

6 March 2025

Our ref: 24NEW10108

Priority Projects
Project Interface & Strategic Coordination
Energy Corporation of NSW (EnergyCo)
Attention: Lexie Tieman

Dear Lexie,

Newcastle Logistics Precinct - Biodiversity Development Assessment Report (BDAR) Waiver Request

Eco Logical Australia Pty Ltd (ELA) was engaged by EnergyCo (the proponent) to provide an ecological assessment for the project site associated with the Newcastle Logistics Precinct – Intertrade Project (the project). The project site is located in Mayfield North, NSW within the City of Newcastle Local Government Area (LGA). The project will provide additional storage areas near Port of Newcastle lease area to support the supply chain for critical transmission, generation, firming and storage projects under the NSW Electricity Infrastructure Roadmap.

The project is being assessed and determined as State Significant Infrastructure (SSI). Major projects including SSI typically require a Biodiversity Development Assessment Report (BDAR); alternatively, a BDAR waiver may be sought. Outcomes of the ecological assessment by ELA (Appendix A) indicate that a BDAR waiver is appropriate for this project. This letter is seeking a BDAR waiver.

This letter assesses potential impacts to biodiversity as a result of the proposal, in accordance with the NSW Department of Planning, Industry & Environment's *How to apply for a biodiversity development assessment report waiver for a major project application document* (DPIE, 2019). Information to support the application is outlined in Table 1 and Table 2 below. To inform this letter, a desktop review and site assessment was completed by ELA which is attached in Appendix A.

The project area does not contain vegetation which supports significant biodiversity values and is located within a highly disturbed, fragmented urban and industrial environment. The vegetation and built structures within the project area and the immediate vicinity may provide marginal habitat for highly mobile species such as threatened microbats (such as Southern Myotis), avifauna species and the Grey-headed Flying Fox. No native Plant Community Types (PCTs) are within the project area, and no removal of PCTs are proposed.

The assessment concluded that the proposed development is highly unlikely to have any impact on biodiversity values or threatened entities listed under the *Biodiversity Conservation Act 2016* (BC Act), and any potential prescribed impacts (while highly unlikely) would not require offsetting of biodiversity credits. The likelihood of unanticipated prescribed impacts would be reduced with the implementation of appropriate mitigation measures such as pre-works surveys and an Unexpected Finds Protocol. No

Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) would be impacted by the proposed development.

The proponent requests a waiver from the need to submit a BDAR based on the assessment outcomes.

Regards,

A handwritten signature in dark ink, appearing to read 'L. Scanlan', is positioned above the printed name.

Liam Scanlan
Senior Ecologist & BAM Accredited Assessor (BAAS23026)



Figure 1: Location map



Figure 2: Site map

1. Biodiversity Development Assessment Report Waiver Request

1.1. Introduction

This BDAR Waiver Request is submitted on behalf of EnergyCo to support an application for a proposed logistics precinct for materials and equipment for renewable energy projects. The proposed facility is located at 99 Selwyn Street, Mayfield North (Lot 332/DP 1176879) on land zoned as SP1 – Special Activities. All land within the Port of Newcastle Land Application Map is zoned SP1.

1.2. Site location and context

The development information requirements for a BDAR waiver request, in accordance with Attachment A of the BDAR report waiver guidelines (DPIE 2019), are addressed in Table 1. Table 2 provides information regarding the impacts of the proposed development on biodiversity values in accordance with the Attachment B of the guidelines (DPIE 2019).

Additional results and methods of the site inspections are provided in Appendix A.

Relevant terms used in this report as follows:

- **Project site** is the area of land (Lot 332 in DP1176879) that is the subject of the assessment; it includes areas of land proposed for development and areas of land to be retained (Figure 1 and Figure 2).
- **Project area** is the area of land within the project site that is proposed to facilitate the logistics precinct development and associated works. The project area also includes sections of Selwyn Street (managed by the City of Newcastle Council) and Steel Works Road (an internal road that extends into the Port of Newcastle (PoN) lease area and managed by PoN).
- **Retained land** is the vegetated area of land within the project site that is not proposed for development and will be managed as per current maintenance practices.

1.2.1. Sources of information

The assessment included a literature and database review of relevant information concerning potential impacts to biodiversity values as a result of the proposed SSI. The following datasets were reviewed:

- NSW State Vegetation Type Map (SVTM) (DCCEEW 2020)
- NSW Government Biodiversity Values (BV) Map (DCCEEW 2025a)
- High Ecological Value Aquatic Ecosystems (HEVAE GDE) (DCCEEW 2025b)
- BioNet Atlas Database species sightings records - 5 km radius (DCCEEW 2025c)
- NSW BioNet Threatened Biodiversity Data Collection (TBDC) (DCCEEW 2025d)
- High Environmental Value for Hunter Regional Growth Planning area (HEV) (OEH 2015)
- BioNet Threatened Species to Plant Community Types Association data spreadsheet (DPE 2022).

Table 1: BDAR waiver request information requirements

Requirement	Information
Administration	Proponent: Energy Corporation of NSW (EnergyCo) Completed by: Liam Scanlan – Senior Ecologist (ELA), BSc (Hons) (Botany), BAM Accredited Assessor (BAAS23026) Reviewed by: Meredith Henderson – Senior Principal Ecologist (ELA), PhD, BSc (Hons), BAM Accredited Assessor (BAAS17001)
Site Details	Street Address: 99 Selwyn Street, Mayfield North. The project area also includes sections of Selwyn Street (managed by the City of Newcastle Council) and Steel Works Road (an internal road that extends into the PoN lease area managed by PoN). Lot and DP Number: 332//1176879 Local Government Area (LGA): City of Newcastle Land use zoning: The land use zone is SP1 – Special Activities. All land within the Port of Newcastle Land Application Map is zoned SP1. Existing Environment: The project site is approximately 46 ha in size and contains seven disused structures and approximately 33 ha of unoccupied site remediation infrastructure consisting of hard stand with crusher dust substrate. The project site occurs in an industrial area within the Port of Newcastle. The project site has been used for industrial purposes since pre-1931, supporting activities including smelter and coal loading operations, BHP iron and steelworks (Figure 3).
Proposed Development	Key components of the proposed development include: • construction of hardstand and internal roads used for the unloading, loading and storage of materials and equipment for renewable energy projects • operation of mobile equipment comprising forklifts, cranes, reach stackers and road trucks for movement of materials and equipment for renewable energy projects • associated stormwater drainage to manage stormwater flows and water quality across and around impervious surfaces • construction of bridges over existing stormwater channels, for the provision of access and egress from the hardstand area • internal roads, staff amenity buildings, carpark and other ancillary infrastructure to facilitate operation of the project • utility adjustments and provisions within the indicative project area to maximise operational efficiencies of the hardstand area and minimise possible upgrades in future. It is expected that construction of the project would commence in late 2026 and take around nine months to complete with initial operations commencing in 2027.
Impacts on biodiversity values	The project site is not mapped under the NSW Government Biodiversity Values (BV) Map (Figure 4) (accessed February 2025) (DCCEEW 2025a). Further assessment provided in Table 2 and in the attached ecological assessment (Appendix A).

Table 2: Criteria to assess biodiversity under the BC Act and BC Regulation

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
Vegetation abundance - 1.4(b) BC Regulation	Occurrence and abundance of vegetation at a particular site	✓	Five vegetation zones have been identified on the project site (Figure 5). Detailed descriptions and photographs of each vegetation zone are provided in Appendix A. The current proposal seeks the development of Vegetation Zone 1 and a small portion of Vegetation Zone 2. Vegetation Zone 1 occurs on capped, hardstand land that is dominated by exotic grasses, and contains sparse occurrence of native species with overall very low native species richness and cover. Vegetation Zone 2 comprises planted exotic trees in garden beds and landscaped lawns around buildings. Zones 3-5 do not occur within the proposed project area; however, these areas were included in the assessment to determine if any indirect impacts are likely to occur to biodiversity values. It was determined that the proposed development would not have indirect impacts to biodiversity values. • Vegetation Zone 1 – Virgin Excavated Natural Material (VENM) cap site remediation infrastructure (33.18 ha) (Within project area) • Vegetation Zone 2 - Planted garden beds and mown lawn (2.02 ha) (Within project area) • Vegetation Zone 3 - Planted native parkland (4.21 ha) (Retained land) • Vegetation Zone 4 - Planted Fig trees (0.90 ha) (Retained land) • Vegetation Zone 5 - Unmanaged exotic forest (0.95 ha) (Retained land). No native PCTs occur within the project area. Planted native species in a parkland setting (VZ-3), which is outside of the project area and not proposed to be impacted, was assigned to the 'best fit' PCT for the purpose of identifying potential threatened species associations relevant to the project land.
Vegetation Integrity 1.5(2)(a) BC Act	Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near-natural state.	✓	The project site has been used for industrial purposes since pre-1931, supporting activities including smelter and coal loading operations, BHP iron and steelworks, and has more recently been the subject of intensive contamination remediation works (Figure 3). Site remediation infrastructure has been applied across all parts of the site. The hardstand substrate present in VZ-1 is designed to minimise infiltration of underlying contaminated soils. The substrate consists of virgin excavated natural materials (VENM) which is a low permeability capping material with an overlay of crusher dust (i.e. fine gravel <5 mm). Site remediation infrastructure is managed in accordance with a notice issued by the NSW EPA under section 28 of the <i>Contaminated Land Management Act 1997</i>. Routine management of this area includes removal of trees and shrubs to maintain integrity of remediation infrastructure. The VENM cap site remediation infrastructure (VZ-1) is dominated by exotic grasses <i>Melinis repens</i> (Red Natal Grass) and <i>Chloris gayana</i> (Rhodes Grass) and also includes sparse occurrences of <i>Casuarina glauca</i> (Swamp Oak) seedlings/saplings, <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (Bitou Bush), <i>Acacia saligna</i> (Golden Wreath Wattle), <i>Acacia longifolia</i> (Sydney Golden Wattle) and <i>Cynodon dactylon</i> (Couch) (Photograph 1).

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
			One vegetation integrity plot was undertaken in this vegetation zone (data provided in Appendix A) however the lack of native species (n=3) meant that selection of best fit PCT could not be accurately undertaken as PCT selection requires a distinct native species assemblage, usually with soil type or landscape position. Due to the sparse presence of Swamp Oak in Vegetation Zone 1, an assessment has been made to demonstrate that vegetation on site is not representative of Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions TEC (Appendix A). This vegetation zone is considered to contain negligible biodiversity value, does not contain significant native vegetation or habitat for threatened species.  Photograph 1: Site remediation infrastructure with exotic grass colonisation

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
			The majority of established vegetation in the project area comprises planted exotic trees in garden beds and landscaped lawns around buildings (Photograph 2). Plant species identified in this zone include <i>Platanus orientalis</i> (Oriental Plane), <i>Nerium oleander</i> (Oleander), <i>Jacaranda mimosifolia</i> (Blue Jacaranda), and limited planted native species <i>Melaleuca viminalis</i> (Weeping Bottlebrush), <i>Melaleuca quinquenervia</i> (Broad-leaved Paperbark). Naturalised exotic species are also present including <i>Acacia saligna</i> and <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>. <i>Acacia saligna</i> is native to WA and not native in NSW. Land around buildings and garden beds consist of hardstand concrete roads and carparks. Neither of the two vegetation zones within the project area contain significant native vegetation or habitat for threatened species such as hollow bearing trees.

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
			 Photograph 2: Example of planted garden vegetation around buildings One PCT has been mapped on the project site on the NSW SVTM, however, ground-truthing and sampling of this community concluded that this vegetation has been planted and contains a mix of native, non-indigenous and exotic tree species which do not conform to a naturally occurring Plant Community Type. Further details of this assessment are provided in Appendix A.
Habitat Suitability 1.5(2)(b) BC Act	Degree to which the habitat needs of threatened species are present at a particular site	✓	No records on the project site of threatened flora or fauna species, are currently held in NSW BioNet species sighting database (DCCEEW 2025a) (Figure 5; Figure 6). Threatened flora is very highly unlikely to occur within or

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
			adjacent to the project site given the historical land clearing and industrial land use, recent capping with VENM substrate and lack of connectivity with natural areas or areas with threatened species records. Planted vegetation within the project area (VZ-2) is considered to be highly marginal, potential foraging habitat for highly mobile species, such as <i>Pteropus poliocephalus</i> (Grey-headed Flying-fox) and this resource would not support the habitat needs for this species. Planted fig trees located outside of the project area likely provide better quality foraging resources (located in VZ-4). No impacts are proposed to VZ-4, and it is not anticipated that the proposed development will adversely affect the foraging behaviour of any species which may utilise VZ-4. Six structures varying in size are located in the project site south of Administration Drive as shown in Figure 2. The Bicycle Shed is proposed to be removed. This structure was inspected, and it was determined that it does not support favourable conditions for microbat roosting habitat. One building (Roll Shop) is proposed to be utilised as part of the proposed development. This building represents low quality, potential roosting habitat for microbats. Due to the large size of this building, with sections that could not be accessed, their presence cannot be ruled out entirely. A detailed inspection was undertaken within the Roll Shop and a dusk emergence survey was completed utilising an infra-red camera. No evidence of microbats has been recorded to date. There are no major structural changes proposed to this building. This building is currently vacant but has recently been utilised for industrial-scale storage and supporting remediation works. It is not suspected that microbats are currently utilising this structure, however, to decrease the risk of any unanticipated impacts to fauna, mitigation measures will be employed such as the preparation of an Unexpected Finds Protocol and a pre-works survey for evidence of microbats. Further details of the Bicycle Shed and Roll Shop assessment and proposed mitigation measures are provided in Appendix A.
Threatened Species Abundance 1.4(a) BC Regulation	Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site	✓	There are 417 records of Grey-headed Flying-fox within a 5 km radius of the project site (DCCEEW 2025a) (Figure 6). Planted vegetation adjacent to the project site contains marginal foraging habitat which is unlikely to be heavily relied upon by this species. The development is unlikely to impact on the local occurrence and abundance of this species. The following eight threatened microbat species have been recorded within a 5 km radius of the project site (Figure 5). • <i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle) 2 records • <i>Micronomus norfolkensis</i> (Eastern Coastal Free-tailed Bat) 25 records • <i>Miniopterus australis</i> (Little Bent-winged Bat) 35 records • <i>Miniopterus orianae oceanensis</i> (Large Bent-winged Bat) 30 records • <i>Myotis macropus</i> (Southern Myotis) 15 records • <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail-bat) 4 records

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
			● <i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat) 14 records. No microbat species have been recorded within the project area to date, and no structures are suspected to contain roosting microbats. This is based on targeted site assessments and surveys of the Bicycle Shed and Roll Shop. Details including methods and results of these assessments, as well as mitigation measures to address unexpected finds are provided in Appendix A. It is known that Green and Golden Bell Frog may occur in degraded habitat including areas capped for contamination remediation (i.e. at Kooragang Island). For this reason, targeted surveys for Green and Golden Bell Frog and any suitable habitat were undertaken, which confirmed the absence of this species and minimal potential suitable breeding habitat within the project area. The implementation of an Unexpected Finds Protocol will help to minimise any potential impacts to fauna which have been identified to have a low potential to occur in the project area, even though are not suspected to occur within the project site. It is also recommended that a pre-works inspection and ultrasonic microbat emergence surveys of the structures are undertaken.
Habitat Connectivity 1.4(c) BC Regulation	Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range	N/A	The project site exists in a highly urbanised industrial landscape with heavily disturbed and fragmented vegetation. Vegetation within the project area does not contribute to habitat connectivity of native vegetation patches within the greater landscape (Figure 1 and Figure 2).
Threatened Species Movement 1.4(d) BC Regulation	Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle	✓	Vegetation within the project area does not contribute to habitat connectivity of native vegetation patches within the greater landscape (Figure 1 and Figure 2). It is highly unlikely that the site contributes to the movement of threatened species to maintain their lifecycle, and any potential movement through the site (such as movement by highly mobile aerial species) would be maintained in the future. Vegetation within the project site does not contain suitable breeding habitat or habitat that is critical to maintaining the life cycle of any threatened species. It is a very small component of a larger matrix of urban vegetation but is unlikely to be relied upon by any threatened species. Potential microbat habitat (not suspected to currently be occupied by microbats) was identified as disused buildings within the project area. One building (Roll Shop) is proposed to be utilised as part of the proposed development. As previously identified, the implementation of an Unexpected Finds Protocol, a pre-works inspection including ultrasonic and infra-red microbat emergence surveys of the buildings prior to works being undertaken will minimise any potential impacts to fauna which have low potential to occur and are not currently suspected to occur within the project site.

Biodiversity Value	Meaning	Relevant (✓ or N/A)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
Flight Path Integrity 1.4(e) BC Regulation	Degree to which the flight paths of protected animals over a particular site are free from interference	N/A	Given the lack of natural resources within the development footprint, it is highly unlikely that the site is used as a significant stop over point in the flight path of any threatened or migratory species. Construction of high-rise buildings or structures is not proposed as part of the development. It is unlikely that the proposal would substantially change or interfere with the flight paths of any threatened or migratory species over the project site. Flight paths of protected animals over the site are currently free from interference and these conditions would be preserved.
Water Sustainability 1.4(f) BC Regulation	Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site	✓	One intertidal drainage line within 200 m of the project site was precautionarily identified as potential <i>Myotis macropus</i> (Southern Myotis) habitat. One building within the project site occurs within 200 m of this drainage line. The site inspection concluded that the building is highly unlikely to support favourable conditions for Southern Myotis roosting habitat, and additionally, there are no plans to use or modify this building for the proposed development. Further details of this assessment are included in Appendix A. Targeted surveys for Green and Golden Bell Frog have confirmed the absence of this species. Further details of Green and Golden Bell Frog habitat assessment and targeted surveys are provided in Appendix A.

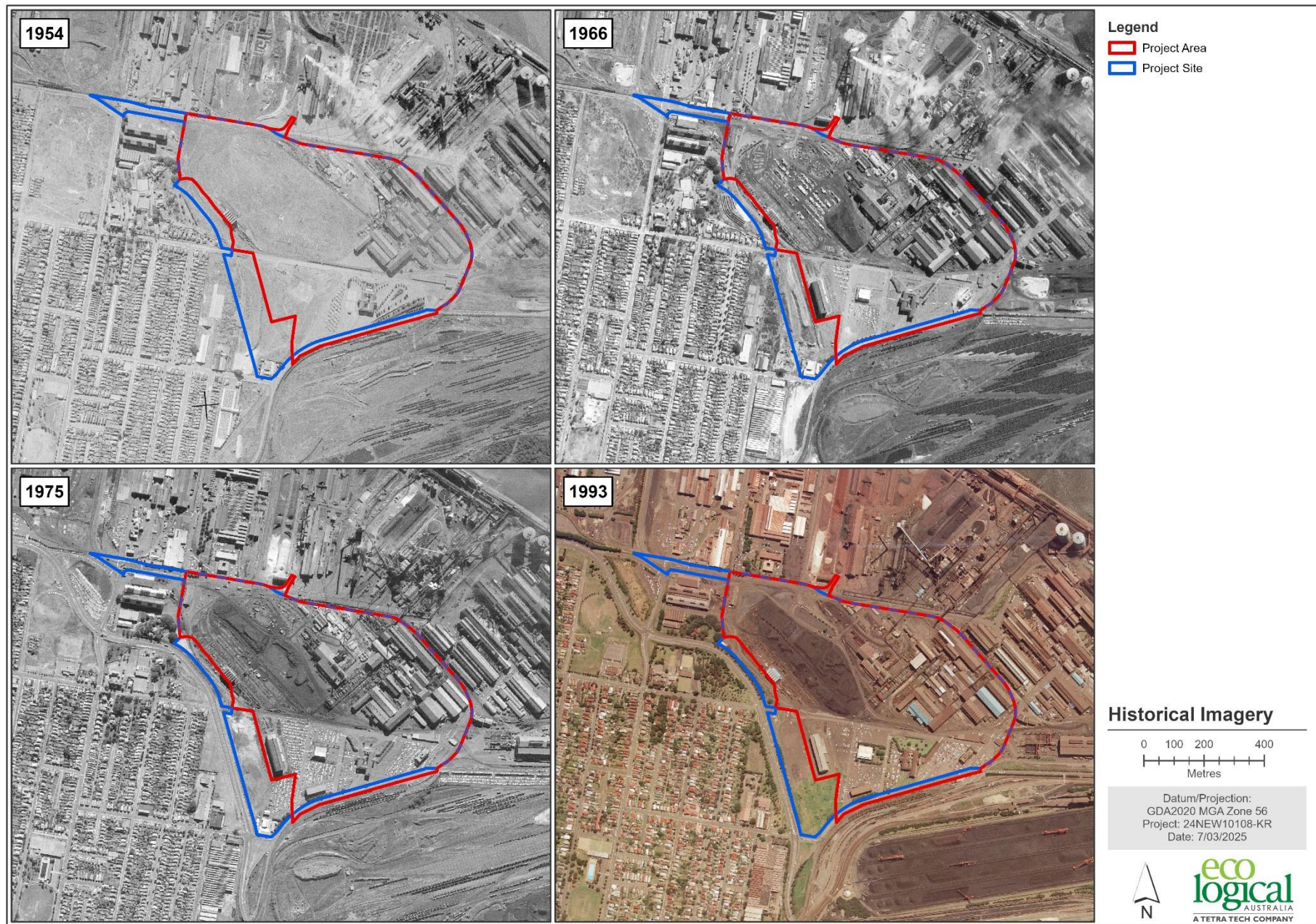


Figure 3: Historical imagery

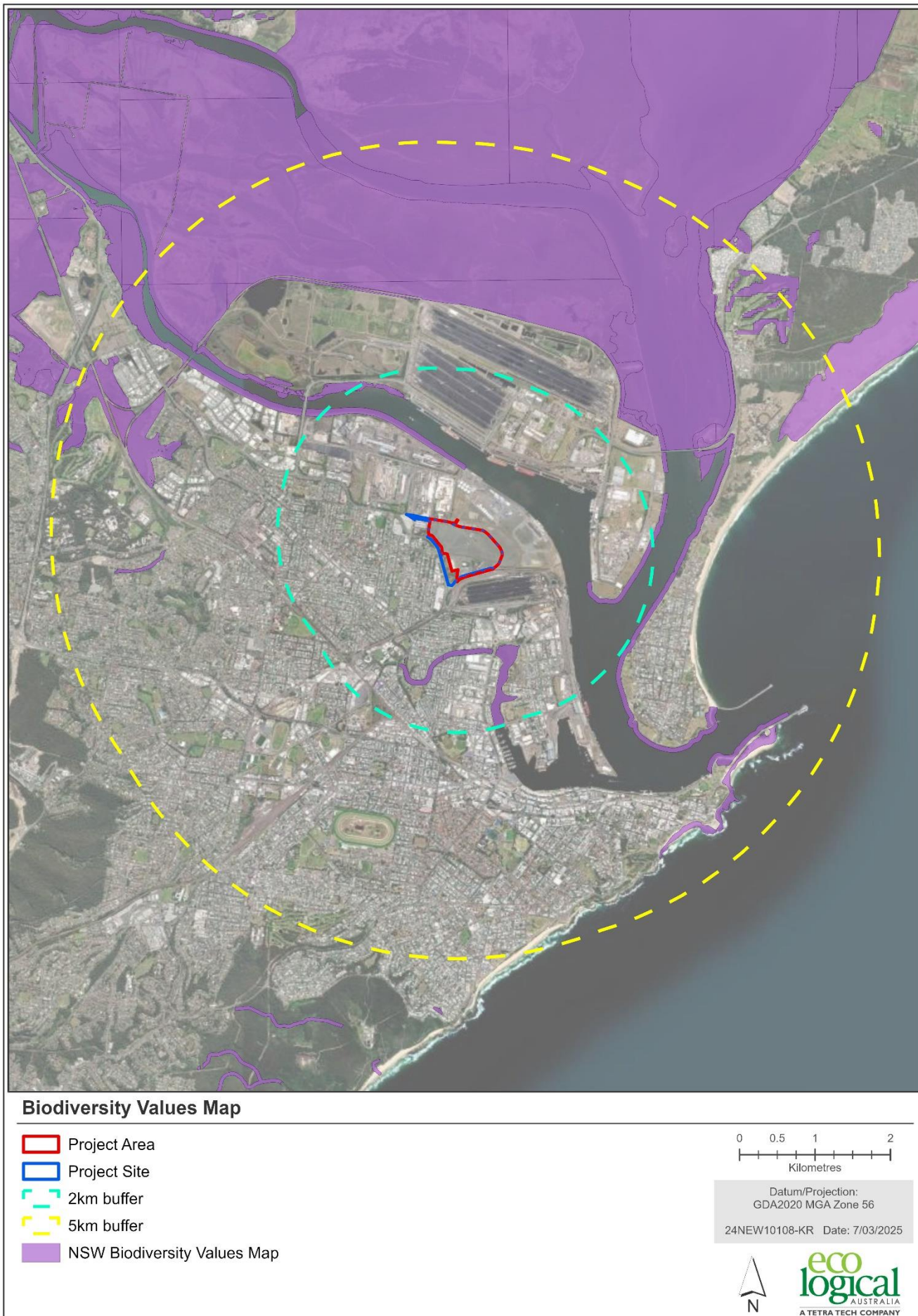
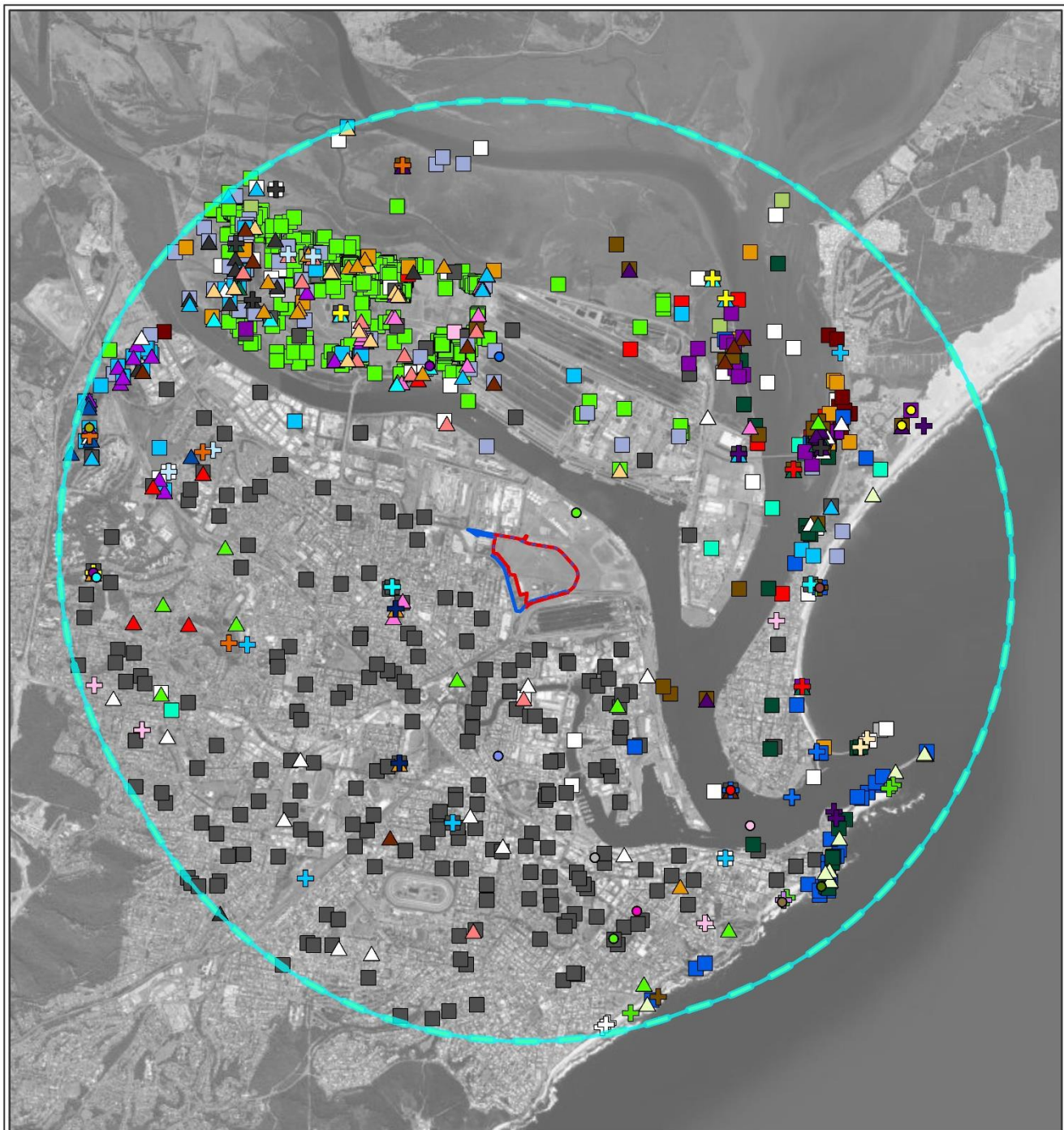


Figure 4: Biodiversity Values Map



Figure 5: Distribution of vegetation zones across the project site



BioNet Atlas Threatened Fauna Records



Figure 6: BioNet Atlas Threatened Fauna Records

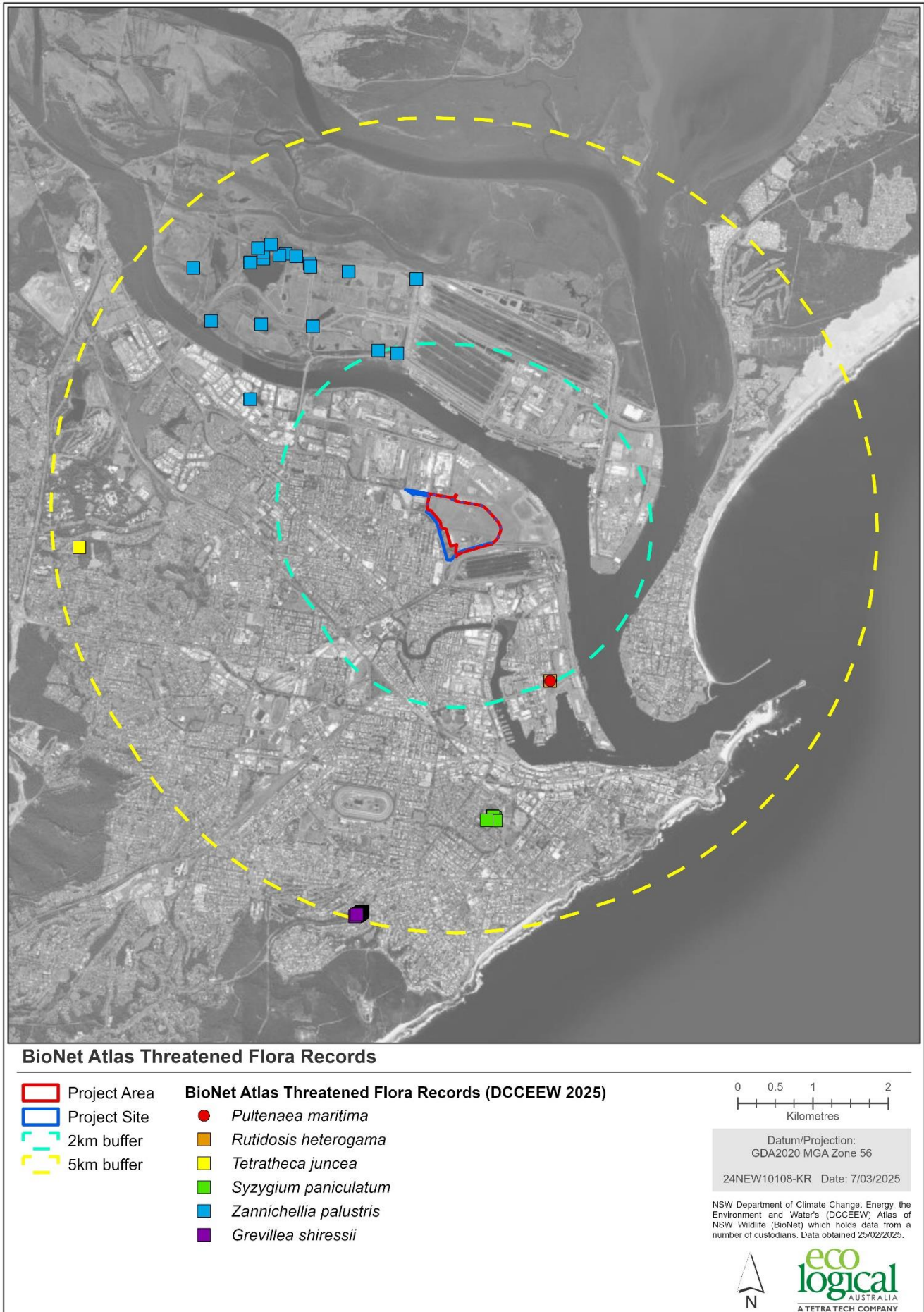


Figure 7: BioNet Atlas Threatened Flora Records

References

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NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2025b. 'HEVAE Vegetation Groundwater Dependent Ecosystems Value - Hunter / Central Rivers'. Available at: <https://datasets.seed.nsw.gov.au/dataset/hevae-vegetation-groundwater-dependent-ecosystems-hunter-central-rivers>

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OEH (2015). Developing maps of High Environmental Value for strategic planning - mapping and governance guide (OEH – Environmental Programs Branch (EPB))

Appendix A – Ecological assessment report

28 March 2025

Our ref: 24NEW10108

Priority Projects
Project Interface & Strategic Coordination
Energy Corporation of NSW (EnergyCo)

Attention: Lexie Tieman

Dear Lexie

Ecological assessment report for the Newcastle Logistics Precinct – Intertrade project

Please find below our report on the field and desktop ecological investigations for the Newcastle Logistics Precinct – Intertrade project, as part of its State significant infrastructure application.

Regards,



Frank Lemckert
Senior Principal Ecologist

1. Introduction

Eco Logical Australia were engaged by Energy Corporation of NSW (EnergyCo) to conduct the following works for the Newcastle Logistics Precinct Intertrade project (proposed development) located in Mayfield North, Newcastle as part of its State significant infrastructure (SSI) application:

- Assess the availability and quality of breeding and non-breeding habitat present for *Litoria aurea* (Green and Golden Bell Frog)
- Complete an ecology survey focused on vegetation mapping, identified of habitat features and a targeted Green and Golden Bell Frog survey
- Completion of a brief survey report summarising survey findings that will include the methods used, all site observations, photos and mapping of any important features and any recommendations for next steps, with specific reference to the need for a Biodiversity Development Assessment Report (BDAR) or alternatively a BDAR Waiver, or recommendations on the need for an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Referral.

Relevant terms used in this report as follows:

- **Project site** is the area of land (Lot 332 in DP1176879) the subject of the assessment; it includes areas of land proposed for development (project area) and areas of land to be retained (retained land).
- **Project area** is the area of land within the project site proposed to facilitate the Newcastle Industrial precinct and associated works. The project area also includes sections of Selwyn Street (managed by the City of Newcastle Council) and Steel Works Road (an internal road that extends into the Port of Newcastle (PoN) lease area and managed by PoN)
- **Retained land** is the landscaped area within the project site along its western boundary that is outside the Project area

The project site for the study is located in Mayfield North, NSW within the City of Newcastle Local Government Area (LGA). The regional context for the project is shown in Figure 1 and the project site and project area boundaries indicated in Figure 2.



Figure 1: Location map (regional context)



Figure 2: Project Site, site features and land zoning

1.1. Proposed development

Key components of the proposed development include:

- construction of hardstand and internal roads used for the unloading, loading and storage of materials and equipment for renewable energy projects.
- operation of mobile equipment comprising of forklifts, cranes, reach stackers and road trucks for movement of materials and equipment for renewable energy projects.
- associated stormwater drainage to manage stormwater flows and water quality across and around impervious surfaces.
- construction of bridges over existing stormwater channels, for the provision of access and egress from the hardstand area
- internal roads, staff amenity buildings, carpark and other ancillary infrastructure to facilitate operation of the project.
- utility adjustments and provisions within the indicative project area to maximise operational efficiencies of the hardstand area and minimise possible upgrades in future.

It is expected that construction of the project would commence in late 2026 and take around nine months to complete with initial operations commencing in 2027.

This assessment has been undertaken in the context of the following anticipated works:

- the proposed development as outlined above.
- Removal of the Bicycle Shed to facilitate access between Selwyn Street and the proposed hardstand area (north of Administration Drive shown in Figure 2)
- Removal of planted regrowth and exotic vegetation within Vegetation Zone 2 to facilitate the access required between Selwyn Street and the proposed hardstand area. Examples of impacted vegetation include but are not limited to the patch of planted exotic trees located between the Admin building and Administration Drive, directly west of the Bicycle Shed (Figure 2) and vegetation shown in Photograph 1.
- Repurposing of the Roll Shop building to support operations by providing all weather storage
- Maintain existing remediation infrastructure in accordance with the site contaminated site management plan (Hunter & Central Coast Development Corporation, 2018).

1.2. BDAR Waiver advice

Advice from NSW Department of Planning, Industry and Environment (DPIE) (2019) states that a BDAR waiver will only be issued in limited circumstances where it is clearly demonstrated that the proposed development is not likely to have any significant impact on biodiversity values.

A proposed development could be considered as unlikely to have any significant impact on biodiversity values if it:

- will not clear or remove native vegetation, other than a few single-standing trees with no native understorey in an urban area.
- will not clear or remove native vegetation, other than planted native vegetation that is not consistent with a plant community type known to occur in the same Interim Biogeographic

Regionalisation of Australia (IBRA) subregion, such as street trees, trees in a car park, or landscaping.

- will have negligible adverse impact on threatened species and ecological communities, considering habitat suitability, abundance, habitat connectivity, movement of species, water sustainability, and non-natural features such as non-native vegetation and human-built structures.
- will have negligible adverse impact on protected animals because of impacts on flight path integrity.

All native vegetation proposed to be affected by a proposal must be considered in a BDAR Waiver request.

Native vegetation is defined in section 60B of *Local Land Services Act 2013* (NSW) as any of the following types of plants that are native to New South Wales:

- trees (including any sapling or shrub or any scrub)
- understorey plants
- ground cover (being any type of herbaceous vegetation)
- plants occurring in a freshwater wetland.

Native vegetation may exist as grassland, herb land and low shrublands that do not have trees or large shrubs. Native vegetation is trees, shrubs, herbs and grasses that are indigenous to New South Wales. Native vegetation extends to any planted vegetation that meets the definition of native vegetation.

1.3. EPBC Act referral

The EPBC Act protects Matters of National Environmental Significance (MNES), such as threatened species and ecological communities, migratory species (protected under international agreements), and National Heritage places (among others). Any actions that will or are likely to have a significant impact on MNES requires referral and approval from the Australian Government Environment Minister.

2. Methods

2.1. Desktop assessment

2.1.1. Review of biodiversity mapping

The following existing vegetation and biodiversity mapping layers were reviewed:

- NSW State Vegetation Type Map (SVTM) (Department of Climate Change, Energy, the Environment, and Water (DCCEEW), 2020)
- Biodiversity Values Map (DCCEEW, 2025a)
- BioNet Atlas Database species records (DCCEEW, 2025c)
- NSW BioNet Atlas Database 'Sightings Search' (DCCEEW, 2024c)
- High Environmental Value for Hunter Regional Growth Planning area (HEV) (Office of Environment and Heritage (OEH), 2015)
- High Ecological Value Aquatic Ecosystems (HEVAE GDE) (DCCEEW, 2025b).

2.1.2. Selection of plant community type

To identify potential plant community types (PCTs) on site and potential associated threatened entities, selection of PCTs was undertaken using a manual filtering method. Potential PCTs were downloaded from the "Export Bulk Data" feature from the NSW BioNet Vegetation Classification. Floristic data collected in vegetation integrity plots were used to identify and select PCTs. The filtering process is detailed in Section 3.4.

2.1.3. Threatened species likelihood of occurrence

To ensure all threatened species with potential to occur within the project site and project area would be adequately considered, a list of threatened species was generated based on BioNet Atlas Database species records (DCCEEW, 2025c), as well as PCT associations.

Threatened species records within 5 km of the project area were downloaded from NSW BioNet Atlas Database 'Sightings Search' (DCCEEW, 2024c).

A list of threatened species associated with PCT4006 (Northern Paperbark-Swamp Mahogany Saw-sedge Forest) (based on 'best fit' PCT selection, details provided in Section 3.4) within the Hunter IBRA (Interim Biogeographic Regionalisation for Australia) Subregion was taken from the BioNet Threatened Species to Plant Community Types Association data spreadsheet (DPE 2022, refreshed March 2025).

This list was used to undertake a likelihood of occurrence assessment which considered the environment in the 5 km locality, species occurrence records, and habitat constraints and descriptions that are specified in the Threatened Biodiversity Data Collection (TBDC) (DCCEEW, 2025d).

2.2. Green and Golden Bell Frog habitat assessment and targeted survey

Dr Frank Lemckert completed a Green and Golden Bell Frog habitat survey within the project area on Wednesday 22 January and aural-visual surveys for this frog on the nights of 22 and 30 January and 3 and 5 February 2025. Areas of potential breeding habitat that required nocturnal survey for the Green and Golden Bell Frog were mapped during the inspection. The targeted survey for the Green and

Golden Bell Frog was completed as per the NSW Survey Guide for Threatened Frogs (DPIE, 2020) as well as the EPBC Act Survey guidelines for Australia's threatened frogs (Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA), 2010).

The survey consisted of four separate nocturnal aural visual surveys (with call playbacks) covering identified potential breeding sites, starting with an initial 2-5 minutes of listening for calling frogs followed by call playbacks for 2-5 minutes and completed with visual survey of the banks of the water body using headlamp torches to look for active frogs. The timing of the four nights of survey allowed the minimum 14 day difference between the first and last surveys required in the Biodiversity Assessment Method (BAM) Guidelines. Maximum temperature, rainfall on the day and rainfall over the previous seven days for each of these dates is provided in Table 1. The first survey was also conducted 4 days after > 50 mm of rain had fallen and within 7 days of nearly 100 mm, as is preferred under the EPBC Act Survey Guidelines (DEWHA, 2010). Rainfall over the period was relatively constant and conditions were judged to be very good for frog activity.

No suitable reference site was available but contact with the University of Newcastle staff monitoring the Green and Golden Bell Frog on Kooragang Island indicated that calling activity was occurring around the time of the first and second surveys (C. McHenry Pers. Comm.).

Table 1: Weather conditions for GGBF survey dates (from Nobbys Signal Station 7 km east)

Date	Max. Temp.	Min. Temp.	24 hr Rainfall	Rainfall last 7 days	Wind	Cloud Cover
22/1/2025	34.7° C	20.0° C	0.0 mm	98.8 mm	Moderate	100%
30/1/2025	24.4° C	20.7° C	0.6 mm	4.0 mm	Light	70%
3/2/2025	26.9° C	21.9° C	0.0 mm	15.4 mm	Light	70%
5/2/2025	32.1° C	22.0° C	0.0 mm	12.0 mm	Moderate	100%

2.3. Flora and fauna assessment and mapping

Vegetation and habitat assessment and mapping was completed on 3 February and 17 February 2025 to determine the presence, condition and extent of vegetation within the project area. This work was conducted by Liam Scanlan (ELA Senior Ecologist and BAM accredited assessor) who completed a visual inspection of the project site and completed two BAM vegetation integrity plots (Figure 8) to provide required data for assessments under BAM. Rapid data points were collected to complete vegetation validation of the site, as well as photo reference points, to allow for the observed vegetation to be mapped into vegetation zones (Figure 8). Vegetation zones were established based on the presence of characteristic vegetation which is related to site history and current land use and management.

The focus of the assessment focused on identifying flora and fauna species potentially impacted by the project, both directly and indirectly, as well as ground-truthing PCT 4020 Coastal Creekflat Layered Grass-Sedge Swamp Forest, which is mapped in the project site on the SVTM (DCCEEW 2020) (Figure 8). This PCT is associated with the Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions Threatened Ecological Community, which is listed as Endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act).

2.4. Microchiropteran bat habitat assessment

It is known that some threatened microchiropteran bats (microbat) including, but not limited to, *Miniopterus australis* (Little Bent-winged Bat), *Miniopterus orianae oceanensis* (Large Bent-winged Bat) and *Myotis macropus* (Southern Myotis) will roost in human-made structures, including buildings (2025d).

There are six built structures within the project area (Figure 2; Figure 7). The Roll Shop is proposed to re-purposed as part of the proposed development for all weather storage during operation and the Bicycle Shed is proposed to be removed to facilitate access requirements. The Roll Shop may require adjustments, minor repair works due to vandalism such as replacement of broken glass windows, repainting/removal of graffiti, and disposal of disused equipment. The remaining structures on the project site are not proposed to be used by the development and the buildings will remain boarded up and barred to minimise accessibility to their interiors.

Due to the proposed development resulting in possible prescribed impact, a detailed assessment of microbat habitat focused on the Bicycle Shed and Roll Shop. An inspection of the internal and external structure of the Roll Shop was undertaken by Liam Scanlan on 3 March 2025. The inspection included a foot traverse targeting dark areas, looking for bats or signs of bats (urine stains, droppings, remains and bat fly castings). A handheld torch was shone into potential locations of holes, cracks and crevices. A handheld ultrasonic bat call detector (Wildlife Acoustics EchoMeter 3) was carried during the inspection, as well as a thermal imaging camera (FLIR T530) which was used to check dark areas.

An emergence survey of the eastern side of the Roll Shop was undertaken by Liam Scanlan on 12 March 2025 from approximately 7:15 – 8:30 pm, with sunset recorded at 7:15 pm and last light recorded at 7:39 pm. The emergence survey utilised a thermal imaging camera and handheld spotlight and targeted potential roost exit points located around the Roll Shop.

2.5. Vegetation integrity plots

Two Vegetation Integrity (VI) plots were undertaken by Liam Scanlan on 3 February 2025.

The following data was collected at each site:

- A list of plant species present within each floristic plot (provided in Appendix A), including details for each species;
 - stratum
 - cover
 - abundance
 - growth form group
 - high threat weed status.
- Following data collected within the functional plot (provided in Appendix B);
 - litter cover in five subplots (1 m²) conducted on alternating sides of the 50 m transect at 5 m, 15 m, 25 m, 35 m and 45 m
 - presence of stem size classes at 1.3 m above ground height (5-9, 10-19, 20-29, 30-49, and 50-79 cm)
 - number of large trees (greater than 50 cm)
 - number of hollow bearing trees (HBT) present (hollow size recorded in three groups: <100, 100-200, and >200 mm)
 - tree regeneration (presence of living tree with maximum stem diameter of <5cm, regardless of height)
 - total length of fallen logs (m).

Further details for each attribute is available in the BAM Subsection 4.3.4 (DPIE, 2020).

3. Results

3.1. Desktop review

3.1.1. Biodiversity mapping

The Biodiversity Values Map (DCCEEW 2025a) and the HEV (OEH 2015) did not contain mapped biodiversity features within the project site (Figure 3).

HEVAE GDE mapping (DCCEEW 2025b) indicates several patches of *Sporobolus virginicus* (Sand Couch) Saltmarsh within the project area (Figure 4).

3.1.2. Threatened species records

A total of 99 threatened flora and fauna species were identified for consideration in the habitat assessment and likelihood of occurrence assessment. Seven-three threatened flora and fauna species are recorded in NSW BioNet as occurring within 5 km of the project site (Figure 5; Figure 6). An additional 26 threatened flora and fauna species are associated with PCT 4006 (Northern Paperbark-Swamp Mahogany Saw-sedge Forest). The habitat requirements of each species were assessed in the context of the project site.

The results of the assessment are provided in Appendix D. Due to a lack of habitat in the project site, lack of connectivity to patches of intact native vegetation, only highly mobile threatened species such as avifauna and microbats were regarded as having potential to occur in the proposed project site.

No threatened flora or fauna species were observed during the field survey and no threatened flora species were considered to have potential to occur within the project area and or retained land of the project site.

Note that marine species (whales, dugongs, turtles) were not assessed due to the project site not containing marine habitat.

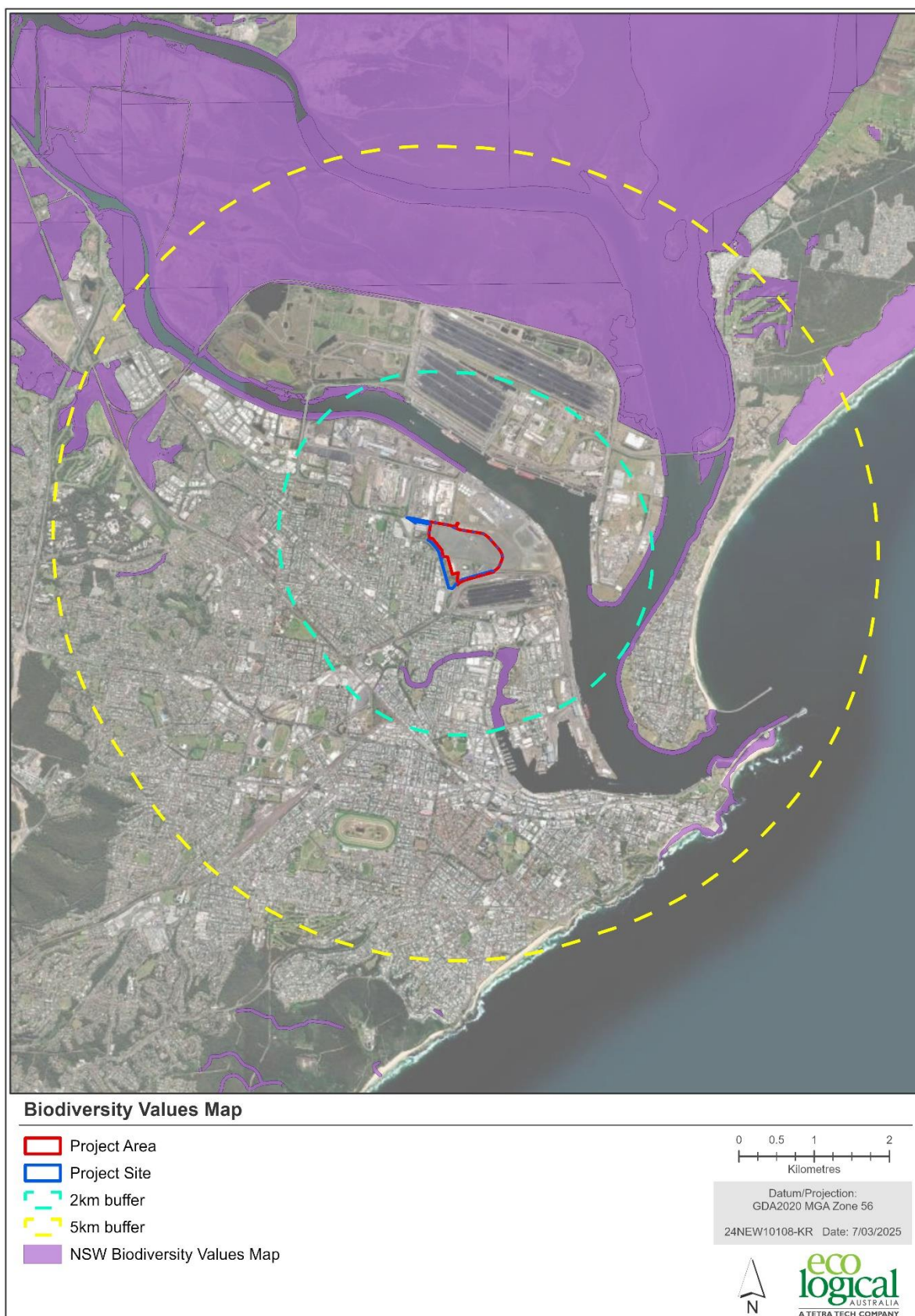


Figure 3: Biodiversity values map



Figure 4: High Ecological Value Aquatic Ecosystems mapping

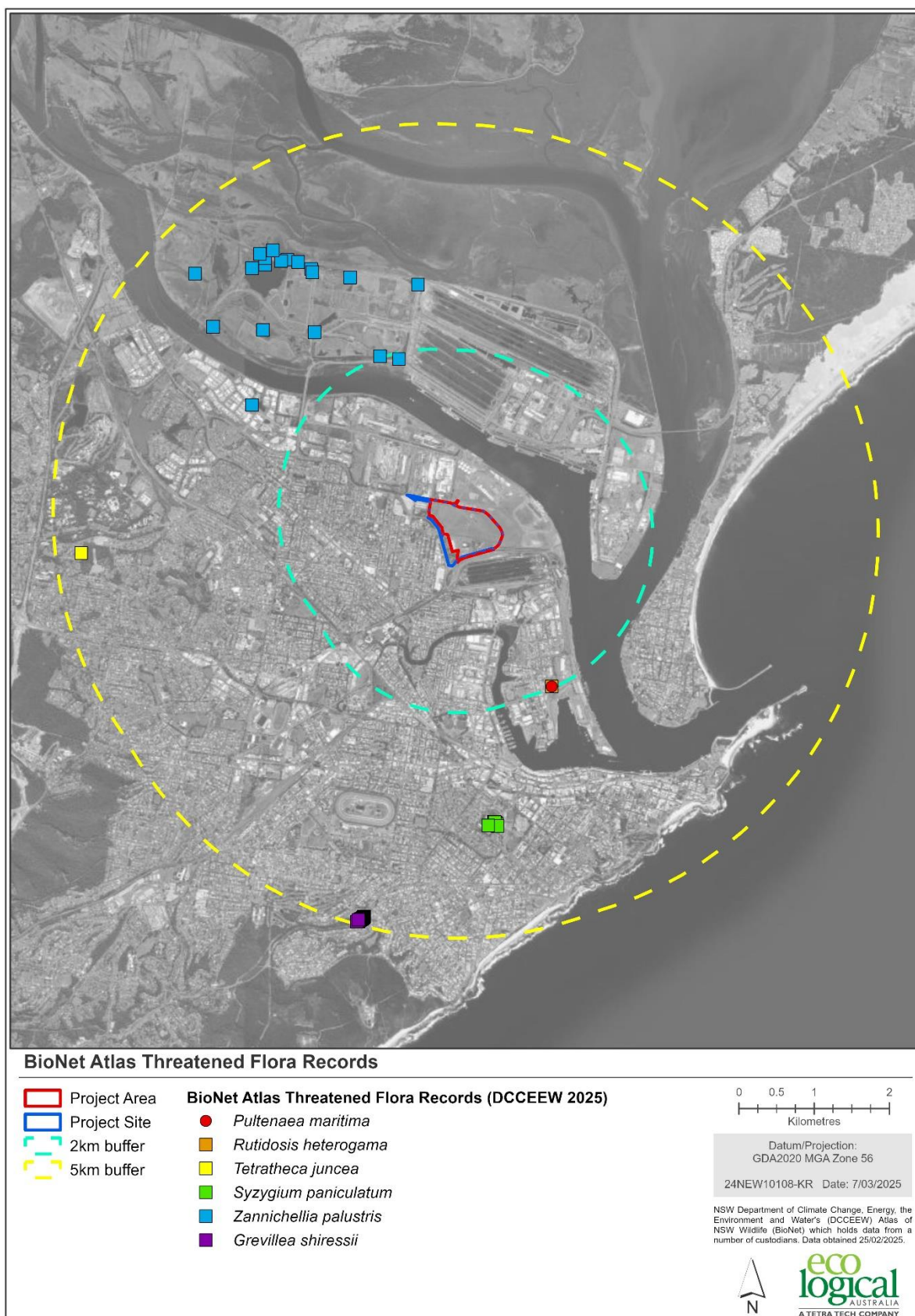


Figure 5: BioNet Atlas threatened fauna records

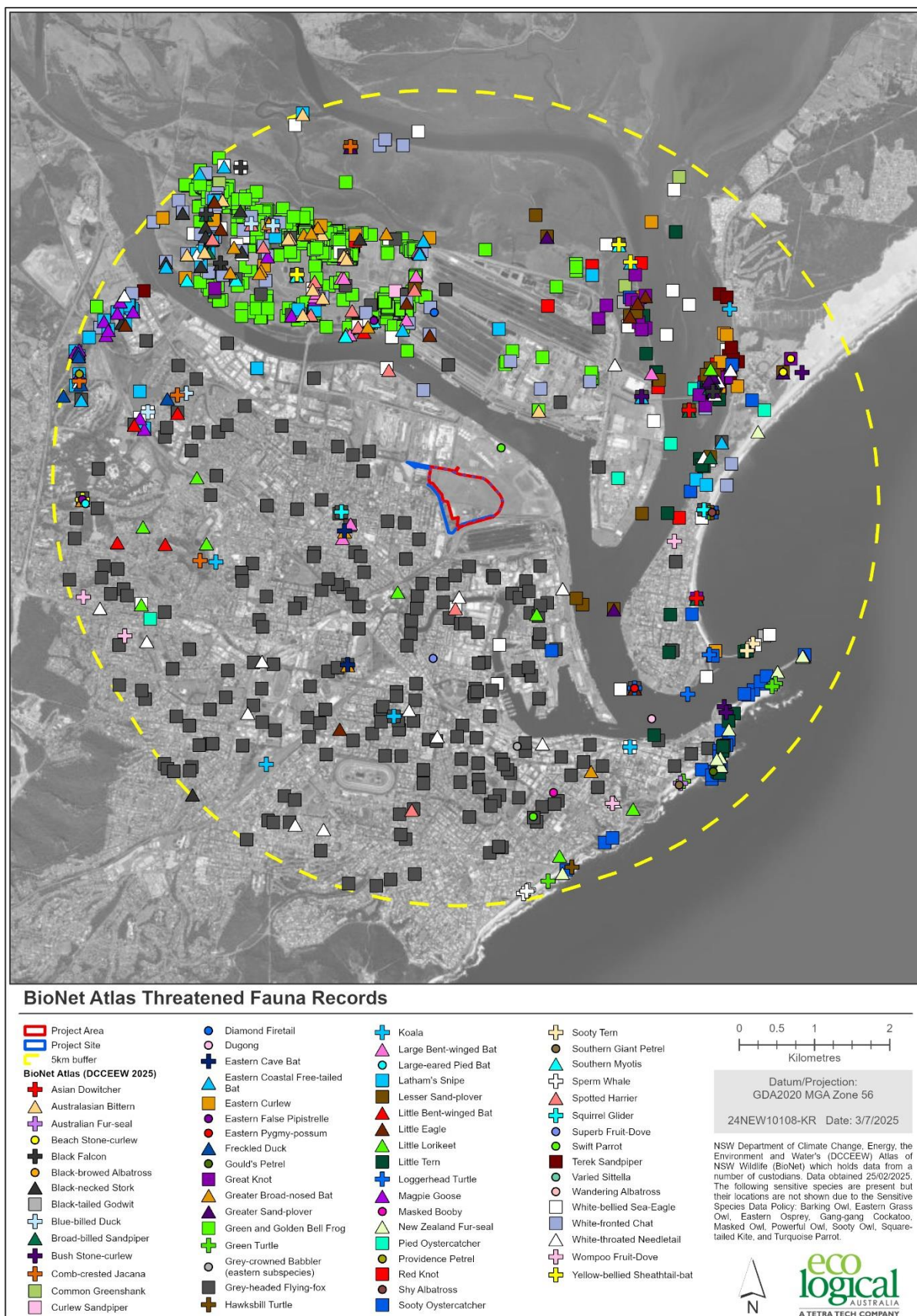


Figure 6: BioNet Atlas threatened flora records

3.2. Assessment of vegetation zones

Five vegetation zones were identified in the project site (Figure 7). Descriptions and photographs for each vegetation zone are provided in the sections below. Zones 3-5 do not occur within the proposed Project Area; however, these areas have been included in the assessment to determine if any indirect impacts are likely to occur to biodiversity values.

- Vegetation Zone 1 - Site remediation infrastructure (Virgin Excavated Natural Material (VENM) cap) (Within Project Area)
- Vegetation Zone 2 - Planted garden beds and lawns (Within Project Area)
- Vegetation Zone 3 - Planted native parkland (landscape cap) (Retained land)
- Vegetation Zone 4 - Planted Fig trees (landscape cape) (Retained land)
- Vegetation Zone 5 - Unmanaged exotic forest (landscape cap) (Retained land).

Occurrences of plant species that made up an area of <200 m² (the area of a BAM plot) that do not fit into the zone descriptions above were not mapped due to their negligible biodiversity value and vegetation integrity. Examples of this include two small individual *Avicennia marina* (Grey Mangrove) stems occurring in an intertidal concrete drain, and scattered *Sarcocornia quinqueflora* (Samphire) growing on a disused concrete sidewalk along Selwyn Street (Photograph 1).



Figure 7: Distribution of vegetation zones across the project site

3.2.1. Presence of Sand Couch Saltmarsh

No *Sporobolus virginicus* was observed during site assessments, including within areas that are mapped as *Sporobolus virginicus* Saltmarsh by DCCEEW (2019).

The base vegetation mapping for the HEVAE GDE mapping appears to be related to NSW Native Vegetation Extent v1.4 (DCCEEW 2019). DCCEEW (2019) attributed these patches as “Tree Cover”. For comparison, known areas of saltmarsh (e.g. on Kooragang Island) were viewed and most were attributed as “Other Native Non Woody”, “Water”, or not mapped.

DCCEEW (2019) appears to base vegetation cover on aerial imagery from approximately 2014. This is around the time when site remediation occurred, and shrubby regrowth vegetation was removed.

The HEVAE GDE mapping of *Sporobolus virginicus* Saltmarsh on the site appears to be inaccurately attributed to woody vegetation based on imagery from 2014. The vegetation that was mapped (likely consisting of *Acacia saligna*) was removed in approximately 2014 for site remediation and capping of contamination.

For this reason, as well as a lack of native saltmarsh species observed within the project area, it has been concluded that the project site does not contain *Sporobolus virginicus* Saltmarsh.

It is noted that very small amounts of saltmarsh plant species were observed growing on the disused concrete roadside sidewalk along Selwyn Street, including stunted *Casuarina glauca* (Swamp Oak), *Sarcocornia quinqueflora* (Samphire), exotic species *Juncus acutus* (Spiny Rush), and exotic species *Limonium hyblaeum* (Sicilian Sea Lavender) (Photograph 1). This very small occurrence of saltmarsh species is not mapped by HEVAE GDE mapping (DCCEEW 2025b).



Photograph 1: Isolated occurrence of Samphire, Spiny Rush and Swamp Oak on the roadside was not mapped due to small patch size and negligible vegetation integrity

3.2.2. Vegetation Zone 1 – Site remediation infrastructure (VENM Cap)

The site remediation infrastructure makes up the majority of land within the project site (approximately 33.18 ha). The hardstand substrate is designed to minimise infiltration of underlying contaminated soils. The substrate consists of low permeability capping material with an overlay of crusher dust (i.e. fine gravel <5 mm). Site remediation infrastructure is managed in accordance with a notice issued by the NSW EPA under section 28 of the *Contaminated Land Management Act 1997*. Routine management of this area includes removal of trees and shrubs to maintain integrity of remediation infrastructure.

The site remediation infrastructure contains a high proportion of bare ground, with groundcover vegetation including exotic grasses *Melinis repens* (Red Natal Grass) and *Chloris gayana* (Rhodes Grass) and also includes sparse occurrences of *Casuarina glauca* (Swamp Oak) seedlings/saplings, *Chrysanthemoides monilifera* subsp. *rotundata* (Bitou Bush), *Acacia saligna* (Golden Wreath Wattle), *Acacia longifolia* (Sydney Golden Wattle) and *Cynodon dactylon* (Couch) (Photograph 2; Photograph 3).

One vegetation integrity plot was undertaken in this vegetation zone however the lack of native species (n=3) meant that selection of best fit PCT could not be accurately undertaken as PCT selection relies on native species.

Due to the sparse presence of Swamp Oak in VZ-1, an assessment has been made to demonstrate that vegetation on the project site is not representative of Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions TEC (Section 3.3).

This vegetation zone is considered to contain negligible biodiversity value, as it does not contain significant native vegetation or habitat for threatened species.



Photograph 2: VENM site remediation infrastructure with exotic grass cover



Photograph 3: Site remediation infrastructure with crusher dust substrate and Swamp Oak removed as routine maintenance

3.2.3. Vegetation Zone 2 – Planted garden beds and lawns

The majority of established woody vegetation in the Project Area is made up of planted exotic trees in garden beds and landscaped lawns around buildings (approximately 2.02 ha) (Photograph 4). Plant species identified in this zone include *Platanus orientalis* (Oriental Plane), *Nerium oleander* (Oleander), *Jacaranda mimosifolia* (Blue Jacaranda), and few planted native species *Melaleuca viminalis* (Weeping Bottlebrush), *Melaleuca quinquenervia* (Broad-leaved Paperbark).

Naturalised exotic species are also present including *Acacia saligna* and *Chrysanthemoides monilifera* subsp. *rotundata*.

Land around buildings and garden beds consist of hardstand concrete roads and carparks. This vegetation zone does not contain significant native vegetation or habitat for threatened species such as hollow bearing trees.

Planted trees in this area predominantly consist of *Platanus orientalis* (Oriental Plane) and *Nerium oleander* (Oleander) and have an understorey of mown lawn.



Photograph 4: Example of planted garden vegetation around buildings and proposed to be removed.

3.2.4. Vegetation Zone 3 – Planted native parkland

This zone consists of scattered, or clusters of trees and exotic grassland and covers an area approximately 4.21 ha that is located outside of the proposed project area (Photograph 5). The tree species are predominantly native however the species assemblage is not representative of a naturally occurring plant community. Species include *Eucalyptus camaldulensis* (River Red Gum), *Syzygium paniculata* (Magenta Lilly Pilly), *Hymenosporum flavum* (Native Frangipani), *Casuarina glauca*, *Eucalyptus robusta* (Swamp Mahogany), *Brachychiton acerifolius* (Flame Tree), *Angophora costata* (Smooth-barked Apple), and *Melaleuca quinquenervia* (Broad-leaved Paperbark). Planted native trees include species that are not indigenous to the local area such as *Corymbia citriodora* (Lemon-scented Spotted Gum) and *Grevillea robusta* (Silky Oak).

The groundcover is dominated by exotic grasses *Megathyrsus maximus* (Guinea Grass) and *Ehrharta erecta* (Panic Veldtgrass).

This area is partially mapped as PCT 4020 in the NSW SVTM (Figure 7), and one vegetation integrity plot was undertaken to verify the identification of this PCT. Floristic plot data is provided in Appendix A and functional plot data is provided in Appendix B. Although it was determined that no PCT matches this zone due to the high number of planted tree species, vegetation plot data suggests that PCT 4006 (Northern Paperbark-Swamp Mahogany Saw-sedge Forest) is the 'best fit'. Details of plant community type selection for this vegetation zone is provided in Section 3.6.

No impacts are proposed to this vegetation zone; however, it is noted that this area is managed as site remediation infrastructure and tree removal may be undertaken if deemed necessary for maintenance of capping infrastructure. This vegetation zone does not contain significant native vegetation or

habitat for threatened species such as hollow bearing trees. It is highly unlikely that the proposed development would result in indirect impacts to any biodiversity values present in this zone. For example, foraging resources for nectivorous birds would not be affected by the proposed development. Development of the adjacent project area is unlikely to significantly alter behavior of highly mobile threatened fauna species, should any ever be actually present.



Photograph 5: Planted native parkland vegetation.

3.2.5. Vegetation Zone 4 – Planted Fig trees

This vegetation zone occurs primarily along the south-western boundary of the lot along Industrial Drive covering approximately 0.90 ha.

The most conspicuous aspects of this zone are the *Ficus macrophylla* (Moreton Bay Fig) trees, and the numerous large *Ficus microcarpa* (Small Fruited Fig) trees which were planted along Industrial Drive around 1974 (Photograph 6; Photograph 7).

The garden beds below the canopy are not regularly maintained and numerous exotic species have become established including *Cinnamomum camphora* (Camphor Laurel), *Tecoma stans* (Yellow Bells), *Schefflera actinophylla* (Umbrella Tree), *Ochna serrulata* (Ochna), *Melia azedarach* (White Cedar), *Celtis sinensis* (Chinese Hackberry), *Archontophoenix cunninghamiana* (Bangalow Palm) and *Asparagus africanus* (Climbing Asparagus). The groundcover is sparse due to high leaf litter of the *Ficus* species, however there is high cover of *Nephrolepis cordifolia* (Fishbone Fern) and *Megathyrsus maximus* (Guinea Grass).

No impacts are proposed to this vegetation zone. This vegetation zone does not contain significant native vegetation or habitat for threatened species such as hollow bearing trees. It is highly unlikely that the proposed development would result in indirect impacts to any biodiversity values present in this zone. For example, foraging resources for nectivorous birds would not be affected by the proposed development. Development of the adjacent project area is unlikely to significantly alter

behavior of highly mobile threatened fauna species that may be present. The vegetation is immediately adjacent to a busy road and so is already subject to noise and light disturbance.



Photograph 6: Planted Fig trees lacking native understorey vegetation.



Photograph 7: Planted Fig trees with exotic species in the understorey.

3.2.6. Vegetation Zone 5 - Unmanaged exotic forest

This vegetation zone occurs primarily along the north-western boundary of the lot along Industrial Drive covering approximately 0.09 ha (Photograph 8). Historical aerial imagery suggests that the vegetation in this zone became established sometime prior to 1993.

The vegetation is predominantly made up of woody weeds including *Tecoma stans*, *Acacia saligna*, *Ricinus communis* (Castor Oil Plant), *Lantana camara* (Lantana). The exotic vine *Anredera cordifolia* (Madeira Vine) has smothered the vegetation in some areas. *Corymbia citriodora* is present as a limited number of individuals along the Industrial Drive roadside and as emergent above the exotic shrubs.

No disturbance is proposed to this vegetation zone. This vegetation zone does not contain significant native vegetation or habitat for threatened species such as hollow bearing trees. It is highly unlikely that the proposed development would result in indirect impacts to any biodiversity values present in this zone. For example, foraging resources for nectivorous birds would not be affected by the proposed development. Development of the adjacent project area is unlikely to significantly alter behavior of highly mobile threatened fauna species that may be present.



Photograph 8: Unmanaged exotic forest

3.3. Identification of an ecological community

Sparse presence of Swamp Oak in VZ-1 requires further assessment to determine if this occurrence is representative of the Swamp Oak Floodplain Forest which is listed as an Endangered Ecological Community under the NSW BC Act.

Section 1.6 of the BC Act defines 'ecological community' as *"an assemblage of species occupying a particular area"*. Section 4 of the *Guidelines for interpreting listing criteria for species, populations and ecological communities under the NSW BC Act 2016* (TSSC 2018) provides further details in relation to what constitutes an 'assemblage', where it states:

"an important aspect of co-occurrence [central to the existence of an assemblage] is the notion that a common, albeit variable, group of species occur within the distribution of a community.... The occurrence of one or two dominant species of itself, is not evidence of the existence of an ecological community".

This suggests that presence of Swamp Oak with sparse occurrence of Couch, does not constitute an ecological community, therefore is not representative of Swamp Oak Floodplain Forest TEC.

Section 4.1.3 of TSSC (2018) also provides further details regarding the meaning of 'a particular area' where it states, *"the natural habitat in which the assemblage of species occurs or has historically occurred and is capable of recurring if measures are taken to restore or allow the habitat to recover"*.

Site remediation infrastructure located within the project area is managed in accordance with a notice issued by the NSW EPA under section 28 of the *NSW Contaminated Land Management Act 1997*, which involves removal of trees and shrubs to ensure integrity of remediation infrastructure.

In recognition of the legal requirement to manage and ensure the integrity of site remediation infrastructure, the site is not capable of maintaining conditions in which a vegetation community is allowed to become established.

3.3.1. Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered Ecological Community, BC Act).

As demonstrated in Section 3.3, the vegetation on site does not qualify as an ecological community in accordance with the guidelines provided by TSSC (2008). To further demonstrate that the vegetation does not conform to the Swamp Oak Floodplain Forest TEC, an assessment has been made against the Final Determination for this community (DEH 2011) and the "Identification Guidelines for Swamp Oak Floodplain Forest" (DECC 2007).

There are no indications of minimum condition thresholds for this community in the Final Determination other than the following excerpt:

"There have also been anecdotal reports of recruitment by Casuarina glauca in pastures during extended dry periods, though not necessarily by other components of the community."

It is assumed that this description refers to an environment with an intact soil profile and natural flooding regime, where the community would be allowed to continue to regenerate and become established. This differs from the colonising vegetation on hardstand remediation infrastructure as it occurs on an engineered substrate designed to minimise infiltration of underlying contaminated soils. Although there is a low possibility of flooding on the site (<1% chance annually) (CoN 2025) the surrounding landscape is dominated by industrial and residential land uses where drainage is highly modified to prevent and limit impacts of flooding. The low flooding occurrence on the site in combination with the artificial soil profile is highly unlikely to support Swamp Oak Floodplain Forest

beyond the sparse presence of Swamp Oak saplings (notwithstanding the capping management which requires that trees and shrubs are routinely removed).

An additional assessment against the “identification guidelines for Swamp Oak Floodplain Forest” (DECC 2007) was undertaken below, which shows the vegetation on site does not conform with the TEC, despite containing sparse Swamp Oak.

3.3.1.1. Identification Guidelines for Swamp Oak Floodplain Forest

The “identification guidelines for Swamp Oak Floodplain Forest” (DECC 2007) provides additional descriptions about the characteristic features of the TEC.

The guidelines provide the following variations of Swamp Oak Floodplain Forest:

1. Dense regrowth stand after disturbance with limited understorey;
2. Tree canopy intact with an understorey of introduced weed species and few natives due to disturbance;
3. Recolonised patches of Swamp Oak in areas that may not have previously supported the community due to changes in drainage regime; **(Potentially consistent with VZ-1, but deemed inconsistent due to lack of key indicators, lack of characteristic species, and unviability of community persistence);**
4. Tree canopy absent due to prior clearing, grazing or fire, occurrence of regrowth of native understorey species along with herbaceous and/or woody weeds.

The above variations are suggestive that the sparse presence of Swamp Oak may be indicative of the TEC, therefore further assessment against the guidelines indicators of the TEC, based on landscape position, soil, flooding and floristics was undertaken which demonstrate the site is not consistent with the TEC (Table 1; Table 2).

The characteristics of vegetation located within the project area is considered representative of only three out of five indicators for Swamp Oak Floodplain forest, as shown in Table 1, with two of those indicators being highly marginal and is therefore, not representative of TEC

Further, Table 2 shows that only two out of 46 indicator species were recorded in the project site (including Couch which is described as very common and widely cultivated (PlantNET 2025)). Further details of the assessment are provided in Table 1 and Table 2.

Table 1: Key indicators of Swamp Oak Floodplain Forest

Key indicator	Response
Is the site on the coastal floodplain of the NSW North Coast, Sydney Basin or South East Corner bioregion	Yes
Is the site associated with humic clay or sandy loams soils	No – VZ-1 is capped with low permeability capping material with an overlay of crusher dust
Is the site subject to waterlogging and/or below the highest flood level	Partially – The project area is not subject to waterlogging. The site is within the mapped flood prone area, however, it is outside of the 1% Annual Exceedance Probability (CoN 2025).
Is the site dominated by Swamp Oak or Swamp Paperbark?	No – Project Site is dominated by bare ground and exotic grasses such as <i>Melinis repens</i> (Red Natal Grass) and <i>Chloris gayana</i> (Rhodes Grass). Swamp Oak occurs as patchy colonization of saplings and seedlings which are periodically removed as part of remediation infrastructure maintenance.
Are any characteristic shrub and/or ground layer species present (see table)?	Yes – one out of 42 characteristic shrub and/or ground layer species are present on the Project Site (<i>Cynodon dactylon</i> (Couch)). The distribution of this species is described on PlantNET

Key indicator	Response
	(2025) as “Widespread and very common; widely cultivated as a lawn grass and for pasture.”
“If you answered yes to the above questions your site is likely to be Swamp Oak Floodplain Forest”	Answered yes to three out of five indicators. Not indicative of the TEC.

Table 2: Characteristic species associated with Swamp Oak Floodplain Forest TEC

Scientific name	Key indicator species	Recorded in VZ-3	Recorded in VZ-1
Tree Canopy Species (>6 m)			
<i>Alphitonia excelsa</i>	--	No	No
<i>Casuarina glauca</i>	Yes	Yes – Four planted Swamp Oak present. May be removed as part of capping maintenance.	Yes - recorded as sparse presence of small seedlings/saplings (0.25-2m).
<i>Cupaniopsis anacardioides</i>	--	No	No
<i>Lophostemon suaveolens</i>	--	No	No
<i>Melaleuca ericifolia</i>	Yes	No	No
<i>Melaleuca quinquenervia</i>	--	No	No
<i>Melaleuca styphelioides</i>	--	No	No
Small trees / Shrubs (1.5 – 6 m)			
<i>Acmena smithii</i>	--	No	No
<i>Callistemon salignus</i>	--	No	No
<i>Glochidion ferdinandi</i>	Yes	No	No
<i>Homalanthus populifolius</i>	--	No	No
<i>Myoporum acuminatum</i>	--	No	No
Groundcover species (0 – 1.5 m)			
<i>Alternanthera denticulata</i>	--	No	No
<i>Blechnum indicium</i>	--	No	No
<i>Centella asiatica</i>	Yes	No	No
<i>Commelina cyanea</i>	Yes	No	No
<i>Enydra fluctuans</i>	--	No	No
<i>Hypolepis muelleri</i>	--	No	No
<i>Lobelia aniceps</i>	--	No	No
<i>Persicaria decipiens</i>	--	No	No
<i>Persicaria strigosa</i>	--	No	No

Scientific name	Key indicator species	Recorded in VZ-3	Recorded in VZ-1
<i>Selliera radicans</i>	--	No	No
<i>Viola banksii</i>	--	No	No
<i>Baumea juncea</i>	--	No	No
<i>Carex appressa</i>	Yes	No	No
<i>Cynodon dactylon</i>	Yes	No	Yes - occurs as sparse but widespread groundcover. PlantNET (2025) describes this species distribution as "Widespread and very common; widely cultivated as a lawn grass and for pasture."
<i>Crinum pedunculatum</i>	--	No	No
<i>Dianella caerulea</i>	--	No	No
<i>Entolasia marginata</i>	--	No	No
<i>Gahnia clarkei</i>	--	No	No
<i>Imperata cylindrica</i>	--	No	No
<i>Isolepis inundata</i>	--	No	No
<i>Juncus kraussii</i>	Yes	No	No
<i>Juncus planifolius</i>	--	No	No
<i>Juncus usitatus</i>	--	No	No
<i>Lomandra longifolia</i>	--	No	No
<i>Maundia triglochinoides</i>	--	No	No
<i>Oplismenus imbecillis</i>	--	No	No
<i>Phragmites australis</i>	Yes	No	No
<i>Parsonsia straminea</i>	Yes	No	No
<i>Stephania japonica</i>	--	No	No
<i>Flagellaria indica</i>	--	No	No
Total count	42	1	2

The above review of DECC (2007) demonstrates that the vegetation within VZ-1 is not a consistent match for the Swamp Oak Floodplain Forest TEC. Further, the highly transformed soil profile consisting of low permeability capping material with an overlay of VENM crusher dust is not consistent with humic clay or sandy loams soils associated with the TEC.

3.3.2. Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (Endangered Ecological Community, EPBC Act).

Floristic data collected in VZ-1 (Plot 1) shows that the groundcover contains 99% non-native species and does not meet the minimum condition threshold of less than 80% non-native understorey species.

Plot 2 (undertaken in VZ-3) found that the groundcover contains 83% non-native species and does not meet the minimum condition threshold of less than 80% non-native understorey species.

Additionally, the colonising vegetation in VZ-1 does not meet the key diagnostic characteristics of the EPBC Act listed TEC. The canopy within VZ-1 zone is absent and *Casuarina glauca* is only present as saplings and seedlings sparsely colonise the site remediation infrastructure. Therefore, it does not meet the requirement to have “an open woodland, woodland, forest, or closed forest structure, with a tree canopy that has a total crown cover of at least 10%”.

An EPBC Act referral would not be required for impacts to this vegetation as it does not meet the condition threshold for the Coastal Swamp Oak Forest TEC.

3.4. Selection of Plant Community Type

For the purpose of identifying potential threatened entity associations, selection of “best fit” PCT was undertaken for VZ-3. The PCT selection process was not applied to other vegetation zones as there were insufficient levels of native plant species diversity, which prevented comparison with naturally occurring communities. The process and results for the selection of PCTs is outlined below.

3.4.1. Vegetation Zone 3 - Planted native parkland

Although no PCT was found to be a match, PCT 4006 (Northern Paperbark-Swamp Mahogany Saw-sedge Forest) was selected as the best fit based on floristic data collected in Plot 1 (Appendix A).

The PCT selection process included the following steps:

- Download “Export Bulk Data” from NSW BioNet Vegetation Classification
- Filter Authority column to “Eastern NSW PCT Classification”
- Filter IBRA Subregion column to “Hunter”
- Filter Tree Growth Form Group Species column to *Casuarina glauca* (33 results)
- Filter Tree Growth Form Group Species column to *Brachychiton acerifolius* (5 results)
- Filter Tree Growth Form Group Species column to *Eucalyptus robusta* (no change)
- Filter Tree Growth Form Group Species column to *Angophora costata* (no change)
- Filter Tree Growth Form Group Species column to *Corymbia maculata* (no change)
- Filter Tree Growth Form Group Species column to *Grevillea robusta* (3 results).

Justification for selection between the remaining PCTs is provided in Table 3.

Table 3: Justification for PCT selection

PCT Name	PCT Description (excerpts)	Justification
3171 - Northern Lowland Viney Wet Forest	The most frequent five species however, which collectively occur often in various combinations and usually with no single species dominant, include occasionally <i>Eucalyptus saligna</i> , <i>Eucalyptus microcorys</i> , <i>Corymbia intermedia</i> and <i>Lophostemon confertus</i> ; and rarely <i>Eucalyptus grandis</i> . At low elevations of up to 80 metres asl	Excluded - Does not list <i>C. glauca</i> or <i>E. robusta</i> as a frequent canopy species. Occurs up to 80 m ASL.
4006 - Northern Paperbark-Swamp Mahogany Saw-sedge Forest	The tree canopy very frequently includes both <i>Melaleuca quinquenervia</i> and <i>Eucalyptus robusta</i> , rarely with other eucalypts. The mid-stratum is otherwise sparse, however often layered with small trees that very frequently includes <i>Glochidion ferdinandi</i> , occasionally <i>Livistona australis</i> and <i>Casuarina glauca</i> , and rarely <i>Melaleuca linariifolia</i> . Almost always below 20 metres asl	Best fit - Canopy very frequently includes <i>Eucalyptus robusta</i> . Suggests <i>C. glauca</i> occurs occasionally. Low elevation is consistent with the Project Area.
4044 - Northern Creekflat Eucalypt-Paperbark Mesic Swamp Forest	Species very frequently include a patchy cover of <i>Melaleuca linariifolia</i> , commonly <i>Callistemon salignus</i> , occasionally <i>Melaleuca styphelioides</i> and rarely <i>Casuarina glauca</i> . It occurs below 90 metres asl, however unlike other coastal swamp forests it is distributed most extensively, however not exclusively, in the coastal lowlands more than 10 kilometres from the coastline. It is almost always exclusively dominated by <i>Eucalyptus robusta</i> .	Excluded - Description states that this community rarely contains <i>C. glauca</i> and is almost exclusively dominated by <i>E. robusta</i> . Occurs over 10 km from coastline, and up to 90 m ASL.

It is noted that *Grevillea robusta* does not naturally occur south of the Coffs Harbour region. However, this species was recorded within the vegetation integrity plot and was used to filter PCTs due to the lack of other native trees within the vegetation integrity plot. Due to the low number of native species recorded, this approach is considered acceptable in identifying a 'best fit' PCT, as it indicates the site conditions are capable of supporting this species assemblage.

It is also noted that *Brachychiton acerifolius*, *Eucalyptus robusta*, *Angophora costata* and *Corymbia maculata* were not recorded within the vegetation integrity plot, but were observed directly adjacent, and were used for the PCT selection.

3.4.2. Non-native vegetation communities

VZ-1 (site remediation infrastructure) contains very low levels of native plant species diversity (n=3) and native plant cover (total of 6.3%) and therefore selection of PCT based on species composition could not be accurately undertaken based on floristic data collected in Plot 2 (Appendix A).

3.5. Habitat Survey

The habitat survey indicated little in the way of intact native vegetation is present within the project area and as such, very little potential habitat for any threatened flora and fauna species to be present and use the land for significant biological processes. There are lines of trees present around the buildings retained on the south end of the project area that included some fig trees, bottlebrushes and paperbarks that were planted to create gardens. No hollows or stick nests were observed in these trees. Details of habitat assessments for GGBF and microchiropteran bats are provided below.

3.5.1. Green and Golden Bell Frog habitat assessment

Only three potential Green and Golden Bell Frog breeding sites were located on site; specifically a decommissioned water treatment plant (Photograph 9), a drainage pit associated with that plant (Photograph 9) and ponding under a substation (Photograph 10). The locations of these points are provided in Figure 8. These sites all held water after the heavy rainfall event prior to the first survey

and were large enough to potentially used as breeding habitat by the species, although they represented only marginal habitat. The main tank of the treatment plant was highly elevated (>3 m walls), and the site had a strong smell of chemicals that may have rendered the water unsuitable for tadpoles. The smaller pit was only around 2 m x 2 m and had steep flat sides and looked to only hold shallow (<30 cm) water. The ponding under the substation was no more than 4 m x 4 m and dried up by the 5 February and so is realistically too ephemeral for use. A drainage area adjacent to a culvert present on the northeast boundary was also noted to contain water (Photograph 10), but this area was clearly tidally flooded and contained mangroves as well as numerous estuarine fish and no emergent vegetation. As the area is saline, it is not suitable breeding habitat.

The main capped area was criss-crossed and surrounded by drainage channels (Photograph 11), but contained no retained water at any time, even after the heavy rainfall event just prior to the first survey. Therefore, it is not breeding habitat for the Green and Golden Bell Frog. No other ponding or stream habitat was seen anywhere on the project area.



Photograph 9: Treatment plant (left) and pool under substation (right).



Photograph 10: Pit adjacent to treatment plant (left) and saline culvert with mangroves (right).



Photograph 11: Examples of two drainage lines running in and around the project area.

3.5.2. Microchiropteran bat habitat assessment

3.5.2.1. Roll Shop

The Roll Shop has been assessed as unlikely to constitute suitable microbat habitat. However, due to the large size of the structure and inaccessible spaces, presence of microbats cannot be ruled out entirely. No bat calls or chatter were identified on the Echo Meter during the site inspection. No signs of bats such as urine stains, droppings, remains and bat fly castings were detected.

The majority of the Roll Shop consists of a large open space with disused industrial equipment such as an overhead gantry crane. The structure consists of a single layer of sheet metal, with the main building lacking an internal cavity on the rooves and walls (Photograph 12 - Photograph 14). The Roll Shop has previously been used for storing construction materials and supporting the site remediation works.

The Roll Shop through its main space looks to have maximised natural light and open space as part of its design. The eastern side of the Roll Shop does contain darkened rooms with disused cabinets, equipment, ducts and crevices which represent potential, low quality habitat for microbat species. There is also an underground confined space (signage indicating confined space registered number 4 - basement of 11kv substation) which was not entered due to safety restrictions, however, represents potential microbat habitat. This confined space is accessible through the building via a hatchway and also has direct openings via small ventilation ducts (approximately 12 x 45 cm) (Photograph 15 - Photograph 20). These are all narrow entrances and likely represent very challenging access points for bats to use given that bats are known to be sensitive to entrances of 125 mm in width during mine gating studies (Slade and Law 2008).

One exotic species of bird, Rock Dove (*Columba livia*), was observed to be roosting within the Roll Shop during the inspection. No microbat species were observed during the emergence survey, either visually or on the thermal camera. Along with the absence of any signs of roosting bats, this further indicates that the Roll Shop is not being used as a roost site by microbats in any significant way. Infra-red video footage recorded during the emergence survey has been retained by ELA and is available to be reviewed.

Demolition of the Roll Shop is not proposed, and any potential habitat would likely remain intact (excluding items that may be removed such as cupboards and disused equipment). If present, any potential impacts to microbat species due to increased use of the Roll Shop, can be managed with appropriate mitigation measures. Out of an abundance of precaution, it is recommended that an Unexpected Finds Protocol is prepared that includes an emergence survey undertaken prior to any major structural works to record if any individual bats could be using the Roll Shop at the time and includes specific actions to manage and mitigate any prescribed impacts that may occur if a bat/s is/are found to be present.



Photograph 12: Eastern exterior of the Roll Shop



Photograph 13: Emergence survey of the Roll Shop



Photograph 14: Interior of Roll Shop



Photograph 15: Exterior of Roll Shop with entrance to confined space indicated by yellow circle.



Photograph 16: Entrance to confined space indicated by yellow circle in Photograph 14.



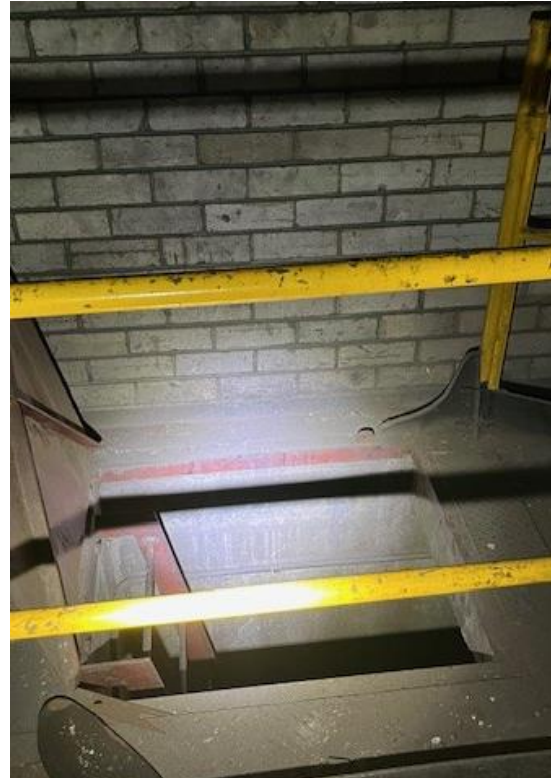
Photograph 17: The confined space via the entrances.



Photograph 18: The confined space via the entrances



Photograph 19: Ventilation duct within dark room



Photograph 20: Hatchway into confined space

3.5.2.2. *Bicycle Shed*

The Bicycle Shed is an open shed structure with a roof consisting of a single layer of sheet-metal and does not contain enclosed cavity spaces. There are very minor crevices between the roof and structural beams, however, the structure is not suspected to represent suitable habitat for microbats due to high light levels, exposure to the open outdoor environment, easy access for predators such as rats and lack of crevices suitable for roosting.

The Bicycle Shed is proposed to be removed to facilitate access between Selwyn Road and the proposed hardstand area and it is not anticipated that removal of the shed would place any fauna species at risk of injury or death.



Photograph 21: Bicycle Shed inspected for microbats and potential habitat

3.5.2.3. Southern *Myotis* potential habitat

According to the TBDC (DCCEEW 2025c), potential habitat for Southern *Myotis* includes waterbodies with permanent pools/stretches 3 m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200 m of the site.

There are two intertidal drainage lines on or within 200 m of the project site.

One unnamed intertidal concrete drain, approximately 80 square metres, is located in the north-west portion of the project area. There is no significant woody vegetation or potential roosting structures within 200 m of this drain (Figure 8). Woody vegetation around this drain consists predominantly of *Acacia saligna* and there are two small mangrove stems within the drain (Photograph 22).

There is a second intertidal concrete drain, outside of the south-east corner of the project area, along Selwyn St. There is one building (Office building) within 200 m of this drainage channel (Figure 8).

There are no proposed modifications to the Office building. Vegetation around this building consists predominantly of small shrubs including *Acacia saligna* which may be removed as part of regular maintenance. If this species does utilise the concrete drainage channels for foraging, there are no anticipated direct, indirect impacts or prescribed impacts to this species.



Photograph 22: Concrete drain in the north-west portion of the project site



Photograph 23: Area between the Office building and the south-east drain

3.6. Green and Golden Bell Frog survey

No Green and Golden Bell Frogs were seen or located through the surveys, determining the species to be absent from the project area. Furthermore, the available breeding habitat is likely unsuitable for any use by the species but was surveyed as a precaution. No frogs of any species were detected anywhere on the project area. No suitable potential breeding sites were evident within 200 m of the boundary of the project area that Green and Golden Bell Frogs might use for breeding and then migrate from post-breeding to use the project area as non-breeding habitat.



Figure 8: Boundary of project area, inspection points, potential GGBF habitat, potential Southern Myotis habitat and SVTM mapping

3.7. Assessment of potential prescribed impacts

The Roll Shop has been assessed as unlikely to constitute suitable microbat habitat. No evidence of microbat occupation was observed within the building, and no microbats were observed during emergence surveys. However, due to the large size of the structure and inaccessible spaces, presence of microbats cannot be ruled out entirely. In accordance with the BAM, impacts to threatened entities associated with human-made structures are considered to be a prescribed impact which are managed and minimised through the implementation of appropriate mitigation measures.

In this case, any residual impacts can be avoided entirely by the implementation of suitable mitigation measures.

Cranes are proposed to be operated on the site. The project site is in close proximity to the Kooragang and Carrington wharves which frequently have bulk carrier ships moving around (around 40m above water level), existing cranes in the coal loading facilities (a minimum of eight in Carrington) and large silos. The risk of birds/bats striking a crane in the development site would not be a significant increase over any existing risk of strike. It is anticipated that birds/bats will be able to manoeuvre around any structures without negative consequences to their populations.

Additionally, there are no native vegetation communities within the project area, and therefore no native vegetation communities are proposed to be impacted, and a species polygon cannot be generated for microbat species that may inhabit the buildings, and under the BAM, credits would not require offsetting for the potential presence of microbats within buildings.

For this reason, a BDAR is not considered necessary to address potential prescribed impacts to microbats, and any risk to microbats associated with works undertaken on buildings can be managed with appropriate mitigation measures.

Further details on the assessment of prescribed impacts are outlined in Table 4 below.

Table 4: Identified prescribed impacts

Feature	Present	Description of feature characteristics and location
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐ Yes ☒ No	Not applicable - there are no karst, caves, crevices, cliffs, rocks and other geological features of significance identified within the project land.
Human-made structures	☒ Yes ☐ No	Describe the nature, extent and duration of short-term and long-term impacts The Roll Shop building is proposed to be repurposed to support operations by providing all weather storage. No evidence of microbat occupation was observed within the building, no microbats were observed during emergence surveys and microbats are not currently suspected to utilise the building. However, due to the large size of the structure and inaccessible spaces, presence of microbats cannot be ruled out entirely. Repurposing the Roll Shop will likely involve removal and disposal of disused industrial equipment and waste, and refurbishment and repair of the building which is required due to disuse and vandalism. Works associated with repurposing the building is estimated to take 6-12 months to complete. Once complete, the Roll Shop will be utilised primarily for storage for the life of the project. Potential impacts include: • Direct disturbance of microbats (the presence of workers close to habitat) • Indirect disturbance through impacts such as noise, vibration, lighting, microclimate and air-quality impacts

Feature	Present	Description of feature characteristics and location
		Loss or modification of potential roosting habitat (when structures are removed or roosts within them are no longer accessible). Cranes are proposed to be operated on the site. The project site is in close proximity to the Kooragang and Carrington wharves which frequently have bulk carrier ships moving around (around 40m above water level), existing cranes in the coal loading facilities (a minimum of eight in Carrington) and large silos. The risk of birds/bats striking a crane in the development site would not be a significant increase over any existing risk of strike. It is anticipated that birds/bats will be able to manoeuvre around any structures without negative consequences to their populations.
		Predict the consequences of impacts on threatened entities The consequences to threatened entities (specifically threatened microbat species) are considered to be negligible, due to the low suitability of the potential habitat within the Roll Shop, minimal changes to the structure and absence of microbat occupancy detected to date. To reduce any further consequences, an unexpected finds protocol will be employed with mitigation measures, which would be activated in the instances of threatened microbat activity being detected prior to works being undertaken.
		Justify predictions of impacts with relevant literature and other published sources of information, or advice from experts. The Hunter Water Balickera Remediation Project recently demonstrated that a highly significant threatened microbat roost site can be appropriately managed to avoid significant impacts to threatened entities. Unlike Balickera Remediation Project, the proposed development involves no removal or disturbance to native plant communities, and the Roll Shop building is not suspected to contain significant roosting or breeding habitat. However, Balickera Remediation Project demonstrates that mitigation measures (such as emergence surveys, bat box installation and exclusion) can be employed to successfully address prescribed impacts to microbats and remove any residual impacts. Similar mitigation measures would be included in the unexpected finds protocol for the proposed development. Microbat management guidelines have been prepared by Transport for NSW (2023). Transport for NSW (2023) frequently undertakes maintenance works on structures that contain known threatened microbat habitat. The guidelines provide a framework to manage potential impacts of works on microbats. A risk-based approach has been applied to support decision-making about whether microbats are likely to be impacted by an activity and who should be involved in developing the management strategy. Further details on proposed mitigation and management recommendations are provided in Section 3.8.
Non-native vegetation	☒ Yes ☐ No	Assessment of the impacts of the proposal on the habitat of threatened entities associated with human-made structures or non-native vegetation must: Describe the nature, extent and duration of short-term and long-term impacts Removal of planted, regrowth and exotic vegetation within Vegetation Zone 2. Planted trees in this area predominantly consist of <i>Platanus orientalis</i> (Oriental Plane) and <i>Nerium oleander</i> (Oleander) and have an understorey of mown lawn. This would result in a very minor, permanent decrease in potential foraging resources for species such as Grey-headed Flying Fox. The Grey-headed Flying-fox is highly mobile and utilises a range of foraging resources within 20 km of camps. The potential foraging habitat in the subject land is not considered to be significant and do not represent any identified important feed tree species (such as winter-flowering Eucalypt species) and is a very minor component of a wider network of resources that extend beyond the project area. Predict the consequences of impacts on threatened entities identified

Feature	Present	Description of feature characteristics and location
		Consequences are considered to be negligible due to the low quality and very small extent of this potential foraging resources.
Habitat connectivity	☐ Yes ☒ No	Not applicable - the subject land does not provide connectivity to patches of native vegetation or habitat.
Waterbodies, water quality and hydrological processes	☐ Yes ☐ No	There are two waterbodies within 200 m of the project area footprint which are concrete drainage channels which are connected to the Hunter River. Southern Myotis are known to occur on the Hunter River, and it is reasonable to assume that this species may forage over these waterbodies occasionally. There are no native plant communities within the 200 m buffer of the drainage channels, and therefore no species polygon is able to be mapped, and no credits would be generated for Southern Myotis. There is one building within this radius, however the building appears to be in good condition with very little habitat available such as crevices or openings into the building structure. This structure, and the surrounding planted garden is not considered to provide any roosting or foraging habitat for Southern Myotis. No impacts of changes to this building are proposed. No impacts to water quality and hydrological processes are anticipated to occur as a result of the proposed development.
Wind turbine strikes (wind farm development only)	☐ Yes ☒ No	Not applicable - the proposed subdivision is not a wind farm development.
Vehicle strikes	☐ Yes ☒ No	Not applicable – the subject land is located in Mayfield North adjacent to Industrial Drive which is frequently subjected to high levels of traffic. Increased levels of traffic associated with the proposed development would be insignificant compared to existing levels.

3.8. Mitigation and management of potential prescribed impacts

The following mitigation and management assessment pathway demonstrates the pathway undertaken to date and provides guidance for future pre-works surveys (Figure 9). The flowchart has been adapted from Transport for NSW (2023).

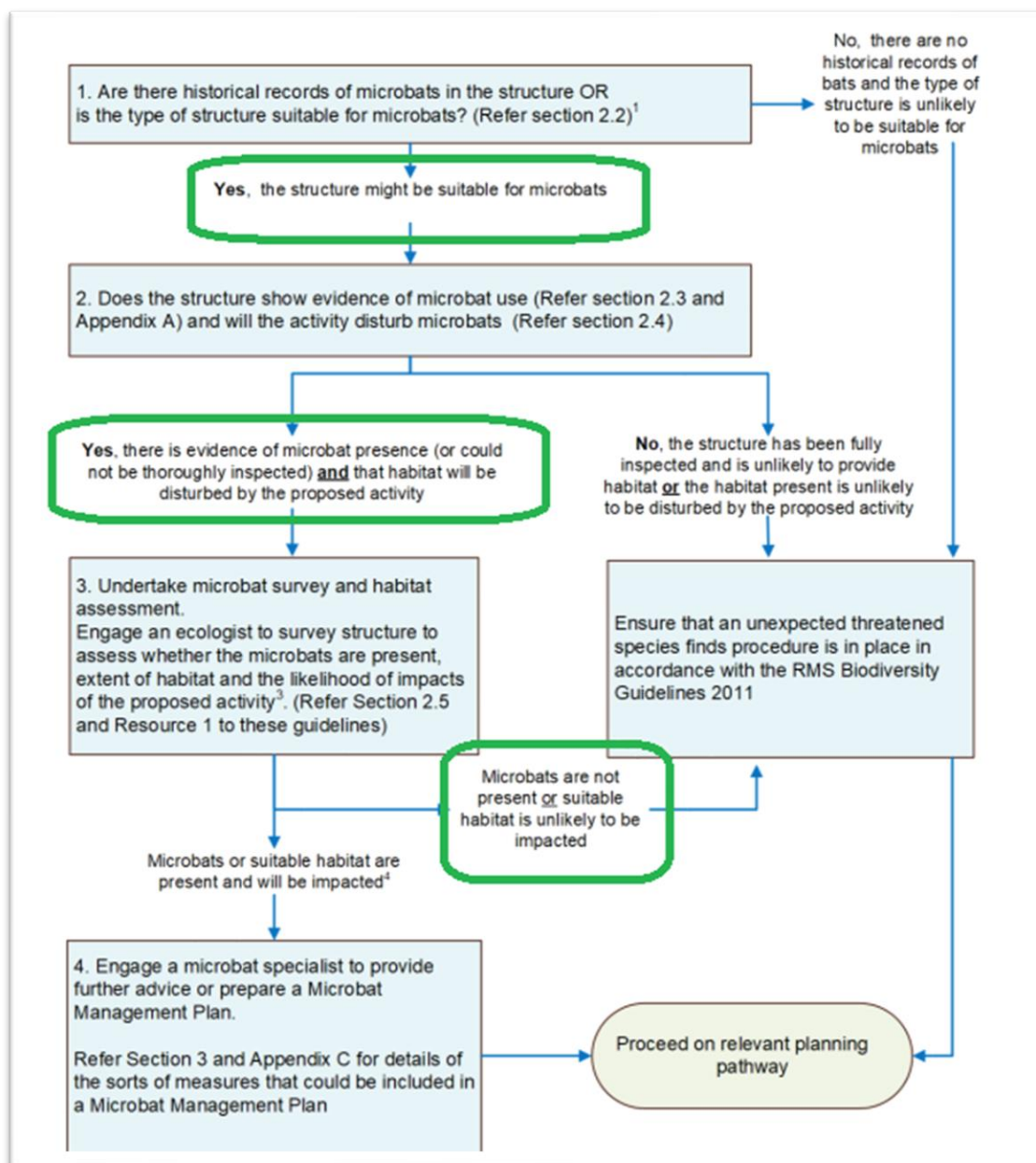


Figure 9: Mitigation and management assessment flowchart from Transport for NSW (2023).

3.8.1. Pre-works microbat survey and habitat assessment

The following pre-works microbat survey methods are taken from Transport for NSW (2023). An ecologist is expected to undertake surveys using the most appropriate survey method for the site to ensure the survey is comprehensive. This may include:

- A thorough inspection of the structure including an assessment of habitat (may include use of thermal imaging camera if available)
- Monitoring for microbat calls using acoustic detectors (such as Songmeter or Anabat), which may assist in the assessment/identification of the species present.
- Undertaking fly-out (emergence) survey, typically using a thermal camera (observation when microbats exit the roost at dusk)

- Consideration of the likely impact (and proposed timing) of the activity on any microbats.

3.8.2. Unexpected threatened species finds procedure

In the event of an unexpected discovery of a threatened species all works in the associated location must stop, the relevant Government agencies must be notified, and works cannot recommence without approval from the Planning Secretary.

The following procedure table has been adapted from the “Unexpected Threatened Species and Threatened Ecological Communities Finds Protocol - M1 Pacific Motorway Extension to Raymond Terrace SSI 7319” (Transport for NSW 2023) (Table 5).

Table 5: Overview of unexpected threatened species finds procedure adapted from Transport for NSW (2023).

Step	Details
--	Unexpected find of threatened species.
1.	Stop work, protect threatened species and inform all relevant project staff and Government agencies.
2.	Engage Ecologist to undertake assessment and provide recommendations for management, consult with Government agencies to seek concurrence on management measures.
3.	Can impacts be avoided? Yes – Undertake avoidance measures and resume work. No – Go to Step 4.
4.	Consult with relevant agencies, prepare microbat management plan, submit microbat management plan for approval.
5.	Review CEMP and approval conditions.
6.	Resume work with implementation of management measures.
7.	Ongoing mitigation measures and monitoring, if required.

3.8.3. Mitigation measures

If the survey determines that microbats are not present or unlikely to be impacted, then no further consideration of microbats is recommended. The details of this investigation and outcome of this process should be outlined in the assessment documentation.

If the survey determines that microbats are present and are likely to be impacted, then the unexpected threatened species finds procedure would be activated, and a microbat management plan should be prepared by a suitably qualified microbat specialist.

Depending on the specific circumstances in the event of an unexpected find, appropriate mitigation measures must be employed. An overview of potential mitigation measures is provided in Table 6, which have been adapted from Transport for NSW (2023).

Table 6: Overview of potential mitigation measures

Mitigation measure	Description	Timing and duration	Considerations
Southern Myotis: Seasonal restrictions	Where Southern Myotis is present, activities should not occur that will disturb habitat during the breeding period from October to April without additional measures being taken to reduce impacts (including an MMP).	While works are being done on structure that impact Southern Myotis.	Where 10 or more Southern Myotis are present OR there is any confirmed breeding

Mitigation measure	Description	Timing and duration	Considerations
Southern Myotis: Hours of work restrictions	Adult Southern Myotis will leave the roost at dusk to forage, flying in and out of roosts all night. Activities undertaken at night may reduce the impacts on microbats present in the structure, as individuals can relocate to roosts that are less disturbed. This measure is not appropriate where juvenile Myotis are present	While works are being done on structures that impact Southern Myotis.	Where 10 or more Southern Myotis are roosting (and not breeding) in the structure.
Bent-winged Bats: Hours of work restrictions	Where Bent-winged bats are present, this restriction would only apply from March to October because both Bent-winged bat species are likely to leave the structures for their maternity caves from October to February each year.	While works are being done between March and October on structures that impact Bent-winged bats.	Where 10 or more Bent-winged bats are roosting in the structure noting a small number of male bats may still be present in the structure during the breeding season
Project staging	Careful staging of project activities can minimise impacts to target microbats and their habitat particularly where indirect impacts are anticipated. This measure requires careful monitoring to ensure that unintended impacts to threatened microbat species are not occurring.	Throughout the project	When impacts to target microbats are possible.
Pre-construction microbat survey	Undertaking microbat surveys to determine if target microbats are present prior to the activity commencing can allow application of mitigation measures to avoid and minimise impacts.	Same timing as pre-clearing surveys.	All projects where target microbats or suitable habitat is present.
Site induction	This involves training construction personnel on the microbat mitigation measures, including their responsibilities, how to identify microbats (e.g., signs), what to do if microbats are encountered within the work area (e.g., unexpected finds procedure) and personal safety practices when working around microbats.	Induction package prepared prior to works commencing.	Microbat presence confirmed or anticipated within a structure
Daily inspection of structures	Work areas should be inspected everyday where microbat habitat is present, but not in active use or where construction activities are being undertaken in close proximity to known habitat. This would ensure that microbats are not present in the structure before starting the activity.	Prior to commencement of works every day for the duration of the project.	Microbat presence confirmed within a structure.
Microbat welfare	Where injured microbats are found during the activity, contact should be made with a suitably accredited wildlife care organisation such as WIRES. The contact details of the relevant organisation should be known by the site supervisor and ecologist. Injured animals should not be handled by construction staff.	Have contact details available prior to commencement of works (where microbats are present).	Microbats present or after unexpected finds.
Exclusion	Involves preventing microbats from returning to the structure by installing exclusion devices. This strategy is only	Outside of the breeding period for the species (for Myotis).	Where significant impact is otherwise expected to microbats in a structure.

Mitigation measure	Description	Timing and duration	Considerations
	suitable in certain situations and requires careful management and monitoring.		
Capture and removal	This involves capturing microbats in bat boxes installed near roost sites in order to move them to a new (safer) location nearby.	Outside of the breeding period for the species (for <i>Myotis</i>).	Where significant impact is otherwise expected to microbats in a structure.
Containment	This involves preventing bats from leaving a roost site during the day and is used where planned disturbance (usually noise) may cause microbats to abandon a roost during the day (which increases predation risk).	Outside of the breeding period for the species (for <i>Myotis</i>).	Can reduce ventilation or create hot/humid microclimate.
Supplementing habitat	This measure can be provided alongside exclusion measures and involves supplementing the habitat excluded or lost with artificial roost boxes installed on the structure or in the surrounding environment.	Prior to microbat exclusion or impact, until impacts to habitat have concluded.	When exclusion (above) is taking place or existing microbat habitat within a structure is being removed.
Creating habitat	Incorporating recesses and roughened surfaces within a structure can provide long-lasting habitat opportunities for microbats.	Considered during project design, implemented during construction.	When existing microbat habitat within a structure is being removed.
Noise minimisation	Efforts to reduce noise should be applied where noise levels are expected to significantly exceed what can be typically expected at a structure. This could include undertaking works at night (and outside the breeding period) or by installing measures to dampen noise	Prior to commencement of works if noise impacts are likely.	Work must stop if Microbats observed leaving roosts in large numbers in immediate response to the activity. Mitigation must then be reconsidered
Monitoring	Monitoring is a critical component of any MMP. Depending on the circumstances, monitoring can occur before, during and after disturbance, and include other populations / structures in the locality.	Project ecologist/microbat specialist to determine.	Whenever habitat in a structure is removed and new habitat is provided.

3.9. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

A list of identified MNES and whether they may be impacted is described in the likelihood of occurrence assessment in Appendix D.

It has been determined that no impacts are likely to occur to the MNES considered in the likelihood of occurrence assessment, however, out of an abundance of precaution the Assessment of Significance criteria have been applied to Grey-headed Flying-fox (*Pteropus poliocephalus*) as it is known to fly-over the site, may utilise highly marginal foraging habitat within the project site (VZ-2) and is likely to utilise the fig trees that are planted directly adjacent to the project site (VZ-4).

3.9.1. Significant Impact Criteria

3.9.1.1. Grey-headed Flying-fox (*Pteropus poliocephalus*)

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and Vulnerable under the BC Act. Grey-headed Flying Fox are typically medium to dark grey with many light-tipped hairs with fur extending to the feet. Its defining feature is an orange or russet-coloured collar which encircles the neck. This species occupies the coastal lowlands and slopes of south-eastern Australia from Bundaberg to Geelong and inland NSW to the tablelands and western slopes. The Grey-headed Flying-fox is a highly mobile, partially migratory species with a distribution that is highly varied between seasons and years. The Grey-headed Flying-fox forms part of one single, interbreeding population. The species breeds once a year between October and December (Department of Agriculture, Water and the Environment; DAWE 2021).

Grey-headed Flying-foxes typically roost in camps which are used as a daytime refuge. Camps are generally stable sites, however numbers and occupation can vary over time, depending on the availability of foraging resources within the locality (DAWE 2021).

This species primarily feeds on blossom and fruit in the canopy and will occasionally supplement this with leaves. This species tends to favour *Eucalyptus* sp., *Corymbia* sp., *Angophora* sp., *Melaleuca* sp., *Banksia* sp. and *Ficus* sp. and will migrate in response to flowering events and the availability of food. This species will forage between 20 km and 40 km in a feeding foray from a camp site, with most distances <20 km. Up to 20 km is considered the average foraging distance and has been used in this assessment (DAWE 2021).

Threats to the Grey-headed Flying-fox include loss of foraging and roosting habitat, competition with Black Flying-foxes, negative public attitude and conflict with humans, electrocution, entanglement in netting and on barbed-wire, climate change and disease (DAWE 2021).

There is suitable foraging habitat present within the Development site and no targeted survey was undertaken for this species, therefore a significant impact criteria assessment has been undertaken in Table 7 below.

Table 7: Significant impact criteria assessment for Grey-headed Flying-fox

Criterion	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility of the following:	
Lead to a long-term decrease in the size of an important population of a species	The project involves the proposed removal of low-quality potential foraging habitat for the species. The proposed works will not lead to a long-term decrease in the size of an important population of the species given that the potential foraging habitat proposed for removal is minimal and primarily consists of planted species that would not make up a significant part of this species diet including <i>Platanus orientalis</i> (Oriental Plane), <i>Nerium oleander</i> (Oleander), <i>Jacaranda mimosifolia</i> (Blue Jacaranda).
Reduce the area of occupancy of an important population	The project involves the proposed removal of potential low-quality foraging habitat for the species. While this work will reduce the area of low quality potential foraging resources, the minimal amount of clearing required will not reduce the area of occupancy for this highly mobile species.
Fragment an existing important population into two or more populations	Grey-headed Flying Foxes are a highly mobile species that forages throughout a wide variety of habitats as well as urban areas where feed resources are present. The project involves the removal of low-quality potential foraging habitat for the species and will not fragment an existing population of the species.
Adversely affect habitat critical to the survival of a species	The project involves the proposed removal of potential, low-quality foraging habitat for the species. Actions that would adversely affect habitat critical to the survival of the species includes loss of foraging habitat, disturbance to camps and impacts of climate

Criterion	Assessment
	change. Loss of foraging habitat is relevant to this proposal. The Grey-headed Flying-fox is highly mobile and utilises a range of foraging resources within 20 km of camps. The foraging habitat in the project site forms part of a wider network of resources that extend beyond the project area into the locality. The proposed works will not adversely affect habitat critical to the survival of a species
Disrupt the breeding cycle of an important population	No roosting habitat in the form of camps would be removed or disturbed for the Grey-headed Flying-fox.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project involves the proposed removal of potential, low-quality foraging habitat for the species. While the project will remove potential foraging habitat availability, the small scale of the impacts will not cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The major threats to the Grey-headed Flying-fox are related to vegetation clearance, camp disturbance, mortality in commercial fruit crops, heat stress, entanglement, climate change, bushfire, conflict with humans and electrocution. These threats are not associated with the increased presence of an invasive species. The proposed development is unlikely to result in invasive species becoming established in Grey-headed Flying-fox habitat.
Introduce disease that may cause the species to decline, or	The Grey-headed Flying-fox is susceptible to Lyssavirus. Increases of the Lyssavirus typically occurs when a population is undergoing stress. The project site would provide limited, low quality foraging habitat that would make up a mosaic of resources that would be utilised in the region. The habitat within the project site would not provide the primary foraging resource, nor does the project area contain known camps for this species. The removal of potential, low quality foraging habitat is unlikely to cause a level of distress such that the Grey-headed Flying-fox is likely to see increased disease and a decline.
Interfere substantially with the recovery of the species.	The proposed works are not located within a known area containing a breeding camp of the species and is located in an industrial area within the Port of Newcastle. The project area does not contain high quality foraging habitat and there are more intact and less disturbed high-quality habitats in urban areas, reserves and national parks within the region. The minimal area of potential habitat requiring removal is unlikely to interfere with the recovery of the species.
Conclusion	While the project is proposing the removal of low quality potential foraging habitat there is unlikely to be a significant impact to this species given the minimal amount of clearing required and low quality potential foraging habitat.

3.10. Summary and recommendations

The project area is a brownfield site and is considered to contain no significant biodiversity values. The project area does not contain any significant native vegetation and is located within a highly disturbed, fragmented urban and industrial landscape within the Port of Newcastle.

The project site is highly unlikely to contain threatened fauna species habitat. Targeted surveys for Green and Golden Bell Frog have confirmed the absence of this species, and detailed habitat assessments and a dusk emergence survey showed no evidence of microbat occupancy.

It has been determined that sparse presence of Swamp Oak on site remediation infrastructure (VZ-1) does not represent an ecological community, and therefore is not indicative of the Swamp Oak Floodplain Forest TEC. Assessment of the vegetation on site has been assessed against the Identification Guidelines for Swamp Oak Floodplain Forest which also concluded that the vegetation is not consistent with the TEC.

Further, due to vegetation removal requirements of the site remediation infrastructure, regeneration of an ecological community is not feasible.

VZ-3 (Planted native parkland) was determined to be a 'best fit' for PCT 4006. This zone is located outside of the project area but was included for assessment to identify potential indirect impacts. A list of threatened species associated with this PCT, and threatened species recorded within 5 km of the project area was used to undertake a likelihood of occurrence assessment, and no significant impacts were identified for any species.

Based on results of the likelihood of occurrence, no threatened species are likely to be impacted by the proposed development.

Due to the large size of the Roll Shop, presence of microbats could not be ruled out, even after an emergence survey did not record any exiting bats. However, in the unlikely event that threatened microbats are detected during pre-works surveys, any potential disturbance (prescribed impact) will be managed in accordance with an Unexpected Finds Protocol and appropriate mitigation measures.

Threatened avifauna and megabats may fly over or forage over the project site, however the proposed development will not significantly reduce possible foraging habitat in the locality as no disturbance to VZ-3 is proposed, and only low quality potential foraging resources are proposed to be removed from V2-2. The proposed development is not anticipated to result in significant changes to the behaviour of threatened species that may occur in the locality.

No MNES listed under the Commonwealth EPBC Act would be affected by the proposed development and a referral is not recommended for biodiversity matters.

A request for a BDAR Waiver is appropriate for the proposed development and may be prepared with the inclusion of the above information that demonstrates that the site has been historically cleared, is highly transformed, and does not contain significant biodiversity values for threatened species with no native plant community types present. Further, in the unlikely event that threatened microbats are detected within the Roll Shop during pre-works surveys, any potential disturbance is a prescribed impact and will be managed in accordance with appropriate unexpected finds mitigation measures.

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Appendix A Floristic Plot Data

Table 8: Floristic plot data

Species	Growth Form Group	Plot 1 (VZ-3)			Plot 2 (VZ-1)		
		Stratum	Cover	Abundance	Stratum	Cover	Abundance
<i>Megathyrsus maximus</i> var. <i>maximus</i>	Exotic	G	70	2000	--	--	--
<i>Ehrharta erecta</i>	Exotic	G	25	1000	--	--	--
<i>Casuarina glauca</i>	Tree (TG)	U	30	4	--	--	--
<i>Grevillea robusta</i>	Tree (TG)	U	15	1	--	--	--
<i>Hymenosporum flavum</i>	Shrub (SG)	U	5	1	--	--	--
<i>Sida rhombifolia</i>	Exotic	G	0.1	10	--	--	--
<i>Oxalis perennans</i>	Forb (FG)	G	0.1	1	--	--	--
<i>Bromus catharticus</i>	Exotic	G	0.1	5	--	--	--
<i>Melinis repens</i>	Exotic	--	--	--	G	20	1000
<i>Chloris gayana</i>	Exotic	--	--	--	G	10	500
<i>Cynodon dactylon</i>	Grass & grasslike (GG)	--	--	--	G	5	100
<i>Bidens pilosa</i> var. <i>pilosa</i>	Exotic	--	--	--	G	0.1	50
<i>Hypochaeris radicata</i>	Exotic	--	--	--	G	0.1	20
<i>Conyza bonariensis</i>	Exotic	--	--	--	G	0.1	10
<i>Verbena rigida</i> var. <i>rigida</i>	Exotic	--	--	--	G	0.1	10
<i>Cyperus brevifolius</i>	Exotic	--	--	--	G	0.5	5
<i>Chloris truncata</i>	Grass & grasslike (GG)	--	--	--	G	0.3	20
<i>Plantago lanceolata</i>	Exotic	--	--	--	G	0.1	20
<i>Aster subulatus</i>	Exotic	--	--	--	G	0.1	10
<i>Euphorbia hyssopifolia</i>	Exotic	--	--	--	G	0.2	500
<i>Portulaca pilosa</i>	Exotic	--	--	--	G	0.1	100
<i>Gamochaeta americana</i>	Exotic	--	--	--	G	0.1	10
<i>Eragrostis benthamii</i>	Grass & grasslike (GG)	--	--	--	G	1	20
<i>Petrorhagia dubia</i>	Exotic	--	--	--	G	0.1	10
<i>Lysimachia arvensis</i>	Exotic	--	--	--	G	0.1	20
<i>Juncus acutus</i>	Exotic	--	--	--	G	0.2	3

Appendix B Functional Plot Data

Table 9: Functional plot data

Plot	Lar geT ree s	Hollow trees	LitterC over	Fallen Logs	TreeSte m5to9	TreeStem 10to19	TreeStem 20to29	TreeStem 30to49	TreeStem 50to79	TreeR egen	HighThrea tExotic
1	0	0	3.6	0	0	1	0	1	1	0	25.0
2	0	0	0.4	0	0	0	0	0	0	0	10.0

Appendix C Plot photographs



Photograph 24: Plot 1 – Start (VZ-3)



Photograph 25: Plot 1 – End (VZ-3)



Photograph 26: Plot 2 – Start (VZ-1)



Photograph 27: Plot 2 – End (VZ-1)

Appendix D Likelihood of occurrence

Table 10: Likelihood of occurrence assessment

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Crinia tinnula</i>	Wallum Froglet	Vulnerable	Not Listed	--	Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgeland and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain.	0	✓	No suitable habitat. Targeted surveys undertaken for Green and Golden Bell Frog, no species of frogs detected. No connectivity to areas known to support this species.
<i>Uperoleia mahonyi</i>	Mahony's Toadlet	Endangered	Not Listed	--	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species. Known records are associated with shallow ephemeral/semi-permanent water bodies with limited flow of water. Aquatic vegetation at breeding sites includes sedges (<i>Shoenoplectus</i> spp., <i>Baumea</i> spp. and <i>Lepironia articulata</i>) and Broadleaf Cumbungi (<i>Typha orientalis</i>). Females have been recorded up to 400m from water-bodies indicating moderate dispersal distances and use of multiple habitat types. Tadpoles have been observed using leaf litter in the shallow verges of water bodies on sandy substrate. Rocks, logs and leaf litter may also be used for shelter and provide important foraging areas for invertebrate prey items.	0	✓	No suitable habitat. Targeted surveys undertaken for Green and Golden Bell Frog, no species of frogs detected. No connectivity to areas known to support this species.
<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Vulnerable	Semi-permanent/ephemeral wet areas; Within 1km of wet areas. Swamps; Within 1km of swamp. Waterbodies; Within 1km of waterbody	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimum habitat includes water-bodies 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. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs. Preyed upon by various wading birds and snakes.	4421	✓	No suitable habitat. Targeted surveys undertaken for Green and Golden Bell Frog, no species of frogs detected. Records are primarily associated with population on Kooragang Island which has no line of connectivity to the project area.
<i>Zannichellia palustris</i>	Horned Pondweed	Endangered	Not Listed	Waterbodies; Freshwater or slightly brackish estuarine areas (1%)	Grows in fresh or slightly saline stationary or slowly flowing water. Flowers during warmer months. NSW populations behave as annuals, dying back completely every summer.	23	No	No suitable semi-permanent waterbodies (freshwater or slightly brackish) that are proposed to be removed in the project area.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Vulnerable	Not Listed	--	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	4	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Myotis macropus</i>	Southern Myotis	Vulnerable	Not Listed	Waterbodies; Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site.	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December.	15	✓	There is one concrete drain on the subject land that is subject to tidal inundation. There is no significant woody vegetation or potential roosting structures within 200m of this drain. There is a second inter-tidal drain on the south-east corner of the project area, along Selwyn St. There are no proposed modifications to the building within 200 m of this drain. Vegetation around this building consists predominantly of small shrubs including <i>Acacia saligna</i> which may be removed as part of

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
								regular maintenance and would not impact this species.
<i>Miniopterus australis</i>	Little Bent-winged Bat	Vulnerable	Not Listed	Caves; Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >5; or from the scientific literature.	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (<i>Miniopterus schreibersii</i>) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.	35	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable	Cliffs; Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in caves, overhangs, mine adits and concrete structures such as derelict buildings. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	1	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Vulnerable	Not Listed	Caves; Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >5	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the treetops.	30	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	Other; Breeding camps	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.	417	✓	Species observed flying over the project site during inspections. No colonies or breeding camps detected during site inspections. May forage within the project area, no significant behavioural changes anticipated, and no significant removal of forage sources.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	Not Listed	--	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles 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.	14	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Phoniscus papuensis</i>	Golden-tipped Bat	Vulnerable	Not Listed	--	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. Bats will fly up to two kilometres from roosts to forage in rainforest and sclerophyll forest on mid and upper slopes. Roost mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes. Bats will use multiple roost and change roosts regularly. Bats roost individually or in small colonies which can contain up to approximately 20 bats of both males and females or just a single sex. Maternity roots may occur away from water sources with one maternity roost found 450m upslope of the nearest water course in a broken bough. Specialist feeder on small web-building spiders. There is one breeding cycle per year.	0	✓	Very low roosting habitat suitability within the project area and subject area. Species may fly over site or forage over the project area and subject area, no significant behavioural changes anticipated due to development.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	Not Listed	--	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	2	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	Vulnerable	Not Listed	--	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	25	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	Vulnerable	Not Listed	Caves; Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds."	Very little is known about the biology of this uncommon species. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Little is understood of its feeding or breeding requirements or behaviour.	2	✓	Potential habitat in the Roll Shop, occurrence cannot be ruled out.
<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove	Vulnerable	Not Listed	--	Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal. Feeds alone, or in loose flocks at any height in the canopy. Despite its plumage, can be remarkably cryptic as it feeds, with the call and falling fruit being an indication of its presence. The nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water, usually 3 - 10 m above the ground. Breeds in spring and early summer; a single white egg is laid. Most often seen in mature forests, but also found in remnant and regenerating rainforest. Aspects of its behaviour such as social behaviour and structure, movements and breeding biology have not been well-studied.	4	✓	Highly marginal foraging habitat present as fig trees in the landscape cap area. Species may fly over project area, no significant behavioural changes anticipated due to development.
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable	Vulnerable	--	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Peninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (e.g. termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More common in coastal areas, less so inland.	31	✓	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Epthianura albifrons</i>	White-fronted Chat	Vulnerable	Not Listed	--	Gregarious species usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days. Birds can breed at one year of age and are estimated to live for five years.	350	No	Vast majority of species records within 5 km are located on Kooragang Island and Ash Island. Minimal suitable foraging habitat within project area. Marginal foraging habitat would be considered for drainage lines in the VENM cap area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Vulnerable	Not Listed	Waterbodies; Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines Other; Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground. May be solitary or live in pairs or small family groups consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days.	535	✓	May fly-over project area. No suitable foraging habitat within project area. No significant behavioural changes anticipated due to development.
<i>Diomedea exulans</i>	Wandering Albatross	Endangered	Vulnerable	--	Wandering albatross spend the majority of their time in flight, soaring over the southern oceans. They breed on a number of islands just north of the Antarctic Circle: South Georgia Island (belonging to the UK), Prince Edward and Marion Islands (South Africa), Crozet and Kerguelen Islands (French Southern Territories) and Macquarie Island (Australia). Breeding takes place on exposed ridges and hillocks, amongst open and patchy vegetation. Wandering albatross pairs mate for life; these long-lived birds do not reach sexual maturity until 9-11 years of age. Wandering Albatross breed biennially in small, loose colonies among grass tussocks, using a large mud nest. A single egg is laid; both parents incubate the egg (that hatches after two months) and feed the growing chick, which remains on the nest for around 9 months. They feed in pelagic, offshore and inshore waters, often at night, taking fish and cephalopods such as squid, crustaceans and carrion, and will often follow ships feeding on the refuse they trail.	1	No	May fly-over project area. No suitable foraging habitat within project area. No significant behavioural changes anticipated due to development.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable	Not Listed	--	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. Generation length is estimated to be 5 years.	1	✓	May fly-over project area. Highly marginal foraging habitat within project area. No significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Xenus cinereus</i>	Terek Sandpiper	Vulnerable	Not Listed	Other; As per Important Habitat Map	In Australia, has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally, roosts communally amongst mangroves or dead trees, often with related wader species. Breaks up into smaller flocks or even solitary birds when feeding in open intertidal mudflats. The diet includes worms, crabs and other crustaceans, small shellfish and the adults and larvae of various flies, beetles and water-bugs. Feeding is undertaken by moving rapidly and erratically over soft, wet mud, pecking or probing at the surface.	388	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered	Other; As per Important Habitat Map	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Forest Red Gum <i>E. tereticornis</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> . Commonly used lerp infested trees include Inland Grey Box <i>E. microcarpa</i> , Grey Box <i>E. moluccana</i> , Blackbutt <i>E. pilularis</i> , and Yellow Box <i>E. melliodora</i> . Return to some foraging sites on a cyclic basis depending on food availability. Following winter, they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum <i>Eucalyptus globulus</i> .	2	No	No Important Habitat Map in project area. Minimal suitable foraging resources within project area. Potential foraging habitat would be considered for the landscape cap area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	Vulnerable	Not Listed	--	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn. Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, and is usually 5-30 metres up in rainforest and rainforest edge tree and shrub species. The male incubates the single egg by day, the female incubates at night.	1	No	Highly marginal foraging habitat present as fig trees in the landscape cap area. Species may fly over project area, no significant behavioural changes anticipated due to development.
<i>Lophoictinia isura</i>	Square-tailed Kite	Vulnerable	Not Listed	Other; Nest trees	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100 square km. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	12	✓	No stick nests observed in the project area or subject area. Species may fly or forage over site, no significant behavioural changes anticipated due to development.
<i>Circus assimilis</i>	Spotted Harrier	Vulnerable	Not Listed	--	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (egg bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	20	✓	No stick nests observed in the project area or subject area. Species may fly or forage over site, no significant behavioural changes anticipated due to development.
<i>Macronectes giganteus</i>	Southern Giant Petrel	Endangered	Endangered	--	Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory. A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population does not nest. It is an opportunistic scavenger and predator, and scavenges from fishing vessels and animal carcasses on land. It is also an active predator of cephalopods and euphausiids, as well as smaller birds (particularly penguins) both at land and at sea. Birds will desert their nests if disturbed at the breeding colony.	2	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Onychoprion fuscata</i>	Sooty Tern	Vulnerable	Not Listed	--	Large flocks can be seen soaring, skimming and dipping but seldom plunging in off shore waters. Breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands.	2	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Vulnerable	Not Listed	Other; Within 1m of estuarine areas and the ocean	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	236	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Thalassarche cauta</i>	Shy Albatross	Endangered	Endangered	--	This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. While at sea, it soars on strong winds and when calm, individuals may rest on the ocean, in groups during the breeding season or as individuals at other times. Occasionally the species occurs in continental shelf waters, in bays and harbours. The species feeds on fish, crustaceans, offal and squid and may forage in mixed-species flocks. Food may be caught by seizing prey from the water's surface while swimming, by landing on top of prey, diving for prey beneath the water and by scavenging behind fishing vessels. Known breeding locations include Albatross Island off Tasmania, Auckland Island, Bounty Island and	1	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
					The Snares, off New Zealand, where nesting colonies of 6-500 nests occur and may contain other species such as the Australian Gannet. Located on sheltered sides of islands, on cliffs and ledges, in crevices and slopes, nests are used annually and consist of a mound of mud, bones, plant matter and rocks. Parents are territorial while nesting, having both defensive and mating displays. Breeding occurs September-December, when a single egg is laid and incubated for 72 days. Both parents feed and guard the young for approximately 5 months before they fledge and become independent.			
<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	Vulnerable	Not Listed	--	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	0	✓	Highly marginal foraging habitat present as fig trees in the landscape cap area. Species may fly over project area, no significant behavioural changes anticipated due to development.
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Critically Endangered	Other; As per Important Habitat Map	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example, the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark <i>Eucalyptus eugenioides</i> and other Stringybark species, and Broad-leaved Ironbark <i>E. fibrosa</i> can also contribute important nectar flows at times. Nectar and fruit from the mistletoes <i>Amyema miquelii</i> , <i>A. pendula</i> and <i>A. cabbagei</i> are also utilised. When nectar is scarce lerp, and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are several known key breeding areas, four of them in NSW - Capertee Valley, Lower Hunter Valley, Mudgee/Wollar and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.	0	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Calidris canutus</i>	Red Knot	Not Listed	Endangered	Other; As per Important Habitat Map	In NSW the Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. It usually forages near the water's edge, with feeding activity regulated by the tide as birds closely follow the tide-edge. The diet consists of worms, bivalves, gastropods, crustaceans and echinoderms. The birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. It is rarely found on inland lakes or swamps.	479	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Erythroriorchis radiatus</i>	Red Goshawk	Critically Endangered	Vulnerable	--	Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km ² for females and 200 km ² for males. Red Goshawks mainly eat medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets, but they also take mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and late in the day and tend to hunt more on the wing at other times of the day. The breeding behaviour of Red Goshawks is not well known. Breeding is likely to be in spring and summer in southern Queensland and NSW. The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall	0	✓	No stick nests observed in the project area or subject area. Species may fly or forage over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
					tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December. In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands. The age at which Red Goshawks first breed is not known, nor is the life expectancy. Young remains with their parents for at least 70-80 days after they leave the nest and may remain with their parents for 4-5 months.			
<i>Pterodroma solandri</i>	Providence Petrel	Vulnerable	Not Listed	--	Marine. Nest on the tops of Mount Gower and Mount Lidgbird and to a less extent, on the lower slopes of the mountains. The nest is a grass lined chamber at the end of a burrow, 1 - 2 metres in length.	2	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Ninox strenua</i>	Powerful Owl	Vulnerable	Not Listed	Hollow bearing trees; a living or dead tree with a hollow >2 cm diameter that occurs >4 metres above the ground	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i> , Black She-oak <i>Allocasuarina littoralis</i> , Blackwood <i>Acacia melanoxylon</i> , Rough-barked Apple <i>Angophora floribunda</i> , Cherry Ballart <i>Exocarpus cupressiformis</i> and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example, in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 ha can support a pair when prey is dense. Where hollow trees and prey have been depleted, the owls need up to 4000 ha. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. Powerful Owls are monogamous and mate for life. Nesting typically occurs from May to October, being variable between pairs and among years. Fledging can occur as late as December if a pair re-nests after a failed first attempt. Clutches consist of two dull white eggs and incubation lasts approximately 38 days.	22	✓	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Haematopus longirostris</i>	Pied Oystercatcher	Endangered	Not Listed	Other; Within 1m of estuarine areas and the ocean	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones. Two to three eggs are laid between August and January. The female is the primary incubator and the young leave the nest within several days.	572	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Vulnerable	Other; Mistletoes present at a density of greater than five mistletoes per hectare	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	0	✓	Species may fly over site or forage within the landscape cap area, no significant behavioural changes anticipated due to development.
<i>Tyto novaehollandiae</i>	Masked Owl	Vulnerable	Not Listed	Hollow bearing trees; a living or dead tree with a hollow >2 cm diameter that occurs >4 metres above the ground	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 1000 hectares or more, depending on prey availability. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	2	✓	No hollow bearing trees occur in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Sula dactylatra</i>	Masked Booby	Vulnerable	Not Listed	--	Marine. Remain at Lord Howe Island year round but range widely for food and some juveniles wander before returning to breed. Young birds banded on Lord Howe Island have been recovered as far away as the Solomon Islands. Breed on high open areas where they can take off directly into the wind. Breeding sites on Lord Howe Island include King Point and Muttonbird Point on the main Island and also Ball's Pyramid, Muttonbird Island and the Admiralty Islets. The nest is a rough platform of trodden grass.	1	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Anseranas semipalmata</i>	Magpie Goose	Vulnerable	Not Listed	--	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	52	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Sternula albifrons</i>	Little Tern	Endangered	Not Listed	--	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.	225	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Glossopsitta pusilla</i>	Little Lorikeet	Vulnerable	Not Listed	--	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. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like <i>Allocasuarina</i> . Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.	12	✓	No hollow bearing trees observed in the study area. Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable	Not Listed	Other; Nest trees - live (occasionally dead) large old trees within vegetation.	Occupies open eucalypt forest, woodland or open woodland. Sheoak or <i>Acacia</i> woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	14	✓	No stick nests observed in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Charadrius mongolus</i>	Lesser Sand-plover	Vulnerable	Endangered	Other; As per Important Habitat Map	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Diet includes insects, crustaceans, molluscs and marine worms. Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey.	70	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Gallinago hardwickii</i>	Latham's Snipe	Vulnerable	Vulnerable	--	--	95	No	Minimal suitable foraging habitat within project area. Marginal foraging habitat would be considered for drainage lines in the VENM cap area. Species may fly over site. No significant behavioural changes anticipated due to development.
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	Vulnerable	Not Listed	--	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.	0	✓	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Listed	--	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft 'chuck' call is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the	1	✓	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
					outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Usually two to three eggs are laid and incubated by the female. During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.			
<i>Charadrius leschenaultii</i>	Greater Sand-plover	Vulnerable	Vulnerable	Other; As per Important Habitat Map	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey.	15	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Calidris tenuirostris</i>	Great Knot	Vulnerable	Critically Endangered	Other; As per Important Habitat Map	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	200	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	Vulnerable	Endangered	--	The first arrival of Gould's petrel on cabbage tree Island occurs from mid to late September. Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. They nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees. They breed colonially and the nests are clumped and often less than 1 m apart. Egg laying takes place over a six week period commencing in early November.	1	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	Vulnerable	Not Listed	Other; Presence of <i>Allocasuarina</i> and casuarina species Hollow bearing trees; Living or dead tree with hollows greater than 15cm diameter and higher than 8m above ground.	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, <i>Allocasuarina diminuta</i> , and <i>A. gymnathera</i> . Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (<i>Casuarina cristata</i>). Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	0	✓	No hollow bearing trees occur in the project area. Species may forage on Swamp Oak in landscape capped area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Endangered	Hollow bearing trees; Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	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. May also occur in sub-alpine Snow Gum (<i>Eucalyptus pauciflora</i>) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground.	1	✓	No hollow bearing trees occur in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Stictonetta naevosa</i>	Freckled Duck	Vulnerable	Not Listed	--	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally, rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	25	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Pandion cristatus</i>	Eastern Osprey	Vulnerable	Not Listed	Other; Presence of stick-nests in living and dead trees (> 15m) or artificial structures within 1m of a floodplain for nesting	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.	97	✓	No stick nests observed in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Numenius madagascariensis</i>	Eastern Curlew	Critically Endangered	Critically Endangered	Other; As per Important Habitat Map	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures. The Eastern Curlew is carnivorous, mainly eating crustaceans (including crabs,	247	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
					shrimps and prawns), small molluscs, as well as some insects. The birds may delay breeding until three to four years of age. Within Australia, immature birds, which do not migrate, move northward in winter.			
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	Not Listed	--	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also, frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while Tasmanian birds migrate to southeastern NSW after breeding. Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding. Although dusky woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species. Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.	0	✓	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Vulnerable	--	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farmhouses.	1	No	Single record associated with Kooragang Island. Minimal suitable foraging habitat within project area. Marginal foraging habitat would be considered for drainage lines in the VENM cap area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered	Other; As per Important Habitat Map	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.	1389	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Tringa nebularia</i>	Common Greenshank	Endangered	Endangered	--	#N/A	797	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Irediparra gallinacea</i>	Comb-crested Jacana	Vulnerable	Not Listed	Waterbodies; Freshwater wetlands with a good surface cover of floating aquatic vegetation	Inhabit permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation. Forage on floating vegetation, walking with a characteristic bob and flick. They feed primarily on insects and other invertebrates, as well as some seeds and other vegetation. Breed mainly in spring and summer in NSW, with clutches recorded from September to April. The nest is a platform or shallow cup of vegetable material, though eggs sometimes laid directly onto a large leaf with no nest built. The male builds the nest, incubates the eggs and broods the young. Eggs that roll into the water from a nest are usually retrieved. The young are precocial, but the adult male can carry one or two under each wing if they are threatened and drop them in separate places. Young birds will dive and stay submerged with just their nostrils exposed for a very long time. Adults will also dive for safety on occasion. Comb-crested Jacanas are dispersive, moving about in response to the condition of wetlands, and occasionally turn up well beyond normal range.	4	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Burhinus grallarius</i>	Bush Stone-curlew	Endangered	Not Listed	Fallen/standing dead timber including logs; Null	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	4	✓	No Fallen/standing dead timber including logs. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Listed	--	Found in eucalypt woodlands (including Box-Gum Woodland) 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>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (<i>Eucalyptus sideroxylon</i>) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae. Hollows in standing dead or live trees and tree stumps are essential for nesting. The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). Each group is composed of a breeding pair with retained male offspring and, rarely, retained female offspring. Often in pairs or cooperatively breeding groups of two to five birds.	0	✓	Species typically occurs further inland. Species may fly over site or forage within the landscape cap area, no significant behavioural changes anticipated due to development.
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Vulnerable	Not Listed	Other; As per Important Habitat Map	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayment's, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches. The species is an active forager, typically feeding by rapidly and repeatedly jabbing its bill into soft wet mud. Feeding also occurs while wading, often in water so deep that they have to submerge their heads and necks in order to probe the underlying mud. Their diet includes insects, crustaceans, molluscs, worms and seeds. Individuals are strongly migratory and only mildly gregarious when not breeding. Large flocks are seldom recorded, and birds are often either encountered alone or feeding with other waders such as Red-necked Stints or Curlew Sandpipers.	30	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Oxyura australis</i>	Blue-billed Duck	Vulnerable	Not Listed	--	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The most common clutch size is five or six. Males take no part in nest-building or incubation. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes.	5	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Limosa limosa</i>	Black-tailed Godwit	Vulnerable	Endangered	Other; As per Important Habitat Map	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars. Frequently recorded in mixed flocks with Bar-tailed Godwits.	711	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	Endangered	Not Listed	Swamps; Shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 3m of these swamps. Waterbodies; Shallow lakes, lake margins and estuaries within 3m of these waterbodies	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). In NSW, breeding activity occurs May - January; incubation May - October; nestlings July - January; fledging from September. Parents share nest duties and in one study about 1.3-1.7 birds were fledged per nest. The NSW breeding population has been estimated at about 75 pairs. Territories are large and variable in size. They have been estimated to average about 9,000ha, ranging from 3,000-6,000ha in high quality habitat and 10,000-15,000ha in areas where habitat is poor or dispersed.	57	✓	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
<i>Thalassarche melanophris</i>	Black-browed Albatross	Vulnerable	Vulnerable	--	Inhabits Antarctic, subantarctic, subtropical marine and coastal waters over upwellings and boundaries of currents. Can tolerate water temperatures between 0°C and 24°C. Spends most of its time at sea, breeding on small isolated islands. When at sea, individuals soar on strong winds and rest on the ocean, when calm, often in groups. This species feeds on fish, crustaceans, offal and squid and often forages in flocks with other seabirds. Individuals seize prey from the surface while swimming or landing, sometimes submerging their head and body to capture prey underwater, and they scavenge in large flocks behind fishing vessels. This species nests annually on a mound of soil and vegetation, on the cliffs or steep slopes of vegetated Antarctic and subantarctic islands. Colonies of up to 100,000 nests are formed, occasionally containing other species such as the Grey-headed Albatross, during which time the birds are territorial while nesting. Breeding occurs September-December, when a single egg is laid and incubated for 65-72 days by both parents. Both parents feed and guard the young for 4-5 months before they fledge and become independent. After breeding, the fledgling and adults leave the breeding colony, with the young reaching breeding age at approximately 11 years of age.	1	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Falco subniger</i>	Black Falcon	Vulnerable	Not Listed	--	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be preferable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993).	5	✓	No stick nests observed in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Ixobrychus flavicollis</i>	Black Bittern	Vulnerable	Not Listed	Waterbodies; Land within 4 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. Feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again. Generally solitary, but occurs in pairs during the breeding season, from December to March. Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks. Between three and five eggs are laid and both parents incubate and rear the young.	0	✓	Species may fly over site. Highly marginal foraging habitat on site. No significant behavioural changes anticipated due to development.
<i>Esacus magnirostris</i>	Beach Stone-curlew	Critically Endangered	Not Listed	--	Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups. Birds forage by stalking slowly like a heron or with quicker dashes after prey. The diet consists of crabs and other marine invertebrates. They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Less strictly nocturnal than the related Bush Stone-curlew (<i>Burhinus grallarius</i>). In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia, breeding has been recorded from September. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves. Only one egg is laid, but birds will re-lay after the failure of a breeding attempt. Both parents defend the nest and care for the young. The young are precocial but appear not to be independent until they are 7-12 months old.	2	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (baueri)	Endangered	Vulnerable	Other; As per Important Habitat Map	It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas. It forages at low to mid tide in shallow water or along the water's edge on sandy substrates on intertidal flats, banks and beaches or on soft mud substrates. Its diet consists of worms, molluscs, crustaceans, insects and some plant material. In NSW its high tide roost areas on sandy beaches, sandbars, spits and near-coastal saltmarsh are frequently shared with other shorebirds. It is rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips. In large part, the observed decline in Bar-tailed Godwit (Western Alaskan) numbers across Australia stems from ongoing loss of intertidal mudflat habitat at key migration staging sites in the Yellow Sea.	0	✓	No Important Habitat Map in project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Ninox connivens</i>	Barking Owl	Vulnerable	Not Listed	Hollow bearing trees; a living or dead tree with a hollow >2 cm diameter that occurs >4 metres above the ground	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial	1	✓	No hollow bearing trees occur in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.

Scientific name	Common name	BC Act	EPBC Act (MNES)	Constraints	Habitat and Ecology	Records within 5km	PCT 400 6	Assessment
					mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats. Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators (e.g. goannas). Nesting occurs during mid-winter and spring, being variable between pairs and among years. As a rule of thumb, laying occurs during August and fledging in November. The female incubates for 5 weeks, roosts outside the hollow when chicks are 4 weeks old, then fledging occurs 2-3 weeks later. Young are dependent on their parents for several months. Territorial pairs respond strongly to recordings of Barking Owl calls from up to 6 km away, though humans rarely hear this response farther than 1.5 km. Because disturbance reduces the pair's foraging time and can pull the female off her eggs even on cold nights, recordings should not be broadcast unnecessarily nor during the nesting season.			
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	--	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally, occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mudflats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	0	✓	Species may fly over site. Highly marginal foraging habitat on site. No significant behavioural changes anticipated due to development.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Endangered	Waterbodies; Brackish or freshwater wetlands	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	19	✓	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	Vulnerable	Vulnerable	--	--	6	No	No suitable foraging habitat within project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Neophema pulchella</i>	Turquoise Parrot	Vulnerable	Not Listed	--	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	4	No	Species may fly over site or forage over the site, no significant behavioural changes anticipated due to development.
<i>Tyto longimembris</i>	Eastern Grass Owl	Vulnerable	Not Listed	--	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth. If disturbed they burst out of cover, flying low and slowly, before dropping straight down again into cover. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation. Breeding season is highly variable and dependent on environmental conditions, but in NSW nesting most typically occurs in autumn or winter.	4	No	No suitable habitat. VENM cap area is likely to sparse and open to represent foraging habitat.
<i>Tyto tenebricosa</i>	Sooty Owl	Vulnerable	Not Listed	Caves. Cliffs; including cliff lines/ledges Escarpments; including cliff lines/ledges. Hollow bearing trees: a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (<i>Pseudocheirus peregrinus</i>) or Sugar Glider (<i>Petaurus breviceps</i>). Nests in very large tree-hollows.	1	No	No hollow bearing trees occur in the project area. Species may fly over site, no significant behavioural changes anticipated due to development.
<i>Persicaria elatior</i>	Tall Knotweed	Vulnerable	Vulnerable	Semi-permanent/ephemeral wet areas; or within 5 m. Swamps; or within 5 m. Waterbodies; including Wetlands, or within 5 m	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	0	✓	Highly marginal habitat associated with the VENM cap drainage lines. Considered highly marginal due to use of virgin excavated material lacking natural soil structure, soil seed bank and lack of waterlogging in the soil. Species not observed during site surveys. Located in an industrial location isolated from intact remnant patches of vegetation.

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<i>Rutidosis heterogama</i>	Heath Wrinklewort	Vulnerable	Vulnerable	--	Grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides.	1	No	Highly marginal habitat marginal, located in an urban/industrial location isolated from intact remnant patches of vegetation. Species not observed during site surveys.
<i>Petaurus norfolcensis</i>	Squirrel Glider	Vulnerable	Not Listed	--	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. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	2	✓	No hollow bearing trees occur in the project area. No connectivity to areas with Squirrel Glider, landscaped cap area too small and degraded to support an isolated population
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Vulnerable	Endangered	--	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creek lines. Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.	0	✓	No connectivity to areas with Spotted-tailed Quoll, landscaped cap area too small and degraded to support an isolated population
<i>Phascolarctos cinereus</i>	Koala	Endangered	Endangered	Other; Presence of koala use trees - refer to Survey Comments field in TBDC	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.	11	✓	No connectivity to areas with koala, landscaped cap area too small and degraded to support a. isolated population
<i>Petauroides volans</i>	Greater Glider	Endangered	Vulnerable	--	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Recorded using hollows with a minimum diameter of 8 cm. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.	0	✓	No hollow bearing trees occur in the project area. No connectivity to areas with Greater Glider, landscaped cap area too small and degraded to support an isolated population
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Vulnerable	Not Listed	--	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) 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. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (<i>Pseudocheirus peregrinus</i>) dreys or thickets of vegetation, (e. g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. Appear to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0. 68 hectares and females about 0. 35 hectares. Young can be born whenever food sources are available, however most births occur between late spring and early autumn. Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal. Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings.	1	✓	No connectivity to areas with Eastern Pygmy-possum, landscaped cap area too small and degraded to support an isolated population
<i>Planigale maculata</i>	Common Planigale	Vulnerable	Not Listed	--	Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks. They are fierce carnivorous hunters and agile climbers, preying on insects and small vertebrates, some nearly their own size. They breed from October to January. The female builds a nest lined with grass, eucalypt leaves or shredded bark.	0	✓	No connectivity to areas with Common Planigale, landscaped cap area too small and degraded to support an isolated population

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<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	Vulnerable	Not Listed	--	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. . Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha. Nest and shelter in tree hollows with entrances 2. 5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.	0	✓	No connectivity to areas with Brush-tailed Phascogale, landscaped cap area too small and degraded to support an isolated population
<i>Hoplocephalus stephensii</i>	Stephens' Banded Snake	Vulnerable	Not Listed	Hollow bearing trees; Or within 5 m of this habitat. Other; Within 5 m of arboreal vine tangles. Fallen/standing dead timber including logs; Or within 5 m of this habitat	Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. At night it hunts frogs, lizards, birds and small mammals.	0	✓	No hollow bearing trees occur in the project area. Cannot be ruled out from occurring within landscape capped area (planted fig trees) although this habitat is considered highly marginal. However, no direct impacts to this vegetation are proposed and indirect impacts would be anticipated.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	Not Listed	Vulnerable	--	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes It is a social animal, living predominantly in burrows shared with other individuals Distribution is patchy in time and space, with peaks in abundance during early to mid-stages of vegetation succession typically induced by fire	0	✓	No connectivity to areas with New Holland Mouse, landscaped cap area too small and degraded to support an isolated population. No indirect impacts would be anticipated.
<i>Pseudomys gracilicaudatus</i>	Eastern Chestnut Mouse	Vulnerable	Not Listed	--	In NSW the Eastern Chestnut Mouse is mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. In the tropics it is more an animal of grassy woodlands. Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously. By the time the heath is mature, the larger Swamp Rat becomes dominant, and Eastern Chestnut Mouse numbers drop again. Feeds at night via runways through the grassy and sedge understorey, within an area of less than half a hectare. It has a broad diet of grass stems, invertebrates, fungi and seeds, with the relative significance of each component varying seasonally. Up to three litters are produced from spring to autumn; this strategy allows rapid build-up of numbers in years following fire.	0	✓	No connectivity to areas with Eastern Chestnut Mouse, landscaped cap area too small and degraded to support an isolated population. No indirect impacts would be anticipated.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Critically Endangered	Critically Endangered	--	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	0	✓	No naturally occurring native trees in the subject land. Not observed during site inspections.
<i>Rhodomyrtus psidioides</i>	Native Guava	Critically Endangered	Not Listed	--	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	0	✓	No naturally occurring native trees in the subject land. Not observed during site inspections.
<i>Grevillea shiressii</i>	Mullet Creek Grevillea	Vulnerable	Vulnerable	--	Grows along creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils. Flowers mainly late winter to Spring (July-December), with seed released at maturity in October. Flowers are bird pollinated and seeds are dispersed by ants. A fire sensitive obligate seeder that is highly susceptible to local extinction due to frequent fire, however, fire is likely to be relatively infrequent in the habitat of <i>G. shiressii</i> . Seed germination does occur in the absence of fire, however some physical disturbance is likely to promote seed germination.	40	No	Record within 5 km has the status listed as "Vagrant or Escaped Animal or Planted Specimen", not naturally occurring.
<i>Pultenaea maritima</i>	Coast Headland Pea	Vulnerable	Not Listed	--	The species occurs in grasslands, shrublands and heath on exposed coastal headlands and adjoining low coastal heath. Found on clay or sandy loam or clay loam over sandstone at altitude 5–30 m. Associated with <i>Banksia integrifolia</i> and <i>Themeda australis</i> . Flowers from (June) August to March; fruit occurs from January to March.	1	No	Habitat highly marginal, located in an urban/industrial location isolated from intact remnant patches of vegetation. Species not observed during site surveys.
<i>Tetradlea juncea</i>	Black-eyed Susan	Vulnerable	Vulnerable	--	It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. Most populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients, and clayey soil from conglomerates, pH neutral. It usually spreads via underground stems which can be up to 50 cm long. Consequently, individual plants may be difficult to identify. It also reproduces sexually but this requires insect pollination. Large populations of this species are particularly important.	3	No	Habitat highly marginal, located in an urban/industrial location isolated from intact remnant patches of vegetation. Species not observed during site surveys.

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<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Endangered	Vulnerable	--	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	13	✓	One planted individual identified in landscape cap area. No naturally occurring native trees in the subject land.
<i>Eucalyptus parramattensis subsp. decadens</i>	Eucalyptus parramattensis subsp. decadens	Vulnerable	Vulnerable	--	Generally, occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, <i>E. parramattensis</i> subsp. <i>decadens</i> is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the TSC Act. In the Tomago Sandbeds area, the species is usually associated with the 'Tomago Swamp Woodland' as defined by NSW NPWS (2000). Very little is known about the biology or ecology of this species. Flowers from November to January. Propagation mechanisms are currently poorly known. Seed dispersal is likely to be affected by wind and animals. Likely to be sensitive to over-frequent fire, however there is evidence (i. e. coppicing, epicormic shoots) that the species may be tolerant of low intensity fires. The species has a canopy stored seed bank for dispersal after fire events.	0	✓	No naturally occurring native trees in the subject land. Habitat highly marginal, located in an urban/industrial location isolated from intact remnant patches of vegetation. Species not observed during site surveys.
<i>Angophora inopina</i>	Charmhaven Apple	Vulnerable	Vulnerable	--	This species is a member of the <i>A. bakeri</i> complex, which also includes <i>A. crassifolia</i> , <i>A. paludosa</i> and <i>A. exul</i> . It is most similar to <i>A. crassifolia</i> from which it is distinguished by the broader leaves with shorter petioles. None of these related species are known from the same area as <i>A. inopina</i> , although <i>A. bakeri</i> does occur sporadically in the ranges to the west, and near Kurri Kurri. Occurs most frequently in four main vegetation communities: (i) <i>Eucalyptus haemastoma</i> – <i>Corymbia gummifera</i> – <i>Angophora inopina</i> woodland/forest; (ii) <i>Hakea teretifolia</i> – <i>Banksia oblongifolia</i> wet heath; (iii) <i>Eucalyptus resinifera</i> – <i>Melaleuca sieberi</i> – <i>Angophora inopina</i> sedge woodland; (iv) <i>Eucalyptus capitellata</i> – <i>Corymbia gummifera</i> – <i>Angophora inopina</i> woodland/forest. Ecological knowledge about this species is limited. Is lignotuberous, allowing vegetative growth to occur following disturbance. However, such vegetative reproduction may suppress the production of fruits/seeds, necessary for the recruitment of new individuals to a population, and the time between such disturbance and the onset of sexual reproduction is not known. Flowering appears to take place principally between mid-December and mid-January but is generally poor and sporadic. Preliminary experiments indicate that neither pollination or seed viability are limiting factors in the life cycle.	0	✓	No naturally occurring native trees in the subject land. Habitat highly marginal, located in an urban/industrial location isolated from intact remnant patches of vegetation. Species not observed during site surveys.