<i>Angophora costata</i>)
62	Smooth-barked Apple (<i>Angophora costata</i>)
63	Eucalyptus tree (<i>Eucalyptus sp</i>)
64	Eucalyptus tree (<i>Eucalyptus sp</i>)

Tree ID	Species
65	Eucalyptus tree (<i>Eucalyptus sp</i>)
66	Eucalyptus tree (<i>Eucalyptus sp</i>)
67	Eucalyptus tree (<i>Eucalyptus sp</i>)
68	Smooth-barked Apple (<i>Angophora costata</i>)
69	Smooth-barked Apple (<i>Angophora costata</i>)
70	Smooth-barked Apple (<i>Angophora costata</i>)
71	Smooth-barked Apple (<i>Angophora costata</i>)
72	Smooth-barked Apple (<i>Angophora costata</i>)
73	Eucalyptus tree (<i>Eucalyptus sp</i>)
74	Red Bloodwood (<i>Corymbia gummifera</i>)
75	Eucalyptus tree (<i>Eucalyptus sp</i>)
76	Eucalyptus tree (<i>Eucalyptus sp</i>)
77	Eucalyptus tree (<i>Eucalyptus sp</i>)
78	Smooth-barked Apple (<i>Angophora costata</i>)
79	Blackbutt (<i>Eucalyptus pilularis</i>)
80	Eucalyptus tree (<i>Eucalyptus sp</i>)
81	Eucalyptus tree (<i>Eucalyptus sp</i>)
82	Smooth-barked Apple (<i>Angophora costata</i>)
83	Smooth-barked Apple (<i>Angophora costata</i>)
84	Smooth-barked Apple (<i>Angophora costata</i>)
85	Eucalyptus tree (<i>Eucalyptus sp</i>)
86	Smooth-barked Apple (<i>Angophora costata</i>)
87	Eucalyptus tree (<i>Eucalyptus sp</i>)
88	Eucalyptus tree (<i>Eucalyptus sp</i>)
89	Eucalyptus tree (<i>Eucalyptus sp</i>)
90	Smooth-barked Apple (<i>Angophora costata</i>)
91	Blue Gum (<i>Eucalyptus saligna</i>)
92	Eucalyptus tree (<i>Eucalyptus sp</i>)
93	Blackbutt (<i>Eucalyptus pilularis</i>)
94	Smooth-barked Apple (<i>Angophora costata</i>)
95	Corymbia tree (<i>Corymbia spp</i>)
96	Corymbia tree (<i>Corymbia spp</i>)
97	Corymbia tree (<i>Corymbia spp</i>)

Tree ID	Species
98	Eucalyptus tree (<i>Eucalyptus sp</i>)sp
99	Smooth-barked Apple (<i>Angophora costata</i>)
100	Eucalyptus tree (<i>Eucalyptus sp</i>)

Appendix F – Significant Impact Assessments

Sydney Turpentine Ironbark Forest

EPBC Act Assessment of Significance

Table F- 1 assesses whether the Project would cause a significant impact on the Turpentine-Ironbark Forest of the Sydney Basin Bioregion TEC for the Impact Area, as per the significant impact criteria for Critically Endangered ecological communities within the *Significant impact guidelines 1.1: MNES* (Commonwealth DCCEEW, 2013a).

Table F- 1: EPBC Act Test of Significance: Turpentine-Ironbark Forest of the Sydney Basin Bioregion

Criteria	Description
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	Yes. The Project alignment would have indirect impacts to 0.026 ha of this community on Agincourt Rd, Marsfield. The community within Stewart Park on Agincourt Road, Marsfield, comprises remnant vegetation and a native understorey indicative of the critically endangered Sydney Turpentine–Ironbark Forest of the Sydney Basin Bioregion, as listed under the EPBC Act. According to the NSW Threatened Species Scientific Committee, it is estimated that 2940ha of the TEC remains. Therefore, the Project will only have an impact on 0.000084% respectively, to the remainder of the ecological community. Furthermore, only indirect impacts are anticipated, primarily affecting the TPZ or RPZ of trees within the TEC. So, whilst the project is proposed to reduce the extent of the community, the impact is small-scale and therefore non-significant.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	No. The Impact Area is within a residential urban area and is bounded by houses and main roads. Due to the location of Stewart Park in an urban area, the Project is considered unlikely to fragment or increase fragmentation of an ecological community.
Adversely affect habitat critical to the survival of an ecological community	No. Critical habitat refers to areas essential for the long-term survival and recovery of a listed TEC. These areas support the community's structure, composition, and ecological processes. Only indirect impacts are anticipated, primarily affecting the TPZ or RPZ of trees within the TEC. Given the limited scale of these proposed works, it is unlikely they will have broad-scale impacts on the overall habitat and ecological functioning of the TEC. Therefore, the Project is unlikely to adversely affect habitat critical to the survival of the ecological community.
Modify or destroy abiotic (non-living) factors (such as water,	No. The Impact Area is within an existing modified urban adjacent environment. Mitigation measures include controls for erosion and sediment dispersal to

Criteria	Description
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nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	prevent offsite impacts. Therefore, the Project is not considered to 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.
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	No. The Project does not involve burning. Vegetation removal is indiscriminate and would not target one species or a group of species within the community. Vegetation removal is proposed at the understory, midstory, and canopy level. Therefore, the Project is not considered to 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.
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 community which kill or inhibit the growth of species in the ecological community.	No. Weed invasion will be mitigated through biosecurity procedures, including but not limited to disposal of sealed bagged weeds to a licenced waste disposal facility, and washdown procedure adhered to when traveling between sites and prior to entering the proposed activity area. A biosecurity kit should be kept in all vehicles (as per DPI 2012). The Project does not involve mobilisation of fertilisers, herbicides or other chemicals or pollutants. Provided appropriate biosecurity mitigation measures are adhered to, the Project is not considered to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.
Interfere with the recovery of an ecological community	No. The following have been identified as threats to the community: Clearing, fragmentation, livestock grazing, weed, invasive fauna, and disease and pathogen incursion, hydrological changes, and altered fire regimes (DAWE, 2020). The overarching principle of the conservation objective is to maintain the current extent of the community. Priority actions are to: protect and restore habitat, communicate and engage with stakeholders, and research and monitor to improve understanding of the community (DAWE, 2020). While the Project involves removal of the community, the extent is minor, and unlikely to interfere with the recovery if the community as a whole.
Assessment of potential for significant residual impacts	The community has been assessed against the criteria above and it has been determined that the Project will NOT constitute a significant impact on the community.

BC Act Test of Significance

Table F- 2 assesses whether the Project would cause a significant impact on the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion TEC , as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 2: BC Act Test of Significance: Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion

Test of Significance: Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	
a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	
N/A not a threatened species	
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
The Project alignment would have indirect impacts to 0.026 ha of this community on Agincourt Rd, Marsfield. Only indirect impacts are anticipated, primarily affecting the TPZ or RPZ of trees within the TEC. Therefore, the Project would impact a very small percentage of the community at Stewart Park, suggesting that vegetation clearance within the Impact Area would not be on such a significant scale that the ecological community will be placed at a risk of extinction. Furthermore, the minor indirect impacts to this community is predominantly within urban and residential environments, suggesting that a local and broad scale impact to ecological function is highly unlikely. The Project is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	
ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	
The Project alignment would have indirect impacts to 0.026 ha of this community on Agincourt Rd, Marsfield. As only minor TPZ and RPZ impacts are proposed to occur, the Project is not considered to cause a modification of the species composition of the ecological community.	
c) In relation to the habitat of a threatened species or ecological community:	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and	
The Project alignment would have indirect impacts to 0.026 ha of this community on Agincourt Rd, Marsfield.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
As only a small percentage of the community occurs within the Impact Area habitat, the Project is considered unlikely to be fragment or isolate the community.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
The community within the Impact Area, is considered important to the survival of the TEC as it is within a protected reserve that is managed by Council and maintained through bush-regeneration efforts. Therefore, the overall quality of the TEC is of a good- high condition. However, the impacts to this community for Option 2, is considered minor due to the small-scale level of impact. Furthermore, the minor trimming and removal of the community is predominantly within	

Test of Significance: Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion

urban and residential environments, suggesting that a local and broad scale impact to ecological function is highly unlikely.

Therefore, any impacts to the vegetation is considered unlikely to significantly impact the long-term survival of the community in the locality.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value are present or will be impacted by the Project.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this community, the Project is likely to include or exacerbate the following Key Threatening Processes:

- Anthropogenic climate change: The Project would contribute a minor increase in the processes causing anthropogenic climate change via the removal of vegetation which act as a carbon sink. The impact is considered minimal due to the small amount of non-vegetation removed.
- Clearing of native vegetation
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses
- Infection of native plants by *Phytophthora cinnamomic*

The introduction and spread of invasive weed species and pathogens have the potential to occur during the Project, as weeds and pest species are commonly introduced through earthworks, movement of soil and through attachment of seeds to vehicles and machinery. Weed spread can occur from outside the Study Area, and from within the Study Area. Mitigation measures include biosecurity procedures to disinfection of equipment before entering site.

Conclusion

Overall based on the small-scale impact of the Project to the remainder of the ecological community, the Project is not likely to have a significant negative impact on the extent of the ecological community and its long-term survival.

Duffys Forest

BC Act Test of Significance

Table F- 3 assesses whether the Project would cause a significant impact on the Duffys Forest Ecological Community in the Sydney Basin Bioregion TEC for Option 2, as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 3: BC Act Test of Significance: Duffys Forest Ecological Community in the Sydney Basin Bioregion

Test of Significance: Duffys Forest Ecological Community in the Sydney Basin Bioregion

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

N/A not a threatened species

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Test of Significance: Duffys Forest Ecological Community in the Sydney Basin Bioregion

The Project alignment would have indirect impacts to 0.035 ha of this community at David Martin Reserve and Rothwell Rd, South Turramurra.

This can be considered a notable small-scale impact. Based on Duffys Forest vegetation community-endangered ecological community profile, approximately 240ha of the original distribution remains. Conservatively, the Project would impact a very small percentage (0.0146ha) of the estimated remainder of the ecological community, suggesting that vegetation clearance within the Impact Area would not be on such a significant scale that the ecological community will be placed at a risk of extinction

Furthermore, minor impacts to the community is predominantly within urban and residential environments, suggesting that a local and broad scale impact to ecological function is highly unlikely. The Project is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The Project alignment would have indirect impacts to 0.035 ha of this community at David Martin Reserve and Rothwell Rd, South Turramurra.

As only minor TPZ and RPZ impacts are proposed to occur, the Project is not considered to cause a modification of the species composition of the ecological community.

c) In relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The Project alignment would have indirect impacts to 0.035 ha of this community at David Martin Reserve and Rothwell Rd, South Turramurra.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity

As only small-scale impacts are anticipated, the Project is considered unlikely to fragment or isolate the community. Furthermore, the Impact Area already exists within a fragmented landscape, due to surrounding urbanisation, so the Project is unlikely to further isolate the Impact Area from other areas of habitat.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The majority of the community within the Impact Area is not considered important to the survival of the TEC due to its highly fragmented condition in a disturbed urban environment.

Therefore, direct and indirect impacts to this vegetation is considered unlikely to significantly impact the long-term survival of the community in the locality.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value are present or will be impacted by the Project.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this community, the Project is likely to include or exacerbate the following Key Threatening Processes:

Test of Significance: Duffys Forest Ecological Community in the Sydney Basin Bioregion

- Anthropogenic climate change: The Project would contribute a minor increase in the processes causing anthropogenic climate change via the removal of vegetation which act as a carbon sink. The impact is considered minimal due to the small amount of non-vegetation removed.
- Clearing of native vegetation
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses
- Infection of native plants by *Phytophthora cinnamomic*

The introduction and spread of invasive weed species and pathogens have the potential to occur during the Project, as weeds and pest species are commonly introduced through earthworks, movement of soil and through attachment of seeds to vehicles and machinery. Weed spread can occur from outside the Study Area, and from within the Study Area. Mitigation measures include biosecurity procedures to disinfection of equipment before entering site.

Conclusion

Overall based on the small-scale impact of the Project to the remainder of the ecological community, the Project is not likely to have a significant negative impact on the extent of the ecological community and its long-term survival.

Little Lorikeet

Habitat for the Little Lorikeet was observed within the Study Area. The species primarily feeds and forages in the canopy of open Eucalyptus Forest and woodland, which also include Angophora, Melaleuca and other native tree species. The species also nests and breeds in proximity to feeding areas, mainly in the hollows in the limb of smooth-barked Eucalyptus (small hollows). The Study Area supports patches of remnant native vegetation, especially in areas including Vimiera rd Marsfield and Twin Creeks Reserve. There are also numerous street feed and habitat trees within South Turramurra.

EPBC Act Significant Impact Assessment

The species is not listed under the EPBC Act.

BC Act Test of Significance

Little Lorikeet is listed under the BC Act as 'Vulnerable', and subsequently a Test of Significance has been completed. Table F- 4 assesses whether the Project would cause a significant impact on the Little Lorikeet as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 4 :BC Act Test of Significance: Little Lorikeet

Test of Significance: Little Lorikeet

(a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Little Lorikeets primarily inhabit dry, open sclerophyll forests and woodlands dominated by eucalyptus species. While they are primarily found in open eucalypt forests and woodlands, they have been observed in urban parks and gardens that provide suitable foraging and nesting habitats such as hollow-bearing trees. In urban settings, Little Lorikeets feed on nectar from native trees like *eucalypts*, *melaleucas*, and *angophoras*, and therefore may occasionally occupy both remnant bushland patches and streetscapes along the entire alignment.

While direct and indirect impacts from the Project—such as the removal or trimming of hollow-bearing and mature native trees—can disrupt the Little Lorikeet's life cycle, the species' nomadic and opportunistic nature may mitigate these effects. As a nomadic species, the Little Lorikeet's movements are influenced by the availability of nectar resources. Therefore, it is more likely to utilise high-quality vegetation areas in surrounding reserves and National Parks, particularly around Lane Cove National Park and Garigal National Park, which offer abundant food sources and suitable nesting sites. Therefore, if areas of foraging, breeding and nesting habitat along the alignment are impacted, the species can easily migrate to areas of more suitable habitat in surrounding areas.

Test of Significance: Little Lorikeet

Furthermore, safeguards including pre-clearing surveys will be adhered to, to mitigate the direct impacts (refer to Section 9.2). Therefore, the Project is unlikely to cause an adverse effect on the life cycle of the species or place them at risk of extinction.

(b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

N/A not a TEC

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

N/A not a TEC

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The Project entails the removal of native vegetation, including *Eucalyptus*, *Angophora*, and *Melaleuca* species, which serve as vital foraging resources for the Little Lorikeet. Additionally, the removal of hollow-bearing trees, essential for nesting and breeding, is proposed. While these impacts may affect potential habitats within the Study Area, the overall reduction is considered minimal due to the presence of extensive, undisturbed habitats in adjacent areas, particularly near Lane Cove National Park and Garigal National Park.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

Barriers to movement would fragment populations, including fences, roads and unsuitable habitat (e.g., industrial and urban estates). The Project does not involve construction that would fragment or isolate or isolate areas of habitat. The land surrounding the Study Area consists of active roadways, non-native vegetation, and industrial buildings. Therefore, the Project is unlikely to further fragment or isolate areas of habitat from surrounding areas.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The Project would remove native vegetation which provides sheltering, foraging, breeding and nesting habitat. Standard mitigation measures during construction work and the Project design including pre-clearance surveys, and the offsetting of hollow-bearing trees with nest-boxes or salvaged hollows, and replanting of native vegetation., will mitigate potential impacts. The Project is not likely to place the local population at risk.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

No areas of outstanding biodiversity value are present or will be impacted by the Project.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this species, the Project is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Removal of dead wood and dead trees,
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses

The Project would remove native vegetation which provides sheltering, foraging dispersal, breeding and nesting habitat. Mitigation measures include pre-clearance surveys, and the offsetting of hollow-bearing trees with nest-boxes or salvaged hollows, and replanting of impacted native vegetation. The Project is not likely to increase the impact of a key threatening process.

Conclusion

The Project would remove native vegetation which provides sheltering, foraging dispersal, breeding and nesting habitat. Due to the availability of quality vegetation in the surrounding areas and the nomadic nature of the species, it is unlikely that the species will be reliant on resources within the Study Area.

Test of Significance: Little Lorikeet

Mitigation measures include pre-clearance surveys, and the offsetting of hollow-bearing trees with nest-boxes or salvaged hollows, and replanting of impacted native vegetation will also negate impacts.

Therefore, impacts to the species as a result of the Project are unlikely to be considered significant.

Little Bent-winged Bat

The species habitat includes wet and dry sclerophyll forest, including Melaleuca swamps and Banksia scrub. The species is also known to roost in tree hollows and culverts. Planted and remnant Melaleuca trees and Banksia habitat is abundant throughout the Study Area, particularly in reserves and streetscapes north of the alignment in South Turramurra and Lane Cove. Kissing Point Rd also contained culverts which may provide suitable roosting habitat, and hollows were presents all along the alignment. Whilst the species prefers remnant native vegetation as habitat, it is well-adapted to urbanisation, as it often uses buildings, and tunnels to roost.

EPBC Act Significant Impact Assessment

The species is not listed under the EPBC Act.

BC Act Test of Significance

Table F- 5 assesses whether the Project would cause a significant impact on the Little Bent-Winged Bat as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 5: BC Act Test of Significance: Little Bent-winged Bat

Test of Significance: Little Bent-Winged Bat

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Little Bent-wing Bats prefer well-vegetated areas, including moist eucalypt forests, rainforests, vine thickets, and sclerophyll forests. While its primary habitats are well-vegetated areas, the species has been observed roosting in urban structures. These include stormwater drains, tunnels, old mines, and occasionally buildings, particularly in areas where suitable roosting sites are limited in natural habitats.

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted.

Furthermore, several culverts and vegetated areas with feed trees were present along the alignment. Therefore, the Project, which involves the removal or trimming of trees in vegetated areas like South Turramurra may have localised impacts on potential roosting and foraging sites.

However, urban habitats are often unfavoured by the species, due to challenges such as artificial lighting, which can disrupt their navigation and foraging behaviours. Given the species' preference for more natural, less disturbed environments and the availability of suitable habitats in surrounding areas such as at Lane Cove National Park and Garigal National Park, the Little Bent-wing Bat is unlikely to rely on the Study Area for habitat. Furthermore, if marginal foraging habitat is impacted, the species is known to opportunistically migrate to areas of more suitable habitat.

Therefore, the project is unlikely to have a significant adverse effect on the Little Bent-wing Bat's life cycle or place a viable local population at risk of extinction. Additionally, safeguards such as pre-clearing surveys will be implemented to mitigate direct impact (refer to Section 9.2).

Therefore, the Project is unlikely to cause an adverse effect on the life cycle of the species or place them at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Test of Significance: Little Bent-Winged Bat

N/A not a TEC

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

N/A not a TEC

c) In relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted.

For both options, the Project would have direct or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. While the Project would impact potential habitat, this reduction is considered minimal. There is an abundance of adjacent undisturbed habitat in surrounding areas such as Lane Cove National Park and Garigal National Park.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity

Barriers to movement would fragment populations, including fences, roads and built areas (*e.g., industrial and urban estates*). The Project does not involve construction that would fragment or isolate areas of habitat. The land surrounding the Study Area consists of active roadways, non-native vegetation, and industrial buildings. Therefore, the Project is unlikely to further fragment or isolate areas of habitat from surrounding areas.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

For both options, the Project would have direct or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. Standard mitigation measures during construction work and the Project design including pre-clearance surveys, will mitigate potential impacts. The Project is not likely to place the local population at risk.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value are present or will be impacted by the Project.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this species, the Project is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Removal of dead wood and dead trees,
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses.

The Project would remove native vegetation which provides marginal roosting, sheltering and foraging habitat. Standard mitigation measures during construction work and the Project design including pre-clearance surveys, will mitigate potential impacts. The Project is not likely to increase the impact of a key threatening process.

Conclusion

Test of Significance: Little Bent-Winged Bat

The Project would remove native vegetation which provides marginal roosting, sheltering and foraging habitat. Due to the availability of quality vegetation in the surrounding areas and the migratory nature of the species, it is unlikely that the species will be reliant on resources within the Study Area.

Mitigation measures include pre-clearance surveys, with also negate impacts.

Therefore, impacts to the species as a result of the Project are unlikely to be considered significant.

Large Bent-winged Bat

There are several areas of suitable roosting habitat along the alignment such as buildings, culverts and tree hollows, particularly along the streetscapes and remnant bushland areas along South Turramurra. Whilst the species prefers remnant native vegetation as habitat, it is well-adapted to urban and fragmented environments.

EPBC Act Significant Impact Assessment

The species is not listed under the EPBC Act.

BC Act Test of Significance

Table F- 6 assesses whether the Project would cause a significant impact on the Large Bent-Winged Bat as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 6:BC Act Test of Significance: Large Bent-Winged Bat

Test of Significance: Little Bent-Winged Bat

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Large Bent-winged Bats are found in a variety of woodlands, heathlands, shrublands, and grasslands near roosting habitat. They feed primarily on moths and other flying insects, flying quickly above treetops in valleys and making fast dives to catch prey. In urban areas, they may utilise man-made structures like abandoned mines and road culverts as roosting sites.

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted.

Furthermore, several culverts and areas of woodland within more natural remnant bushland reserves were identified along the alignment. Therefore, for both options which involve direct and/or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat, there may be localised impacts to potential roosting and foraging sites.

However, urban habitats are often unfavoured by the species, due to challenges such as artificial lighting, which can disrupt their navigation and foraging behaviours. Given the species' preference for more natural, less disturbed environments and the availability of suitable habitats in surrounding areas such as at Lane Cove National Park and Garigal National Park, the Large Bent-wing Bat is unlikely to rely on the Study Area for habitat. Furthermore, if marginal foraging habitat is impacted, the species is known to opportunistically migrate to areas of more suitable habitat.

Therefore, the Project is unlikely to have a significant adverse effect on the Large Bent-wing Bat's life cycle or place a viable local population at risk of extinction. Additionally, safeguards such as pre-clearing surveys will be implemented to mitigate direct impact (refer to Section 9.2).

Therefore, the Project is unlikely to cause an adverse effect on the life cycle of the species or place them at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

Test of Significance: Little Bent-Winged Bat

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

N/A not a TEC

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

N/A not a TEC

c) In relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted.

For both options the Project would have direct and/or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. While the Project would impact potential habitat, this reduction is considered minimal. There is an abundance of more favourable, undisturbed habitat in surrounding areas such as Lane Cove National Park and Garigal National Park.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity

Barriers to movement would fragment populations, including fences, roads and unsuitable habitat (*e.g., industrial and urban estates*). The Project does not involve construction that would fragment or isolate or isolate areas of habitat. The land surrounding the Study Area consists of active roadways, non-native vegetation, and industrial buildings. Therefore, the Project is unlikely to further fragment or isolate areas of habitat from surrounding areas.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

For both options the Project would have direct and/or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. Standard mitigation measures during construction work and the Project design including pre-clearance surveys, will mitigate potential impacts. The Project is not likely to place the local population at risk.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value are present or will be impacted by the Project.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this species, the Project is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Removal of dead wood and dead trees,
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses.

For both options the Project would have direct and/or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. Standard mitigation measures during construction work and the Project design including pre-clearance surveys, will mitigate potential impacts. The Project is not likely to increase the impact of a key threatening process.

Conclusion

Test of Significance: Little Bent-Winged Bat

For both options the Project would have direct and/or indirect impacts to native vegetation which provides marginal roosting, sheltering and foraging habitat. Due to the availability of quality vegetation in the surrounding areas and the migratory nature of the species, it is unlikely that the species will be reliant on resources within the Study Area.

Mitigation measures including pre-clearance surveys, with also negate impacts.

Therefore, impacts to the species as a result of the Project are unlikely to be considered significant.

Grey-headed Flying-fox

Suitable habitat includes Melaleuca and Banksia Street and remnant trees. The species is well-adapted to urban environments, as it often forages in gardens for fruits and crops. The closest roosting camp to the alignment is located at Parramatta Park, located 12km away at the closest point in West Ryde.

EPBC Act Assessment of Significance

An assessment of whether the project would cause a significant impact on the Grey- Headed Flying-fox as per the significant impact criteria for Vulnerable species within the *Significant impact guidelines 1.1: MNES* (DEWHA, 2013) is provided in Table F- 7.

Table F- 7:EPBC Act Assessment of Significance: Grey-headed Flying-fox

Criteria	Description
Lead to a long-term decrease in the size of an important population	No. There is no available classification of an important population along the alignment from West Ryde to South Turramurra. The closest roosting camp to the alignment is located at Parramatta Park, located 12km away at the closest point in West Ryde. The species typically inhabits myrtaceous dominated woodlands as they rely on pollination for feeding. Their diet primarily consists of the fruit and blossoms of eucalypt trees and native figs. There there is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted. According to the National Recovery Plan for the Grey-headed Flying-fox, there is currently at least 100,000ha of foraging habitat created by remnant vegetation communities. Therefore, the Project is only anticipated to impact, 0.000658% of the current extent of foraging habitat. This further reinforces the marginal impact of the Option 2 Project on the current extent of habitat for this species. This habitat primarily consists of feed trees particularly mature Spotted Gum (<i>Corymbia maculata</i>), Smooth-barked Apple (<i>Angophora costata</i>), Brown Stringybark (<i>Eucalyptus capitellata</i>) and Sydney Peppermint (<i>Eucalyptus piperita</i>) species. There are also several Banksia feed trees along the alignment including Old Man Banksia (<i>Banksia serrata</i>), and Hairpin Banksia (<i>Banksia spinulosa</i>). Whilst there are 448 records within 10km of the Study Area, there are no known roosting camps, within the Study Area. Whilst the removal of native vegetation may impact on feeding resources, as the vegetation is within an urban setting, it only provides marginal foraging habitat. Likewise, the abundance of suitable habitat in surrounding areas especially in Lane Cove National Park and Garigal National Park adjacent to the Study Area, suggests that the species may only use the Study Area occasionally and less frequently than the surrounds. Furthermore, the high mobility of the species suggests that if impacts were to occur to important foraging resources, the species can easily disperse and migrate to surrounding areas for habitat. Therefore, it is highly unlikely that the proposal will lead to a long-term decrease in the size of the population.

Criteria	Description
Reduce the area of occupancy of an important population	No. There is no known area of occupancy for the species. There is no known population of the species within the Study Area, and no important population defined in the Study Area. There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted. Given the urban setting of the Study Area and the already fragmented nature of vegetation in the landscape, the vegetation within the Study Area would limit its use by the Grey-headed Flying-fox to occasional foraging only. Overall, this habitat is an extremely small percentage of available habitat for the Grey-headed Flying-fox locally, and regionally. Due to the high dispersibility of the species, and the availability of more suitable habitat in the surrounds particularly within adjacent national parks such as Lane Cove National Park, it is unlikely to be considered critical habitat. Therefore, the project is unlikely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	No. As the Study Area is already within a highly urbanised area with active roadways and residential housing, the project does not involve further fragmenting two areas of suitable habitat. Likewise, the Study Area is well connected to adjoining areas of suitable quality habitat, so fragmentation impacts will be minor if they do occur.
Adversely affect habitat critical to the survival of a species	No. There is no identified habitat critical to the survival of the Grey-headed Flying-fox. The project is not considered to contain habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	No. The species breeds in camps. As there are no known breeding camps within the Study Area, and the closest camps are over 10 km away, the project is unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. Whilst the removal of native vegetation and trees may reduce feeding resources within the Study Area, it is unlikely to destroy habitat to the extent that the species is likely to decline, due to the high mobility of the species and the abundance of high-quality habitat in surrounding areas, as the Study Area is well-connected to national parks such as Lane Cove National Park.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No. The project is unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. Appropriate mitigation measures for biosecurity must be implemented during the project works, as recommended in Section 9.2.
Introduce disease that may cause the species to decline	No. The project is unlikely to result in introduced disease that may cause the species to decline. Appropriate mitigation measures for biosecurity must be implemented during the project works, as recommended in Section 9.2.

Criteria	Description
Interfere substantially with the recovery of the species	No. The following have been identified as potentially threatening processes to the Grey-headed Flying-fox. ■ Clearing of native vegetation ■ Invasion, establishment and spread of Lantana (<i>Lantana camara L. sens. lat</i>) ■ Invasion and establishment of exotic vines and scramblers ■ Camp disturbance by urban pressures ■ Entanglement in netting and barbed wire fencing ■ Bushfire and heat stress ■ Electrocution on power lines ■ Competition from the Black Flying Fox (<i>Pteropus alecto</i>) and Little Red Flying Fox (<i>Pteropus scapulatus</i>) for resources and roosting camp areas. Regional priority actions for the Grey-headed Flying-fox includes protecting and increasing native foraging habitat, build community capacity to coexist with flying foxes and improve the management of camps in areas where interaction with humans is likely (DFEAW, 2021).
Assessment of potential for significant residual impacts	The species has been assessed against the criteria above and it has been determined that the project works will NOT constitute a significant impact on the species.

BC Act Test of Significance

Table F- 8 assesses whether the Project would cause a significant impact on the Grey-headed Flying-fox as per Section 7.3 of the BC Act (State Government of NSW and Office of Environment and Heritage, 2017).

Table F- 8:BC Act Test of Significance: Grey-headed Flying-fox

Test of Significance: Grey-headed Flying-fox
a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Test of Significance: Grey-headed Flying-fox

The Grey-headed Flying-fox typically inhabits Myrtaceous dominated woodlands as they rely on pollination for feeding. Their diet primarily consists of the fruit and blossoms of eucalypt trees and native figs. The species tends to congregate in roosts and can forage up to 50km from their roost. Roost camps are typically near waterways or areas with large trees, although more recently the species have also been observed flying overhead urbanised areas.

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted. According to the National Recovery Plan for the Grey-headed Flying-fox, there is currently at least 100,000ha of foraging habitat created by remnant vegetation communities. Therefore, the Project is only anticipated to impact, 0.000658% of the current extent of foraging habitat. This further reinforces the marginal impact of the Option 2 Project on the current extent of habitat for this species.

This habitat primarily consists of feed trees particularly mature Spotted Gum (*Corymbia maculata*), Smooth-barked Apple (*Angophora costata*), Brown Stringybark (*Eucalyptus capitellata*) and Sydney Peppermint (*Eucalyptus piperita*) species. However, due to the sparsity and fragmented location of the vegetation, the likely habitat usage is restricted to general and rare foraging and is not considered suitable for breeding or roosting. There is also an abundance of more suitable habitat and feed trees in the broader landscape such as at Lane Cove National Park.

The species is also highly adapted to urban environments and is opportunistic in their selection of roosting and breeding camp habitat, so can easily migrate to areas of higher quality vegetation. Therefore, the removal of native vegetation may impact on marginal feeding resources, however it is unlikely to have an adverse effect on the life cycle of the species such that the species could be placed at risk of extinction.

Likewise, safeguards including pre-clearing surveys will be adhered to, to mitigate the direct impacts (refer to Section 9.2). Due to these reasons and the high mobility of the species, it is therefore unlikely that the proposal will cause an adverse effect on the life cycle of the species or place them at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

N/A not a TEC

ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

N/A not a TEC

c) In relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted.

Given the urban setting of the proposal and the already fragmented nature of vegetation in the landscape, the vegetation within the Study Area would limit its use by the Grey-headed Flying-fox to occasional foraging only.

Overall, this habitat is an extremely small percentage of available habitat for the Grey-headed Flying-fox locally, and regionally. Due to the high dispersibility of the species, and the available more suitable habitat in the surrounds, it is unlikely to be considered critical habitat.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity

The Study Area is already situated within a fragmented environment as it is bounded by private properties, buildings and roads. Additionally, as the species would only rarely utilise the trees for foraging and not roosting, it is not considered likely that the proposal will isolate individuals from other areas of habitat.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Test of Significance: Grey-headed Flying-fox

There is 0.658 ha of suitable habitat in the form of Sydney Turpentine-Ironbark Forest, Sydney Coastal Shale-Sandstone Forest, Sydney Coastal Sandstone Gully Forest and Sydney Coastal Enriched Sandstone Forest, that is proposed to be impacted. This provides essential foraging and feeding resources.

Standard mitigation measures during construction work and the project design including elements to offset and revegetate areas where native vegetation is removed. Overall, the habitat to be removed is largely restricted to vegetation in an urban environment and therefore the habitat is not critical to the long-term survival of the species, due to the availability of more suitable quality habitat in the surrounding areas.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No areas of outstanding biodiversity value are present or will be impacted by the Project.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

In relation to this species, the proposal is likely to include or exacerbate the following Key Threatening Processes:

- Clearing of native vegetation
- Removal of dead wood and dead trees,
- Invasion and establishment of exotic vines and scramblers,
- Invasion of native plant communities by exotic perennial grasses.

Native vegetation within the Study Area consists of both remnant and planted vegetation and is fragmented due to being in an urban environment.

In accordance with DPI Weedwise mitigation measures and the development of a weed management plan is recommended for this proposal to mitigate the above key threatening processes and avoid the spread and establishment of priority weeds on site.

Clearing limits should be clearly delineated using bunting or flagging tape prior to the commencement of work to avoid over clearing of vegetation.

Avoid and minimise principles would be considered in micro siting alignments and avoiding impacts to biodiversity where possible. Specific mitigation measures have been recommended including pre-clearing surveys, and clearing supervision should they be required.

Conclusion

The proposal would remove up to 0.658 ha which provides marginal foraging and feeding habitat for the Grey-headed Flying-fox.

However, due to the availability of more suitable quality vegetation in the surrounding areas, and the high dispersibility of the species, impacts to the species resulting from the project are **unlikely to be considered significant**.

Appendix G – Likelihood of occurrence

Table G-1. Likelihood of Occurrence: Flora

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Acacia bynoeana</i>	Bynoe's wattle	E	V	PMST	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly	Low	Low likelihood of occurrence due to a lack of associated vegetation communities, with the Study Area being primarily fragmented eucalypt canopy and a non-native ground cover.
<i>Acacia clunies-rossiae</i>	-	V		1	Kanangra Wattle is a bushy shrub or tree to 8 metres tall. The phyllodes (leaves) are 4 - 6 cm long by 4-10 mm wide. Grows in dry sclerophyll forest on skeletal soils on rocky slopes, or on alluvium along creeks.	Low	Low likelihood of occurrence due to the lack of supporting habitat such as rocky outcrops.
<i>Acacia pubescens</i>	Downy Wattle	V	V	3	It occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly 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.	Low	This species has a low likelihood of occurrence as the Study Area was primarily disturbed with non-native vegetation and only supported patches of remnant woodland or Castlereagh Ironbark Forest. Lack of records indicate its unlikely to be present and the species was also not observed during field assessments.
<i>Acacia terminalis</i>	Sunshine Wattle		E	PMST	An erect or spreading shrub, 1-5 metres tall, with pale yellow flowers and seed pods 3-11 cm long.	Low	Outside the geographic distribution for this species and lack of supporting coastal habitat.
<i>Allocasuarina glareicola</i>	-	E	E	PMST	Mostly restricted to the north-western portion of the Cumberland Plain. Found in open woodlands with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Low	This species has a low likelihood of occurrence as the Study Area was primarily disturbed with non-native vegetation and only supported patches of remnant Cumberland Plain Woodland vegetation. Lack of records indicate its unlikely to be present and the species was also not observed during field assessments.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Asterolasia elegans</i>	-		E	PMST	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. 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	Low	Lack of supporting habitat such as sheltered forests. The lack of records indicates its unlikely to be present and the species was also not observed during field assessments.
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V	-	13	Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers spring-summer. While survey was outside of the flowering period, the species was not recorded.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting dry sclerophyll forest habitat.
<i>Caladenia tessellate</i>	Thick-lipped Spider-orchid		V	PMST	The Thick Lip Spider Orchid is known from the Sydney area (<i>old records</i>), Wyong, Ulladulla and Braidwood in NSW.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting grassy sclerophyll forest habitat and the high weed invasion in most of these areas outcompeting native forbs and grasses.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	PMST	Occurs in a range of vegetation communities including swamp-heath and woodland. Mostly occur in woodland with Eucalyptus sclerophylla, E. sieberi, Corymbia gummifera and Allocasuarina littoralis.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting swamp-heath habitat and the high weed invasion in most of the woodland areas outcompeting native forbs and grasses.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Cynanchum elegans</i>	White- flowered Wax Plant	E	E	PMST	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree <i>Leptospermum laevigatum</i> – Coastal Banksia <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> coastal scrub; Forest Red Gum <i>Eucalyptus tereticornis</i> aligned open forest and woodland.	Low	This species has a low likelihood of occurrence due to a lack of supporting coastal habitat and geographic suitability. The ground cover is highly disturbed from clearing and weed incursion, making it unsuitable for this species. The species was also not observed during field assessments.
<i>Darwinia biflora</i>	-	V	V	308	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Low	This species was initially considered likely to occur due to the large number of records present within the locality. However, due to edge effects, historic clearing and weed invasion impacts, the site is heavily disturbed and therefore it is highly unlikely to support this species. The species is considered to have a low likelihood of occurrence.
<i>Darwinia peduncularis</i>	-	V		1	A broadly spreading shrub to 1.5 m high. Usually grows on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone. Occurs as local disjunct populations in coastal NSW with a couple of isolated populations in the Blue Mountains.	Low	Outside the geographic range and lacks supporting coastal habitat.
<i>Deyeuxia appressa</i>	E	E		PMST	An erect perennial grass to 0.9 m high. Highly restricted geographical distribution to the Sydney Basin and Wollongong.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting swamp-heath habitat and the high weed invasion in most of the woodland areas outcompeting native forbs and grasses.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Epacris purpureascens</i> var <i>purpureascens</i>	-	V		98	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.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting habitat and the high weed invasion in most of the woodland areas outcompeting native forbs and grasses.
<i>Epacris sparsa</i>	-		E	PMST	Small erect shrub, 60–90 cm high; stems with prominent, broad, cup-shaped leaf scars; branchlets finely pubescent. Grows in sandy soil among rocks.	Low	Lack of supporting habitat and rocky substrate. The species was also not observed during field assessments.
<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	V	V	PMST	Mostly mallee to 4 m tall though can grow to a straggly tree to 9 m high. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	Low	Lack of supporting coastal heath habitat. The species was also not observed during field assessments.
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	3	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock	Low	Lack of intact grassy woodland habitat, due to the high weed incursion and clearing disturbance within the Study Area.
<i>Gaudium deanei</i>	-	V	V	13	Rare, only occurring in Lane Cove River watershed, Sydney.	Low	Outside geographic distribution.
<i>Genoplesium baueri</i>	Bauer's Midge Orchid	E	E	6	Grows in dry sclerophyll forest and moss gardens over sandstone.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting dry sclerophyll habitat and the high weed invasion in most of the woodland and forest areas outcompeting native forbs and grasses.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E		5	Moist places, usually near streams, on rocks in rainforest and dry and moist eucalypt forest. Grows on rocks in rainforest and in wet sclerophyll forest.	Low	Lack of supporting rainforest and wet sclerophyll habitat.
<i>Haloragodendron lucasii</i>	-	E	E	1	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.	Low	Lack of suitable rocky slopes and cliff lines near creeks to support this species. Low number of records and was not observed during field survey.
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort	V	V	PMST	<i>Haloragis exalata</i> subsp. <i>exalata</i> is presently known from a range of vegetation types, all of which appear to have a history of recurrent disturbance. In New South Wales populations are known from the areas of western Sydney, Kosciuszko National Park, the Bega Valley, Bungonia Gorge east of Goulburn on the Central Tablelands, the Shoalhaven River and Lake Illawarra on the Central Coast, the North Coast and the Northern Tablelands.	Low	Low likelihood of occurrence due to the lack of supporting habitat. Low number of records and was not observed during field survey.
<i>Hibbertia spanantha</i>	Julians Hibbertia	E	CE	30	Grows in forest with canopy species including <i>Eucalyptus pilularis</i> , <i>E. resinifera</i> , <i>Corymbia gummifera</i> and <i>Angophora costata</i> .	Low	Whilst supporting canopy species are present, they remain within highly disturbed or cleared areas, with high weed incursion in the ground cover.
<i>Kunzea rupestris</i>	Rocky Kunzea	V	V	PMST	Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland. It has a very restricted geographic distribution in NSW; to the north-west of Sydney, occurring in the Maroota/South Maroota – Sackville – Glenorie area and one outlying population in Ku-ring-gai Chase National Park.	Low	Lack of supporting sandstone rocky habitat. Low number of records and was not observed during field survey.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Lasiopetalum joyceae</i>	-	V	V	PMST	Grows in heath on sandstone; Hornsby Plateau.	Low	Lack of supporting heath habitat. Low number of records and was not observed during field survey.
<i>Leptospermum deanei</i>	Gaudium deanei	V	V	PMST	A very rare shrub, growing to 5 metres tall. It is restricted to Sydney, growing in the Hornsby, Warringah, Ku-ring-gai and Ryde Local Government Areas. It is found in dry sclerophyll forest and woodland, typically growing on lower hill slopes or near creeks, on Hawkesbury Sandstone and associated sandy loams.	Low	Whilst within the geographic distribution for this species, the Study Area supports limited areas of remnant native bushland and most of these areas have a highly disturbed ground cover from weed invasion or historic clearing. There is also a lack of creek habitat.
<i>Leucopogon exolasius</i>	Woronora Beard-heath	V	V	PMST	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.	Low	Whilst within the geographic distribution for this species, the Study Area supports limited areas of remnant native bushland and most of these areas have a highly disturbed ground cover from weed invasion or historic clearing. Low number of records and was not observed during field survey.
<i>Macadamia integrifolia</i>	Macadamia Nut	V	V	10	It is not known to occur naturally in the wild in N.S.W. However, it was recorded from Camden but it is not known if the tree was cultivated or growing naturally. This species is frequently cultivated for its fruit. Flowering occurs in August and September.	Low	This species has a low likelihood of occurrence due to a low number of historical records and a lack of habitat suitability. The species was also not observed during field assessments.
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	1	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. 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.	Low	Lack of supporting creek or stream habitat. Low number of records and was not observed during field survey.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Melaleuca deanei</i>	Deane's Melaleuca	V	V	26	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.	Low	This species has a low likelihood of occurrence as the Study Area was primarily disturbed with non-native vegetation and rarely supported vegetation characteristic of heath and ridgetop woodland.
<i>Micromyrtus blakelyi</i>	-		V	PMST	Restricted to areas near the Hawkesbury River, north of Sydney. Typically occurs within heathlands in shallow sandy soil in cracks and depressions of sandstone rock platforms.	Negligible	Negligible likelihood of occurrence as the Study Area is outside the geographic range for this species.
<i>Microtis angusii</i>	Angus's Onion Orchid		E	PMST	All confirmed records of the species are from disturbed areas, with most individuals recorded in road verges. All currently known records of the species are located within Northern Beaches LGA.	Low	Whilst the Study Area is predominantly confined to road edges and disturbed areas, the lack of records indicates that it is unlikely to be present within the Study Area. The species was also not observed during field survey.
<i>Persicaria elatior</i>	Knotweed	V	V	PMST	Within 50m of swamps, wetlands or ephemeral wet areas	Negligible	This species has a low likelihood of occurrence due to the absence of wetland and swamp habitat within the Study Area.
<i>Persoonia hirsuta</i>	Hairy Geebung	E	E	3	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone	Low	This species has a low likelihood of occurrence, as whilst there are patches of remnant dry, open forest and woodland, the ground cover is predominantly non-native and disturbed from, clearing and weed incursion, making it unsuitable habitat for this species.
<i>Pimelea curviflora</i> <i>var curviflora</i>	-	V	V	11	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands	Low	This species has a low likelihood of occurrence due to the absence of Shale Sandstone woodland vegetation and habitat.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Pimelea spicata</i>	Spiked-Rice flower	E	V	PMST	On the Cumberland Plain sites, it is associated with Grey Box communities (<i>particularly Cumberland Plain Woodland variants and Moist Shale Woodland</i>) and in areas of ironbark.	Low	This species has a low likelihood of occurrence due to the lack of associated Cumberland Plain Woodland habitat and vegetation communities within the Study Area.
<i>Prostanthera densa</i>	Villous mint- Bush	V	V	PMST	Grows in sclerophyll forest and shrubland, on coastal headlands and near-coastal ranges, on sandstone; from Nelson Bay to Beecroft Peninsula.	Low	Lack of supporting coastal heathland and shrubland habitat.
<i>Prostanthera junonis</i>	Somersby Mintbush	E	E	PMST	Has a north-south range of approximately 19 km on the Somersby Plateau in the Gosford and Wyong local government areas.	Low	Low likelihood of occurrence due to a low number of records, and the species was not observed during field survey.
<i>Prostanthera marifolia</i>	Seaforth Mintbush	CE	CE	PMST	<i>Prostanthera marifolia</i> is currently only known from the northern Sydney suburb of Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion. Occurs in localised patches in or in close proximity to the endangered Duffys Forest ecological community.	Low	Outside the known geographic range for this species.
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	V	E	1	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	Negligible	This species has a negligible likelihood of occurrence as the Study Area is outside the geographic range for this species.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	CE	11	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forests, usually on volcanic and sedimentary soils.	Low	This species has a low likelihood of occurrence due to the lack of wet sclerophyll and rainforest habitat, with the Study Area being predominantly dry, open woodland and forest, with it being inland.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Rhodomyrtus psidioides</i>	Native Guava	CE	CE	PMST	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Low	This species has a low likelihood of occurrence due to the lack of wet sclerophyll and rainforest habitat, with the Study Area being predominantly dry, open woodland and forest, with it being inland.
<i>Syzygium paniculatum</i>	Magenta Cherry	V	V	20	Found only on the coast of NSW. Occurs on gravels, sands, slits and clays in riverside gallery rainforests and remnant littoral rainforest communities on the central coast.	Negligible	This species has a low likelihood of occurrence due to the lack of wet sclerophyll and rainforest habitat, with the Study Area being predominantly dry, open woodland and forest, with it being inland.
<i>Tetratheca glandulosa</i>		V	-	76	Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest.	Low	Low likelihood of occurrence due to the lack of associated vegetation communities and the high weed incursion and historic clearing throughout the Study Area creating unsuitable habitat.
<i>Thesium australe</i>	Austral Toadflax	V	V	PMST	Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland (<i>Map Unit 10ar</i>). Common woodland tree species include: <i>Corymbia gummifera</i> , <i>C. eximia</i> , <i>Eucalyptus haemastoma</i> , <i>E. punctata</i> , <i>E. racemosa</i> , and/or <i>E. sparsifolia</i> , with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridacea	Low	Low likelihood of occurrence due to the lack of associated vegetation communities and the high weed incursion and historic clearing throughout the Study Area creating unsuitable habitat.
<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	V	-	2	This is a species of the margins of salt marshes and lakes.	Negligible	Lack of suitable wetland, swamp or moist habitat available for this species.

* **Legend:** BC Act = Biodiversity Conservation Act, EPBC Act = Environment Protection and Biodiversity Conservation Act, Status: CE= Critically Endangered, =Endangered, V=Vulnerable, P=Protected, Migratory agreements: J=Listed on Japan Australia Migratory Bird Agreement, K= Listed on Republic of Korea Australia Migratory Bird Agreement.

Table G-2. Likelihood of Occurrence: Fauna

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
Frogs							
<i>Heleioporus australiacus</i>	Giant burrowing frog	V	V	3	Only two known north and south distribution populations. The northern population is known to occur within an area bounded by Wollemi national park and west to Mt Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding frogs will call from open spaces, under vegetation or rocks from within burrows in the creek bank. Typically inhabit swamps, second order streams and even small pools of collected water.	Low	This species has a low likelihood of occurrence as it relies on flowing water courses, rock pools and ephemeral swamps for breeding and sheltering habitat. Whilst there are creeks adjacent to the Study Area, the species is not known to inhabit creeks that are severely degraded and/ or only periodically wet.
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	6	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha spp.</i>) or spikerushes (<i>Eleocharis spp.</i>). Optimum habitat includes waterbodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available.	Low	This species has a low likelihood of occurrence as it relies on flowing water courses, rock pools and ephemeral swamps for breeding and sheltering habitat. Whilst there are creeks adjacent to the Study Area, these creeks will not be directly impacted by the works.
<i>Mixophyes balbus</i>	Stuttering Frog	E	V	PMST	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	Low	This species has a low likelihood of occurrence as it relies on flowing water courses, rock pools and ephemeral swamps for breeding and sheltering habitat. Whilst there are creeks adjacent to the Study Area, the species is not known to inhabit creeks that are severely degraded and/ or only periodically wet.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Pseudophryne australis</i>	Red-crowned Toadlet	V,P	-	72	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter.	Low	This species has a low likelihood of occurrence as it relies on flowing water courses, rock pools and ephemeral swamps for breeding and sheltering habitat. Whilst there are creeks adjacent to the Study Area, the species is not known to inhabit creeks that are severely degraded and/ or only periodically wet.
Birds							
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	4	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.	Low	This species has a low likelihood of occurrence. Whilst the species may utilise surrounding areas for foraging, very few historical records exist and there are several habitat constraints as the site is largely disturbed and urbanised.
<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	2	They can be found in both coastal and inland habitats, usually over open areas with low vegetation. They prefer to perch in trees or on power lines near their nesting sites. The fork-tailed swift will migrate during the winter season depending on the area they live in, traveling south from cold climates in order to find warmer temperatures.	Low	The species has a low likelihood of occurrence due to the lack of associated coastal habitats. Low number of records and was not observed during field survey.
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	10	The Dusky Woodswallow primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understory of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees.
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	P	C	1	Largely restricted to the coast and open sea water.	Negligible	Study Area is not within a coastal/marine environment.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Arenaria interpres</i>	Ruddy Turnstone	P	C	1	During migration they use freshwater shorelines, mudflats, rocky shorelines, and sandy beaches. On the wintering grounds they occur along coastal areas with mudflats, sandy beaches, and rocky shores.	Negligible	Study Area is not within a coastal/marine environment.
<i>Botaurus pocioptilus</i>	Australasian Bittern	E	E	1	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha spp.</i>) and spike rushes (<i>Eleocharis spp.</i>). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.	Low	Low likelihood of occurrence due to a lack of suitable wetland habitat and low number of records.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	V	PMST	Sharp-tailed sandpipers occur within all states of Australia. They are found mostly in the south-east and are widespread in both inland and coastal locations. The species also occurs in both freshwater and saline habitats.	Negligible	Study Area is not within a coastal/marine environment.
<i>Calidris canutus</i>	Red Knot		V	PMST	The red knot is common in all the main suitable habitats around the coast of Australia. During the non-breeding season in Australasia, the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts and sometimes on sandy ocean beaches or shallow pools on exposed rock platforms.	Low	Lack of suitable breeding habitat such as intertidal mudflats, sandflats and wetlands present. No records present.
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	PMST	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	Low	Lack of suitable breeding habitat such as intertidal mudflats, sandflats and wetlands present. Low number of records present.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	E	E	58	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-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Low	Numerous records were present for this species with the most recent record from 2020, and approximately 3km away from the alignment. It is likely that the species may opportunistically forage in areas along the alignment using Box Gums and Eucalyptus sp to feed particularly along northern sections in Turrumurra or Twin Creeks Reserve. However, the species is unlikely to be dependent on the resources, as there is more suitable quality habitat in surrounding areas.
<i>Calidris ruficollis</i>	Red-necked Stint	P	C	1	Red-necked Stints are migratory wading birds. When migrating, they travel by the East Asian-Australasian flyway and flocks of thousands of these birds travel together.	Low	Low likelihood of occurrence due to the low number of records and lack of suitable coastal habitat within the Study Area.
<i>Calyptorhynchus lathami</i>	Southern- eastern Glossy Black-Cockatoo	V	V	1	This species inhabits forest and woodlands of coastal areas.	Low	Low likelihood of occurrence due to the low number of records and lack of suitable coastal habitat within the Study Area.
<i>Climacteris picumnus victoriae</i>	Brown treecreeper	V	V	PMST	Found in eucalypt woodlands (<i>including Box-Gum Woodland</i>) and dry open forest of the 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 (<i>Eucalyptus camaldulensis</i>).	Low	Although there were Eucalyptus trees located in several sites with remnant bushland, it is unlikely that the species would be utilising the highly fragmented surround vegetation. Similarly, as the site is highly disturbed and urbanised this makes the site unsuitable.
<i>Cuculus opatus</i>	Oriental Cuckoo	P	C	3	It mainly inhabits forest in northern and eastern Australia.	Low	Although there were Eucalyptus trees located in several sites with remnant bushland, it is unlikely that the species would be utilising the highly fragmented surround vegetation. Similarly, as the site is highly disturbed and urbanised this makes the site unsuitable.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	3	The Varied Sittella is sedentary and has a continuous distribution in NSW from the coast to the far west. It inhabits eucalypt forest and woodlands specifically rough barked species and Acacia woodlands.	Low	Although there were Eucalyptus trees located in several sites with remnant bushland, it is unlikely that the species would be utilising the highly fragmented surround vegetation. Similarly, as the site is highly disturbed and urbanised this makes the site unsuitable.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird		E	PMST	Predominantly inhabits tall open forest or woodland with a dense grassy understorey close to rainforest areas, though one population occurs in montane heathland close to rainforest.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting open forest or woodland habitat and the high weed invasion in most of the woodland and forest areas outcompeting native grasses.
<i>Diomedea antipodensis</i>		V	V	PMST	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.	Negligible	Study Area is not within a coastal/marine environment.
<i>Diomedea antipodensis gibsoni</i>	Gibsons Albatross		V	PMST	This species is known only to breed on the Adams, Disappointment and Auckland Islands in the subantarctic Auckland Island group. Breeds in colonies among grass tussocks on isolated subantarctic islands, using the wind to travel great distances both during and between breeding seasons.	Negligible	Study Area is not within a coastal/marine environment.
<i>Diomedea epomophora</i>	Southern Royal Albatross		V	PMST	Endemic to New Zealand, the majority of the southern royal breeding population is found on subantarctic Campbell Island, with smaller numbers on the Auckland Islands	Negligible	Study Area is not within a coastal/marine environment.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Diomedea exulans</i>	Wandering Royal Albatross		M	PMST	Wandering albatrosses breed outside of the New Zealand region, in the southern Indian and Atlantic Oceans and at Macquarie Island south-west of New Zealand.	Negligible	Study Area is not within a coastal/marine environment.
<i>Diomedea sanfordi</i>	Northern Royal Albatross		E	PMST	Northern royal albatross can be sighted throughout the Southern Ocean at any time of the year. Non-breeding and immature birds, including newly fledged birds, undertake a downwind circumnavigation in the Southern Ocean. The main wintering grounds are off the coasts of southern South America. They are generally solitary foragers and forage predominantly over continental shelves to shelf edges.	Negligible	Study Area is not within a coastal/marine environment.
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-	1	Floodplain wetlands (<i>swamps, billabongs, watercourses and dams</i>) 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	Negligible	Study Area is not within a coastal/marine environment.
<i>Erythrotriorchis radius</i>	Red Goshawk	E	E	PMST	They often occur at the boundary between two vegetation types, and often favour forests or woodlands dominated by eucalypts or paperbarks. Also favours wetlands.	Negligible	This species has a negligible likelihood of occurrence due to the absence of a suitable wetland habitat, and the absence of an intact and well-connected forest or woodland habitat.
<i>Falco hypoleucos</i>	Grey Falcon	V	V	PMST	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.	Negligible	Study Area is not within a coastal/marine environment.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Gallinago hardwickii</i>	Latham's Snipe	V	V	1	Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration.	Negligible	Study Area is not within a coastal/marine environment.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	PMST	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias.	Low	This species has a negligible likelihood of occurrence due to the lack of characteristic vegetation habitat within the Study Area.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	46	The White-bellied Sea Eagle is widespread along the east coast of NSW. Habitats characterised by large areas of open water. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts. It occurs at sites near the sea and terrestrially at coastal dunes, tidal flats, grassland, heathland, woodland and forest.	Negligible	This species has a negligible likelihood of occurrence due to the lack of characteristic vegetation habitat within the Study Area. The Study Area is also not within a coastal/ marine environment.
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	7	The Little Eagle is found throughout the Australian mainland. The main habitat is open eucalypt forest, woodland or open woodland.	Low	This species has a low likelihood of occurrence. Whilst a few historical records are apparent, habitat constraints exist as the site is largely disturbed and urbanised.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Hirundapus caudacutus</i>	White- throated Needletail	-	V	36	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., <i>termites and ants</i>) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More common in coastal areas, less so inland.	Low	Almost exclusively aerial species, so is unlikely to rely on the woodland and forest habitat present within the Study Area.
<i>Ixobrychus flavicollis</i>	Black Bittern	V		2	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.	Low	Lack of suitable wetland or estuarine habitat present.
<i>Lathamus discolor</i>	Swift Parrot	E	CE	13	The Swift Parrot migrates to south-east mainland Australian between February and October. It occurs in areas where eucalypts flower profusely or where there are abundant lerp infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> .	Low	Whilst there are feed trees scattered throughout the Study Area, these trees are all present in a disturbed urban setting, where local birds including the Noisy Miner are known to aggressively compete with other species. This could defer the species from using these trees.
<i>Limosa lapponica</i>	Bar-tailed Godwit	P	C	2	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.	Low	Study Area is not within a coastal/marine environment.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Limosa limosa</i>	Bar-tailed Godwit	V	E	PMST	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.	Low	Study Area is not within a coastal/marine environment.
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	7	The Square-Tailed Kite is found in various timbered habitats including dry woodlands and open forests. Prefers timbered watercourses. Appears to occupy large hunting ranges of more than 100 km ² . Nest sites are generally located along or near watercourses, in a fork or on large horizontal limbs.	Low	This species has a low likelihood of occurrence as its preferred habitat is coastal and sub-coastal areas and more inland this includes major river systems. The species is unlikely to inhabit small creeks, but may occasionally fly past as the Study Area is within the geographic range for this species.
<i>Macronectes giganteus</i>	Southern Giant-Petrel		E	PMST	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.	Negligible	Study Area is not within a coastal/marine environment.
<i>Macronectes halli</i>	Northern Giant-Petrel		V	PMST	Northern giant petrels are regular visitors to southern Australian and South African waters in winter and spring. They usually arrive in Australian waters about one month earlier than do the southern giant petrels.	Negligible	Study Area is not within a coastal/marine environment.
<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin		E	PMST	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	Low	This species has a negligible likelihood of occurrence due to the lack of characteristic vegetation habitat within the Study Area.
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (<i>eastern subspecies</i>)	V	-	6	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts.	Low	This species has a low likelihood of occurrence. Whilst the species may utilise surrounding areas for foraging, very few historical records exist and there are several habitat constraints as the site is largely disturbed and urbanised.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Neophema chrysostoma</i>	Blue-winged Parrot	-	V	PMST	The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range, they favour grasslands and grassy woodlands.	Negligible	This species has a negligible likelihood of occurrence due to the lack of in-tact grassy woodland habitat, with the Study Area being predominantly cleared areas, mown lawns or areas with a non-native ground cover.
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	1	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Nests in tree hollows, logs or posts, from August to December.	Low	Lack of suitable woodland habitat along creek lines.
<i>Ninox connivens</i>	Barking Owl	V		6	Barking Owls are most common in savannah woodland, although they also inhabit well-forested hill and riverine woodlands.	Low	Whilst small- large hollows were identified within remnant bushland patches in the Study Area, these trees are located in highly urban areas and are fragmented by houses and development nearby.
<i>Ninox strenua</i>	Powerful Owl	V		824	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Moderate	Several small-large hollows were identified within remnant bushland patches in the Study Area, and the species is known to inhabit and thrive in urban and disturbed areas. The species is also likely to fly over or forage whilst travelling to more suitable habitat in surrounding areas such as at Lane Cove National Park or Kuringai Chase National Park.
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	CE	PMST	The Far Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	Negligible	Lack of freshwater and coastal environment within the Study Area.
<i>Numenius minutus</i>	Little Curlew		C	3	The Far Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	Negligible	Lack of freshwater and coastal environment within the Study Area.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Pandion cristatus</i>	Eastern Osprey	V	-	6	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. 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	Negligible	Lack of freshwater and coastal environment within the Study Area.
<i>Parvipsitta pusilla</i>	Little Lorikeet	V	-	14	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Moderate	There was a high presence of Angophora and Melaleuca planted and remnant trees throughout the Study Area, especially in areas such as South Turramurra. Lorikeet calls were also frequently heard during field survey.
<i>Petroica boodang</i>	Scarlet Robin	V		5	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Low	This species has a low likelihood of occurrence as the Study Area is predominantly disturbed with non-native vegetation and planted street trees. Areas with remnant bushland are unlikely to support this species due to the lack of supporting open forest or woodland habitat and the high weed invasion in most of the woodland and forest areas outcompeting native grasses.
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	1	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum Forest.	Low	Lack of associated vegetation communities and low number of records.
<i>Pluvialis squatarola</i>	Grey Plover		C	2	The Grey Plover is a medium-sized, long-legged plover, with a large head and large dark eyes, and a heavy black bill. It is pale grey above with fine mottling, a whitish forehead and eyebrow and a strongly barred white tail.	Low	Lack of suitable freshwater and wetland habitat for this species and low number of records present.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Ptilinopus superbus</i>	Superb Fruit Dove	V	-	4	The Superb Fruit-dove occurs principally from north- eastern in Queensland to north-eastern NSW. 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.	Low	Lack of associated vegetation communities and low number of records present.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	PMST	The Australian Painted Snipe inhabits many different types of shallow, brackish or freshwater terrestrial wetlands.	Negligible	This species has a negligible likelihood of occurrence due to the lack of suitable wetland habitat within the Study Area.
<i>Stagnopleura guttata</i>	Diamond Firetail	V	V	PMST	Found in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (<i>rivers and creeks</i>), and sometimes in lightly wooded farmland	Low	This species has a negligible likelihood of occurrence due to the lack of characteristic vegetation habitat within the Study Area.
<i>Sterna hirundo</i>	Common Tern		C	1	Common Terns nest on rocky islands, barrier beaches, and saltmarshes and forage over open waters including inlets, lakes, and marine waters.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Sternula nereis nereis</i>	Australian Fairy Tern	-	V	PMST	The Fairy Tern (<i>Australian</i>) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Thalassarche sp.</i>	Albatross		V	PMST	Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Thalasseus bergii</i>	Crested Tern	P		6	Occurs in tropical and warm temperate coastal parts of the Old World from South Africa around the Indian Ocean to the Pacific and Australia.	Negligible	The Study Area is not with a coastal/marine environment.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Thalassarche cauta</i>			E	PMST	Diomedea cauta is a large albatross with a wide distribution in the southern hemisphere. In Australia it breeds on islands off Tasmania, but is a visitor to New South Wales waters. Birds in NSW waters may include individuals from New Zealand Colonie	Negligible	The Study Area is not with a coastal/marine environment.
<i>Tringa nebularia</i>	Common Greenshank	-	E	PMST	Common Greenshanks are found both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Tyto novaehollandiae</i>	Masked Owl	V		2	Lives in dry eucalypt forests and woodlands from sea level to 1100 m.	Low	Whilst small- large hollows were identified within remnant bushland patches in the Study Area, these trees are located in highly urban areas and are fragmented by houses and development nearby.
Mammals							
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	E	2	Roosts in caves (<i>near their entrances</i>), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features.	Low	This species has a low likelihood of occurrence due to the absence of cave habitat within the Study Area, and a lack of associated vegetation communities that support this species.
<i>Cercartetus nanus</i>	Eastern Pygmy possum			PMST	Found in a broad range of habitats from rainforest through sclerophyll (<i>including Box-Ironbark</i>) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.	Low	Lack of favoured heath habitat present, and the highly urbanised setting makes the Study Area unsuitable. Also, a lack of records present.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	V	E	4	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.	Low	Although there were a few Eucalyptus trees with hollows located in several sites, it is unlikely that the species would be utilising the highly fragmented surrounding vegetation. Similarly, as the site is highly disturbed and urbanised this makes the site unsuitable.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	6	The Eastern False Pipistrelle prefers moist habitats, with trees taller than 20m. They will generally roost 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. They hibernate in winter. Females are pregnant in late spring to early summer.	Low	This species has a low likelihood of occurrence due to the low number of records and the limited habitat suitability as the site is highly disturbed.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot		E	PMST	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.	Low	Outside the geographical distribution for the species.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	18	The Eastern Coastal Free-tailed Bat occurs 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 roosting communally, probably insectivorous	Low	This species has a low likelihood of occurrence as it typically doesn't roost in disturbed areas, and areas with high levels of urban light. Instead, it prefers to habit quality dry sclerophyll, woodland, or mangrove vegetated areas.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Miniopterus australis</i>	Little Bent- winged Bat	V,P	-	95	This species inhabits moist eucalypt forests, rainforests and dry sclerophyll forests. It tends to roost in caves, tunnels, tree hollows, bridges, buildings and sometimes within the canopy of densely vegetated areas.	Moderate	There were a number of small-large hollows identified within remnant bushland patches of the Study Area. The species is also known to inhabit disturbed, urban areas.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	218	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Moderate	This species has a moderate likelihood of occurrence, due to the presence of buildings, culverts and stormwater channels which could provide ample habitat.
<i>Myotis macropus</i>	Southern Myotis	V	-	23	The Southern Myotis generally roost in groups of 10– 15 close to water in caves, mine shafts, hollow bearing trees, storm water channels, buildings, under bridges and in dense foliage. They 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.	Low	This species has a negligible likelihood of occurrence due to the lack of roosting habitat (caves) near waterbodies/creek lines within the Study Area or nearby.
<i>Notamacropus parma</i>	Parma Wallaby	V	V	PMST	It lives only in New South Wales, occupying wet, sclerophyll forests that have grassy openings and thick undergrowth. The Parma wallaby is found sometimes in dry, eucalypt forests but also in wet, tropical habitats.	Negligible	This species has a negligible likelihood of occurrence due to the absence of wet sclerophyll habitat within the Study Area.
<i>Petauroides volans</i>	Greater Glider (southern and central)	E	E	2	Occurs most commonly in tall, moist eucalypt forests and woodlands with old trees and abundant hollows.	Negligible	This species has a negligible likelihood of occurrence due to the absence of moist woodland habitat within the Study Area.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	V	V	PMST	Occurs in tall, mature eucalypt forests with high rainfall and nutrient rich soils.	Low	Although there were a few Eucalyptus trees with hollows located in several sites, it is unlikely that the species would be utilising the highly fragmented surround vegetation.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-	2	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum Forest west of the Great Dividing Range and Blackbutt-Bloodwood Forest with heath understorey in coastal areas.	Low	Lack of associated vegetation communities including mature River Red Gum Forest.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	PMST	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.	Negligible	This species has a negligible likelihood of occurrence due to the absence of rocky outcrops, caves and crevices within the Study Area.
<i>Phascolarctos cinereus</i>	Koala	E	E	12	The Koala inhabits 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. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Can live in many different eucalypt forests including dense, wet coastal forests.	Low	Although there were a few Eucalyptus trees located in several sites, it is unlikely that the Koala would be utilising the highly fragmented surround vegetation. Similarly, as the site is highly disturbed and urbanised this makes the site unsuitable. The species is more likely to use more suitable areas in the surrounds such as at Lane Cove National Park or Kuringai Chase National Park.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	-	V	PMST	Occupy open heathland, open woodlands with a heathy understory and vegetated sand dunes.	Negligible	This species has a negligible likelihood of occurrence as the site consists highly discontinuous and fragmented woodland habitat, with the absence of sand dunes for sheltering and breeding.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	448	The Grey-Headed Flying Fox occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. 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.	Moderate	This species has a moderate likelihood of occurrence due to the high number of records. The National Flying-fox Monitoring Viewer (DCCEEW Cth, 2024) indicates that the nearest Grey-headed Flying-fox camp is located in Parramatta Park. As the species is known to occur in disturbed areas, it may feed on the Banksia, Melaleuca and Eucalyptus Street and remnant trees throughout the Study Area.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	14	The Yellow-bellied Sheathtail bat roosts in groups of up to six in tree hollows and buildings. The species tends to forage in most habitats with and without trees.	Low	This species has a low likelihood of occurrence as since there are minimal records, and it has such a broad habitat range it is likely to utilise better quality habitat in nearby conservation areas/reserves.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	13	The Greater Broad-Nosed Bat 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. The species 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 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.	Low	This species has a low likelihood of occurrence due to the limited habitat suitability (<i>lack of tall wet forests</i>) and the site is highly disturbed.
Fish							
<i>Epinephelus daemeli</i>	Black Rockcod		V	PMST	The Black Rockcod is a territorial species that inhabits caves, gutters and crevices. They are usually found in depths up to 50 m, although individuals have been collected from below 100 m. Juveniles are found inshore, often in coastal rockpools and estuaries.	Negligible	There is a lack of suitable coastal and freshwater habitat for the species within the Study Area
<i>Macquaria australasica</i>	Macquarie Perch	-	E	PMST	Macquarie Perch occur in waters with lots of cover such as aquatic vegetation, snags, boulders and overhanging banks.	Low	No creeks intersect the Study Area.
<i>Prototroctes maraena</i>	Australian Grayling	-	V	PMST	In NSW its most northern limit is now the Clyde River.	Negligible	Negligible likelihood of occurrence as the Study Area is outside the geographic range for this species.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
Reptile							
<i>Caretta caretta</i>	Loggerhead Turtle	E	E	PMST	The loggerhead turtle has a worldwide distribution in coastal tropical and subtropical waters. In Australia, loggerheads occur in coral reefs, bays and estuaries in tropical and warm temperate waters off the coast of Queensland.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Chelonia mydas</i>	Green Turtle		V	PMST	Green turtles occur in coral reefs that are rich in seaweeds, and in coastal seagrass pastures in tropical and subtropical areas worldwide.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Dermochelys coriacea</i>	Leatherback Turtle	E	E	PMST	In Australia, leatherback turtles occur in tropical and temperate waters. Leatherback turtles are most commonly reported feeding in coastal waters in central eastern Australia (<i>from the Sunshine Coast in southern Queensland to central New South Wales</i>); south-east Australia (<i>from Tasmania, Victoria and eastern South Australia</i>) and in south-western Western Australia.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Eretmochelys imbricata</i>	Hawksbill Turtle		V	PMST	The Hawksbill Sea Turtle lives in tropical coastal waters where they are associated with coral reefs, rocky shoals and mangroves.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Hoplocephalus bungaroides</i>	Broad- headed Snake	E	E	PMST	Shelters in sandstone rock crevices and under flat rocks on exposed cliff edges during autumn, winter and spring. In summer, this species moves to crevices or hollows in large trees within 500m of escarpments.	Negligible	This species has a negligible likelihood of occurrence due to the absence of rocky outcrops on a cliff area for this species to shelter.

Scientific name	Common name	BC Act	EPBC Act	No. of records	Distribution and habitat	Likelihood	Rationale
<i>Natator depressus</i>	Flatback Turtle		V	PMST	All known breeding sites of the flatback turtle occur in tropical Australia, on beaches and islands in Queensland, the Northern Territory and Western Australia.	Negligible	The Study Area is not with a coastal/marine environment.
<i>Pommerhelix duralensis</i>	Dural Land Snail	E	E	5	It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris.	Low	This species has a low likelihood of occurrence due to the low number of records and the limited habitat suitability as the site is highly disturbed.

* **Legend:** BC Act = Biodiversity Conservation Act, EPBC Act = Environment Protection and Biodiversity Conservation Act, Status: CE= Critically Endangered, =Endangered, V=Vulnerable, P=Protected, Migratory agreements: J=Listed on Japan Australia Migratory Bird Agreement, K= Listed on Republic of Korea Australia Migratory Bird Agreement.

Document prepared by

Aurecon Australasia Pty Ltd

ABN 54 005 139 873

Level 11, 73 Miller Street
North Sydney 2060 Australia

PO Box 1319
North Sydney NSW 2059
Australia

T +61 2 9465 5599

F +61 2 9465 5598

E sydney@aurecongroup.com

W aurecongroup.com