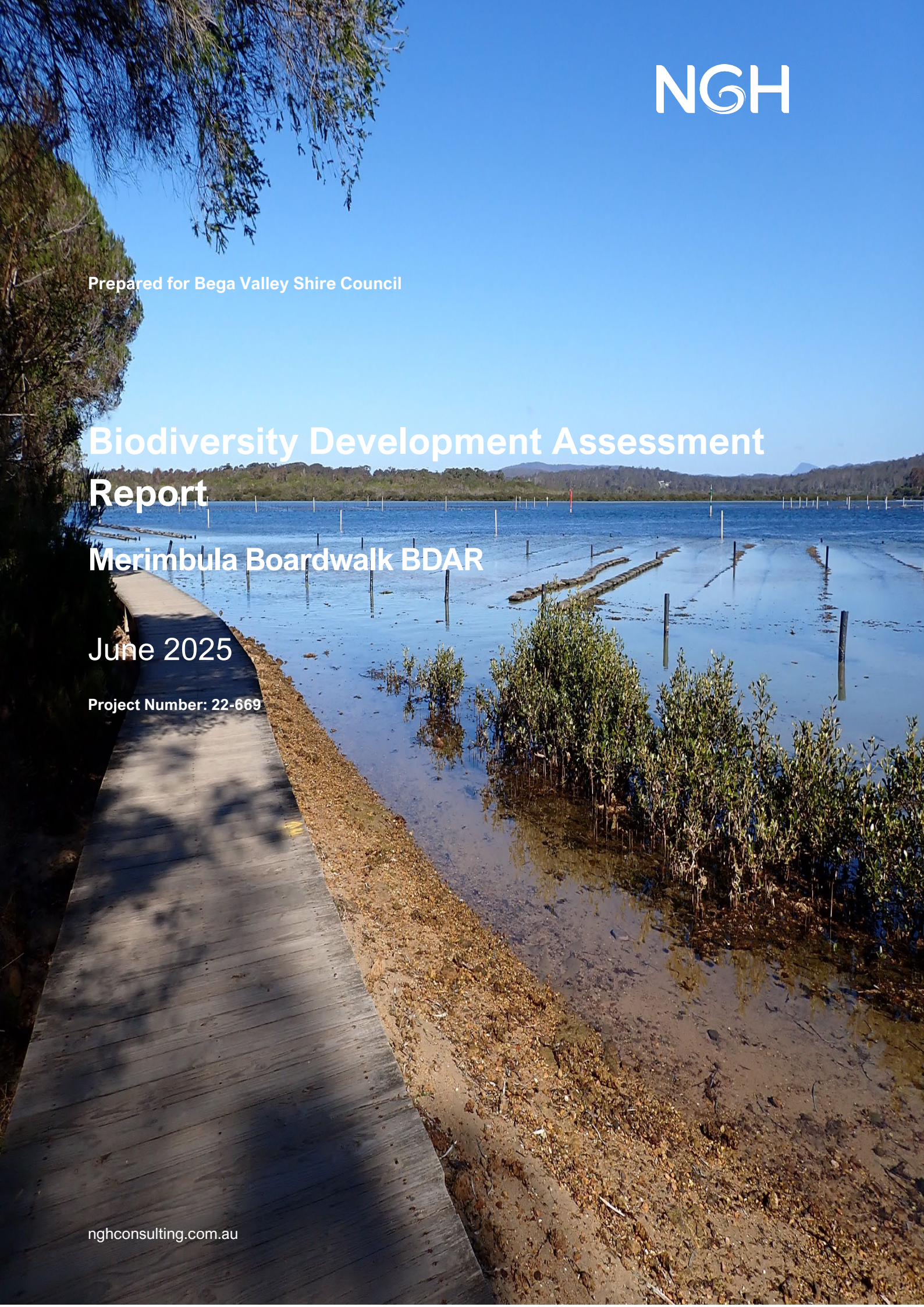

Prepared for Bega Valley Shire Council

Biodiversity Development Assessment Report

Merimbula Boardwalk BDAR

June 2025

Project Number: 22-669

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Document verification

Project Title:	Merimbula Boardwalk BDAR
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Revision	Date	Prepared by	Approved by
Final V3.0	13/06/2025	Clare Vincent, Jared Graham-Higgs	Julie Gooding (BAAS18074)
Final V2.1	8/11/2024	Bianca Heinze, Jared Graham-Higgs	Julie Gooding (BAAS18074)
Draft V2.0	8/10/2024	Bianca Heinze, Clair Davies	Julie Gooding (BAAS18074)
Draft V1	12/07/2024	Eliana Hack, Elise Keane Justin Solomons, Bianca Heinze and Jared Graham-Higgs	Julie Gooding (BAAS18074)

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Executive summary

The Bega Valley Shire Council (BVSC) are proposing to demolish and upgrade the pre-existing Merimbula Boardwalk. The boardwalk is located on the northern edge of Merimbula Lake, in Merimbula, NSW. The Merimbula Boardwalk upgrade is a linear development which extends across approximately 1.7kms, with a proposed Subject Land of 1.3ha. This Biodiversity Development Assessment Report (BDAR) assesses the biodiversity impacts of the proposed Merimbula Boardwalk upgrade (the proposal) according to the NSW Biodiversity Assessment Methodology (BAM).

The new boardwalk structure is proposed to be built over the same area of the current boardwalk structure with some minor alterations. These alterations include the widening of the boardwalk hardstand. The Proponent, Bega Valley Shire Council (BVSC), is a consent authority and this project would ordinarily fall under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). However, due to areas of Coastal Land (refer to Statement of Environmental Effects), the proposal triggers Part 4 EP&A Act. Biodiversity Values mapped land occurs in the subject land and thus the proposal triggers the Biodiversity Offset Scheme as specified by the BC Act and the *Biodiversity Conservation Regulation 2017*. This BDAR includes an assessment of impacts to protected matters listed under the federal *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

To avoid and minimise impact to biodiversity, BVSC have:

- Located the upgrade over the existing footprint.
- Reduced planned lookouts/platforms to the number already existing.
- Reduced planned lighting along the boardwalk to carparks only.
- Minimised clearing width to one metre either side of the existing footprint in most areas.
- Accessing sensitive aquatic areas during construction using barge rather than across land.

Several site visits were undertaken by NGH across 2023 and 2024. Seven Plant Community Types were identified in the subject land including four associated with the following threatened ecological communities:

- *Brogo Vine Forest of the south east corner bioregion* (endangered EPBC Act)
- *Bangalay Sand Forest of the south east corner bioregion* (endangered BC Act)
- *Coastal Saltmarsh of the south east corner bioregion* (endangered BC Act)
- *Subtropical and Temperate Coastal Saltmarsh* (endangered EPBC Act).

Habitat occurs for a range of threatened flora and fauna species including the intertidal zone, eucalypt forest, swampland and wetland along with microhabitat components such as dense understorey and hollow-bearing trees. The subject land intersects important habitat areas for migratory shorebirds and Swift Parrot. Numerous fauna species were recorded during surveys and opportunistically including five threatened species:

- Grey-headed Flying Fox *Pteropus poliocephalus* - foraging in forest
- Pied Oystercatcher *Haematopus longirostris* – foraging in intertidal zone
- Eastern Curlew *Numenius madagascariensis* – foraging on oyster leases
- Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* – Anabat recording
- Eastern Coastal Free-tailed Bat *Micronomus norfolkensis* – Anabat recording.

Thirteen threatened candidate species were generated in the BAM-C, with eight candidate species excluded based on targeted surveys, an absence of microhabitat requirements or vagrancy. Although total direct impact (clearing) area is relatively low (0.39 ha), credits have been generated for six Plant Community Types, four TECs and five threatened species. Total credit liability is 13 ecosystem credits and 40 species credits including two Serious and Irreversible Impact (SAII) species: Swift Parrot, Eastern Curlew. Details are given in Table E1 and E2 below.

Mitigation measures include offsetting requirements, unexpected finds procedure, next box installation, weed control, high quality construction practice and standard sediment and erosion controls.

Table E1 Impacts that require an offset - ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
1	3108 Moderate	EPBC Act - *Brogo Vine Forest of the South Eastern Corner Bioregion*	0.06	2
2	3639 Moderate	BC Act – *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions*	0.06	2
3	4054 Moderate	N/A	0.04	1
4	4056 Moderate	N/A	0.02	1
5	4091 High	N/A	0.13	4
6	4097 High	BC Act - *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EPBC Act - *Subtropical and Temperate Coastal Saltmarsh*	0.08	3
Total			**0.39**	**13**

Table E2 Impacts that require an offset – species credits

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
Pied Oystercatcher	*Haematopus longirostris*	0.08 ha	3
Swift Parrot	*Lathamus discolor*	0.16 ha	9
Southern Myotis	*Myotis macropus*	0.39 ha	15

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
Eastern Curlew	*Numenius madagascariensis*	0.24 ha	13
Total			**40**

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Acronyms and Abbreviations

ALA	Atlas of Living Australia
ASL	Above sea level
BAM	Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offset and Agreement Management System
BOS	Biodiversity Offset Scheme
BV	Biodiversity values
Biosecurity Act	*Biosecurity Act 2015* (NSW)
BOM	Australian Bureau of Meteorology
BVSC	Bega Valley Shire Council
CE	Critically endangered
CEMP	Construction environmental management plan
Cth	Commonwealth
DA	Development Application
DAWE	(Former) Department of Agriculture, Water and the Environment (Cth) (formerly DoEE)
DBH	Diameter at breast height (1.3m) over bark
DCCEEW - Cth	Department of Climate Change, Energy, the Environment and Water (Commonwealth) (formerly DAWE)
DCCEEW – NSW	Department of Climate Change, Energy, the Environment and Water (NSW)
DPE	(Former) Department of Planning and Environment (NSW) (now DCCEEW and DPHI)

DPIE	(Former) Department of Planning, Industry and Environment (NSW) (now DPE)
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
FFMP	Flora and Fauna Management Plan
FM Act	*Fisheries Management Act 1994* (NSW)
FRP	Fibre reinforced plastic
FSC	Fauna spotter catcher
GIS	Geographic information system
GPS	Geographical positioning system
ha	hectares
HBT	Hollow bearing tree
IBRA	Interim biogeographic regionalisation for Australia
ICOLL	Intermittently closed lakes and lagoons
ISEPP	State Environmental Planning Policy (Infrastructure) 2007 (NSW)
km	kilometres
LGA	Local government area
m	metres
MNES	Matters of national environmental significance
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
NVR	Native vegetation regulation
OEH	(Former) Office of Environment and Heritage (NSW) (now EES)
PCT	Plant community type

PMST	Protected Matters Search Tool
REF	Review of Environmental Factors
RHAP	Rapid habitat assessment point
SAII	Serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
SEE	Statement of Environmental Effects
SEED	Sharing and Enabling Environmental Data
Sp/spp	Species/multiple species
SPRAT	Species Profiles and Threats
SVTM	State Vegetation Type Mapping
TBDC	Threatened biodiversity data collection
TEC	Threatened ecological community – a general term given to both Commonwealth and NSW listed ecological communities
VI	Vegetation integrity
VIS	Vegetation Information System

Accredited assessor declaration

Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has been prepared on the basis of the requirements of, and information provided under the Biodiversity Assessment Method and s6.15 of the BC Act. It has been assessed in accordance with BAM 2020. A full list of staff qualifications and experience can be found in Appendix G of this report.

In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct.

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

Signature: 

Name: Julie Gooding

Date: 13/06/2025

BAM Assessor Accreditation No.: BAAS18074

The associated development case 00042868/BAAS18074/24/00049718, 00051513 and 00051563 within the BAM Calculator has been finalised as of 13/06/2025, with the associated credit report reflected in Revision 4. Please notify NGH when you submit the report and we will submit the BAM-C case to the appropriate regulator.

Details and experience of author/s and contributors

The staff responsible for and involved with the preparation of this BDAR are listed in Table a) below along with relevant qualifications.

Table a) Staff involved with Merimbula BDAR

Name	BAM assessor accreditation No. (if relevant)	Position/role	Tasks performed	Relevant qualiffications
Julie Gooding	BAAS 18074	Accredited Assessor – BDAR	Supervision, BAM-C, technical review	B. Sci (Biology)
Beth Noel	BAAS 19015	Accredited Assessor – Preliminary BAM report	Field, BAM-C, co-author	BAppSc(Hons) M. Wildlife Management
Gillian Young	BAAS 17086	Accredited Assessor - BDAR	Field, PCT identification and mapping	B. Natural Resources (Hons 2)

Name	BAM assessor accreditation No. (if relevant)	Position/role	Tasks performed	Relevant qualifications
Bianca Heinze		Technical Lead - BDAR	Field, co-author	BAppSc (EnvMgt)
Elise Keane	BAAS 23013	Accredited Assessor – BDAR	Co-author, BAM-C	MEnvMgmtSust BEnvSc (ConsEcol)
Clare Vincent	BAAS23034	Accredited Assessor – BDAR	BAM-C	MEnvMgmt&Ecology BEnvSC in EnvMgmt&Ecology
Jared Graham-Hlggs		Spatial Analyst	Preparation of figures	BEnvSc Environmental Resource Management
Dylan Robertson		Graduate ecologist - Preliminary BAM report	Field, co-author	BSc Animal Science (Hons)
Justin Solomons		Graduate ecologist – BDAR	Field, co-author	BEnvSc (ConsEcol)
Eliana Hack		Graduate ecologist - BDAR	Field, co-author	BEnvSc

Conflict of interest

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

Signature: 
Date: 13/06/2025
BAM Assessor Accreditation No.: BAAS18074

Stage 1: Biodiversity assessment

1. Introduction

This Biodiversity Development Assessment Report (BDAR) assesses the biodiversity impacts of the proposed Merimbula Boardwalk upgrade (the proposal) according to the NSW Biodiversity Assessment Methodology 2020 (BAM). NGH Pty Ltd has prepared this report on behalf of the proponent, Bega Valley Shire Council.

The proposal requires development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A), with a Statement of Environmental Effects (SEE) being undertaken to support a Development Application (DA). Due to Biodiversity Values (BV) mapped land occurring in the development footprint, this proposal is subject to the Biodiversity Offset Scheme (BOS) and accordingly this BDAR has been prepared as directed by the Biodiversity Assessment Method.

Report terminology

The following terms are used in this document:

a) **Development Footprint**– all areas of land which may be directly impacted by the proposal, either during construction, operation or decommissioning. The Development Footprint has been defined by buffering the Indicative Infrastructure Layout by one metre; this accounts for all direct impacts required to allow for construction activities. Development footprint areas are used in the BAM Calculator (BAM-C) to generate ecosystem and species credits where relevant. Adjustments to the Development Footprint have been made throughout the assessment to avoid or minimise or mitigate biodiversity impacts.
b) **Subject Land** – land within which the development footprint is sited together with areas of land that could be indirectly impacted by the proposal. The Subject Land is assessed under Stage 1 of the Biodiversity Assessment Methodology (BAM). The Subject Land contains the Development Footprint plus 20 metre buffer to allow for indirect impacts.
c) **Assessment Area** – the assessment area includes the Subject Land plus the area of land within the 500m buffer zone surrounding the Subject land. The assessment area considers landscape context of the proposal including native vegetation cover calculations.

1.1. Proposed development

1.1.1. Development overview

The Bega Valley Shire Council (BVSC) are proposing to demolish and upgrade the pre-existing Merimbula Boardwalk. The current boardwalk was originally built by Green Corp trainees in 1997 (BVSC, 2024). Since then, sections of the boardwalk have been replaced or substantially repaired over a number of years. The boardwalk is approximately 1.7km in length, comprised of timber planks on timber pylons. Concrete and gravel sections occur on land. Carparks are present at either end of the boardwalk. Toilet facilities are located at the western carpark, as well as a cafe and boat hire business. There are several paths that connect with the boardwalk from side streets, which are generally narrow informal 'bush' tracks. The proposed Subject Land is 1.3ha.

The proposed upgrades to the boardwalk, associated paths and carparking areas would provide for inclusive community use by improving safety and access. The aim of the proposed boardwalk upgrade is to improve general use and options for recreation, safety, and environmental outcomes. This includes the connecting side tracks joining the boardwalk from Otway Close, Kiama Place, Imlay Street and Terry Place.

NGH understands that the proposed boardwalk upgrades comprise the following:

- Set up laydown areas and undertake early works including installation of environmental controls and minor vegetation clearing and trimming
- Removal of existing boardwalk decking and timber pylons
- Installation of new pylons in differing positions to old pylons due to spacing change
- Installation of new boardwalk structure using timber or fibreglass reinforced polymer constructed wider than old structure from 1.5m to 2.5m wide, with some alterations and additions to fishing/seating/viewing platforms and water access areas (e.g. jetties)
- Upgraded path and gravel areas to 2.5m wide as needed using local materials where possible.
- Install local Merimbula Split Stone Mine and Nullica Rock walls
- Access, drainage and surface improvements to the existing car park at the eastern end and carpark reconfiguration at the midway point near the sewer pump station
- Installation of furniture, lighting and Interpretative signage
- Revegetation where required and removal of environmental controls.

1.1.2. Location

The Subject Land is located along the northern edge of Merimbula Lake, in Merimbula, NSW. The site resides in the South East Corner IBRA region, South East Coastal Ranges region. Additionally, it is located within the Nadgee Coastal Range and Estuary/Water NSW (Mitchell) Landscapes.

The pre-existing boardwalk follows the lake edge between the Market Street Bridge (the eastern extent of the boardwalk) and Lakewood Drive, at the carpark at the top of Merimbula Lake (the western extent of the boardwalk). Most of the Subject Land is located within council land bordering the Merimbula Lake. Additionally, the Subject Land intersects with several other lots (Figure 1-1). Of these, seven lots intersect with the Development Footprint:

- Lot 1, DP 109636
- Lot 36, DP 208862
- Lot 37, DP 208862
- Lot 98, DP 747323
- Lot 202, DP 793447
- Lot 7032, DP 1047318
- Lot E, DP 355155

Key features of the Subject Land include:

- Pre-existing boardwalk
- Pre-existing hardstand (footpaths and carparks)
- Aquatic habitat
- Areas of exotic plants/lawn
- Saltmarsh
- Mangroves
- Forested wetland
- Dry sclerophyll forest.

1.1.3. Proposed development and subject land

The Subject Land occurs at the base of a south facing gradual hillslope on the edge of an intermittently closed lake/estuary (ICOLL) known as Merimbula Lake. The Merimbula Lake catchment area is approximately 37.9km^2 (DPE, 2024). The fringes of the lake contain saline wetlands and ephemeral streams.

The Subject Land comprises of a range of six vegetation types in different condition states: saline wetlands, dry sclerophyll open forest, forested wetlands, exotic lawn, and low-quality native vegetation, consisting of a mixture of exotic and naturalised species. There is a high level of vegetation diversity within the Subject Land with a variety of upper, middle, and lower stratum species. The Subject Land is proximal to residential areas and is subject to high levels of foot traffic from use of the current boardwalk and other hardstand (footpaths).

The proposal will involve the demolition and removal of the pre-existing boardwalk, which has been used for recreational purposes since it was first built in 1997, concurrently with the installation of a new boardwalk structure and upgrades to pre-existing hardstand.

The new boardwalk structure is proposed to be built over the same area of the current boardwalk structure with some minor alterations to the Subject Land. These alterations include the widening of the boardwalk hardstand as well as slight alterations and additions to the placement of fishing/seating/viewing platforms and water access areas.

The pre-existing boardwalk is constructed from treated pine wood and has two support pylon beams beneath the structure roughly every 1.5 m. While no significant amounts of native vegetation are proposed to be cleared, the demolition and removal of this structure may impact surrounding vegetation indirectly via trampling of lower stratum species by workers, flattening of lower and mid stratum species from incorrect placement of construction materials and cutting or snapping of branches and shrubbery obstructing construction.

1.1.4. Other documentation

This BDAR addresses the terrestrial biodiversity only. Other documentation submitted with the development application includes the Merimbula Aquatic Ecology Assessment Report (NGH, 2024), which assesses the impacts to aquatic matters.

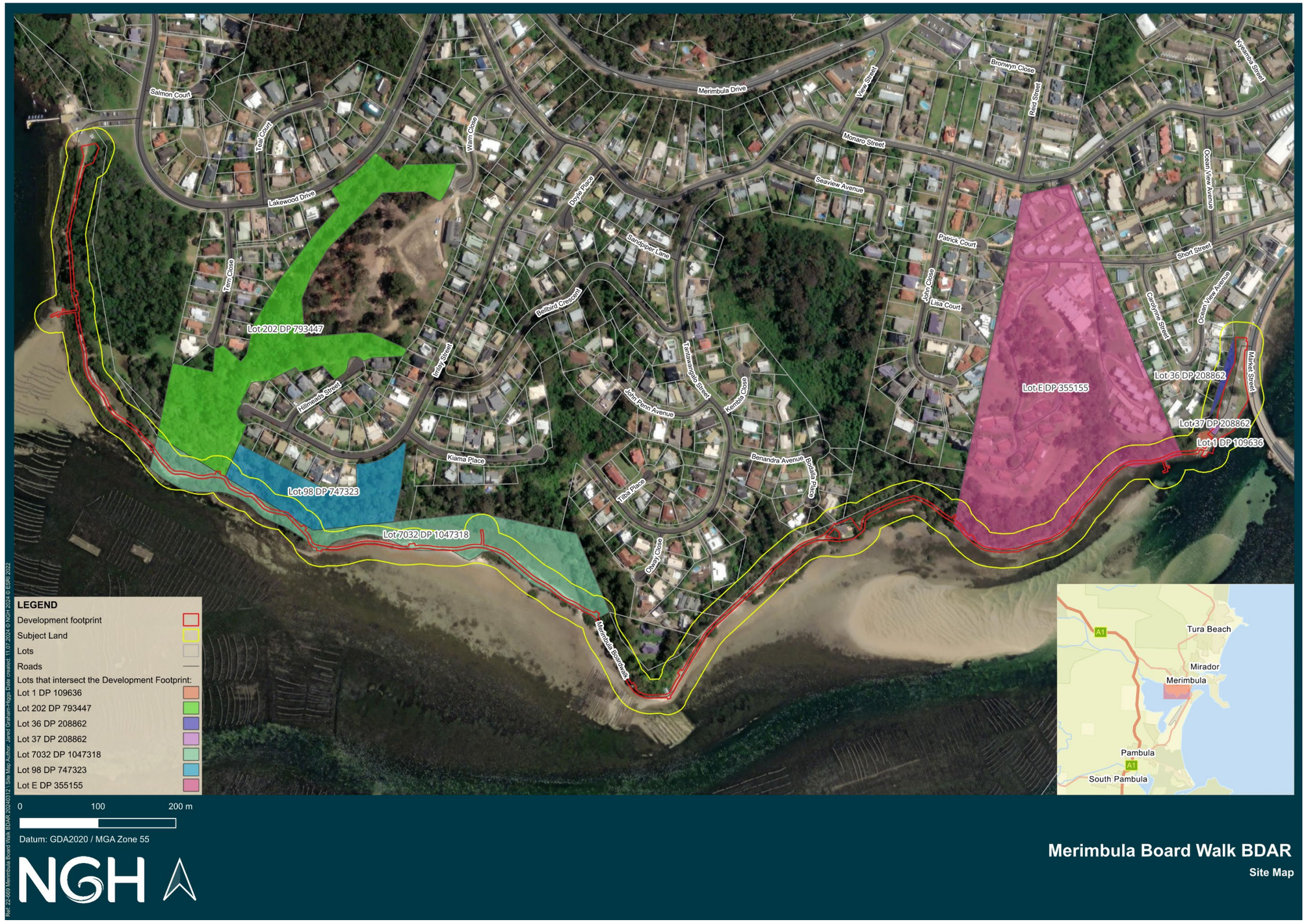

Figure 1-1 Merimbula Boardwalk BDAR subject land and associated allotments

1.2. Biodiversity Offsets Scheme entry

The Proponent is a consent authority and this project would ordinarily fall under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and be assessed under a Review of Environmental Factors (REF). However, due to areas of Coastal Land (refer to SEE), this proposed development must be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*. Due to Biodiversity Values (BV) mapped land occurring in the development footprint, this proposal is subject to Biodiversity Offset Scheme (BOS) as specified by the BC Act and the *Biodiversity Conservation Regulation 2017* (BC Reg).

The Subject Land contains a relatively large portion of areas mapped as having high biodiversity value. These include areas mapped as:

- Biodiverse riparian land
- Wetlands – Coastal Management Act
- Threatened species or communities with potential for serious and irreversible impacts.

Details are given in Appendix B; a snapshot of the BV Map is given in Figure 1-2 below.

Figure 1-2 The Subject Land (approximated in yellow) intersects with Biodiversity Values mapped land (purple) - extract from Appendix B (NSW Dept. Customer Service, 2019)

1.2.1. Assessment versions

A draft BDAR was prepared using the Part 4 developments (general) assessment type in the BAM-Calculator (BAM-C). However, during the course of the assessment it became clear that the clearing area (0.24ha) qualifies the proposal to be assessed using the Part 4 developments (small area) assessment type, as per Table 12 BAM 2020 (NSW Department of Planning and Environment, 2020). Thus, the small area module has been used.

1.2.2. Study aims

The aim of this BDAR is to document the assessment of the Proposal using the Biodiversity Assessment Method (BAM 2020) including:

- The biodiversity values of the Subject land (BAM Stage 1) and impact of the Proposal (BAM Stage 2)
- The avoid and minimise measures undertaken by the Proponent

- The number and class of biodiversity credits required to offset residual impacts of the Proposal.

1.3. Matters of National Environmental Significance

The *NSW Assessment Bilateral Agreement* applies to a range of projects assessed under the NSW EP&A Act and streamlines the assessment process for NSW and Commonwealth listed entities by endorsing the BOS for impact assessment and offsetting (DCCEEW NSW, 2024).

This BDAR includes an assessment of impacts to protected matters listed under the federal *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). This assessment includes use of the Protected Matters Search Tool (PMST) to determine potential species and communities occurring within the locality, and targeted surveys across the site to detect the presence of these entities or their habitats. Entities known or considered likely to occur have been included in the impact assessment, and Assessments of Significance have been prepared where there is the potential for impacts to determine the significance of impacts to these entities. These are reported in Appendix C.Commonwealth listed entities have been assessed using BAM-C and credits generated, as shown in 10.1.3.

1.4. Fisheries Management Act 1994

An *Aquatic Ecology Assessment* has been prepared for the Merimbula Boardwalk upgrade to address issues under the *Fisheries Management Act 1994* (FM Act). Please note that although mangroves and saltmarsh are discussed in the *Aquatic Ecology Assessment*, impact assessment and credit generation for these communities are dealt with herein under the BC Act.

1.5. Information sources

Information sources that have been used in preparing this report are shown in Table 1-1.

Table 1-1 Information sources used in the preparation of this report

Information	Source
Australia's Interim Biogeographic Regionalisation for Australia (IBRA) bioregions and subregions (DAWE, 2020)	www.environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps
Mitchell Landscapes (DECCW, 2002)	Department of Environment and Climate Change NSW (DECC, 2002). Descriptions for NSW (Mitchell) Landscapes, Version 3
NSW Biodiversity Assessment Method (BAM) calculator (BAM C)	Department of Planning, Industry and Environment (DPIE), NSW Biodiversity Accredited Assessor System (https://customer.lmbc.nsw.gov.au/assessment/s/userlogin?startURL=%2Fassessment%2Fs%2F
NSW BioNet Threatened Biodiversity Database	Office of Environment and Heritage (OEH, 2021) Accessed online via login at www.bionet.nsw.gov.au
BioNet vegetation classification database (DPE, 2021)	Accessed online via login at: www.environment.nsw.gov.au/NSWVCA20PRapp/default.aspx

Information	Source
Concept design and project information	Bega Valley Shire Council
Biodiversity Assessment Method 2020 (DPE, 2020)	www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/accredited-assessors/biodiversity-assessment-method-2020
Biodiversity Assessment Method Calculator (NSW Gov, 2021)	www.lmbc.nsw.gov.au/bamcalc
Department of Primary Industries (DPI) profiles of threatened species, populations, ecological communities and key threatening processes (DPI, n.d.)	www.dpi.nsw.gov.au/fishing/threatened-species/what-current
Directory of Important Wetlands (DCCEEW, 2021)	www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands
Transitional Native Vegetation Regulatory (NVR) Mapping	https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap
NSW Biodiversity Values Map and Threshold Tool (NSW Gov, n.d.)	www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap
NSW BioNet Atlas (DPE, 2021)	www.bionet.nsw.gov.au
NSW BioNet Vegetation Classification (DPE, 2021)	www.bionet.nsw.gov.au
NSW Flora Online (PlantNET, n.d.)	https://plantnet.rbgsyd.nsw.gov.au
NSW Government SEED mapping (SEED, 2024)	https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU
NSW Sharing and Enabling Environmental Data (SEED) Mapping Portal (SEED, 2022)	www.seed.nsw.gov.au
NSW Soil and Land Information (eSpade, n.d.)	www.environment.nsw.gov.au/eSpade2WebApp#
NSW Threatened Species Profiles (NSW Government) (OEH, n.d.)	https://www.environment.nsw.gov.au/threatenedSpeciesApp/
NSW State Vegetation Type Map	Data set accessed through the SEED portal (earlier entry in this table)

Information	Source
NSW Threatened Species Scientific Committee final determinations (DPE, n.d.)	www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/nsw-threatened-species-scientific-committee-final-determinations
Protected Matters Search Tool (Commonwealth Government) (DCCEEW, n.d.)	www.environment.gov.au/epbc/protected-matters-search-tool
Species Profiles and Threats (SPRAT) Database (Commonwealth Government) (DCCEEW, n.d.)	http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
Aerial imagery of historical land use	Sourced from Google Earth and NSW Spatial Services Delivery

2. Methods

2.1. Site context methods

2.1.1. Landscape features

Background searches were undertaken using the information sources listed above for IBRA sub-region, NSW Mitchell landscapes, Strahler and other features. Habitat connectivity was assessed using aerial imagery along with field surveys. Relevant landscape features (e.g. habitat connectivity) within the Subject Land were verified during field surveys in August 2023, February 2024 and March 2024. In particular, the existing boardwalk was assessed for containing potential habitat features.

Due to the majority of the Assessment Area being within private land, assumptions had to be made using state mapping resources as to potential landscape features. In particular, contour and data from SixMaps was utilised to determine the presence of any geological features of significance, as well as State Vegetation Type Mapping (SVTM) and aerial imagery to determine native vegetation cover estimates.

2.1.2. Native vegetation cover

During preliminary BAM assessment, native vegetation cover was estimated by a BAM Accredited Assessor by using pre-existing vegetation mapping. Pre-existing mapping resources included SVTM, BioNet vegetation classification database as well as the use of previous identical Plant Community Type (PCT) data from the Merimbula Airport (undertaken as part of a BDAR for a proposed runway extension, less than 1km away). These resources were utilised to determine the native vegetation cover within the 500 m Assessment Area.

Native vegetation cover within the Subject Land was ground truthed during the preliminary BAM site visit in August 2023, and further during targeted flora and BAM plot surveys in February 2024. Assumptions have been made about native vegetation cover outside of the Subject Land, in areas of private land, where field surveys were unable to be undertaken.

2.2. Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1. Existing information

To assist with gaining knowledge of the existing native vegetation and Threatened Ecological Communities (TECs) within the assessment area, a desktop investigation was undertaken for the proposed development footprint in April and May 2024 to review existing information. The following searches were conducted:

- Biodiversity Values Mapping and areas of outstanding biodiversity value were conducted. The search was conducted on 20 May 2024
- BioNet species sightings records of threatened flora, fauna and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act). The search was conducted on 10 April 2024 within a 10km radius surrounding the Subject Land
- Protected Matters Search Tool (PMST) for threatened species and populations listed under the EPBC Act. The search was conducted on 04 April 2024 within a 10 km radius surrounding the Subject Land
- Atlas of Living Australia (ALA) species sightings, accessed 14 August 2023.

Following field surveys, the following resources were utilised to determine native vegetation extent and PCTs present onsite:

- State Vegetation Type Mapping
- BioNet Vegetation Classification database
- Eastern Plot to PCT Tool.

2.2.2. Mapping native vegetation extent

Native vegetation cover within the Subject Land was estimated at a desktop level using pre-existing vegetation mapping. These resources included Statewide Vegetation Type Mapping, BioNet vegetation classification database as well as the use of previous identical PCT data from the Merimbula Airport (undertaken as part of a BDAR for a proposed runway extension, less than 1km away).

Field surveys were undertaken by BAM Accredited Assessors in August 2023 and February 2024 to ground truth the native vegetation extent within the Subject Land. Following field surveys, vegetation mapping was refined, including confirming PCTs present within the Subject Land to create a more accurate and comprehensive map.

2.2.3. Plot-based vegetation survey and PCT determination

On-site field surveys were conducted by BAM accredited ecologists in August 2023 and February 2024 to determine the PCTs on-site and determine the presence of any threatened ecological communities (TECs). Surveys included BAM plot data collection in accordance with the BAM (DPE, 2020) and the use of BAM plot data to stratify vegetation across the site. A site inspection and one BAM plot was conducted in August 2023, with a further seven BAM plots undertaken across the Subject Land in February 2024. The aim of this field work was to assess the vegetation visually and conduct an acceptable number of BAM plots in the representative PCTs observed onsite in accordance with BAM 2020. A minimum of one BAM plot was undertaken for each PCT to better describe and capture representative data for each vegetation zone within the assessment area.

Upon conducting further BAM plots in February 2024, some plots had to be selectively chosen due to limited available habitat close to the Subject Land as well as the linear nature of the Subject Land (Plot number 1, 2, 3, 4 and 7). Additionally, several plot measurements had to be altered to better fit the limited representative

extent of some PCT habitats, therefore rather than the standard 20m x 50m plots, some plots were 10m x 100m (e.g. Plot number 2).

Within the Grey Mangrove-River Mangrove Forest, the mangroves were counted as tree growth form in the collection of function data. Marine algae such as Neptune's Necklace *Hormosira banksii* and seagrass was also included with any mangrove leaf litter inside each 1m square litter quadrat.

PCT determination

Step 1

BAM plot data was input into the Plot to PCT Assignment Tool (DCCEEW (NSW), 2024), which provides a standardised repeatable method for identifying quantitative PCTs using floristic survey methods required under the BAM.

1A. 'Centroid matches and Environmental Thresholds' were investigated for PCTs where scores were within thresholds (0 to 0.695).

1B. If score was below threshold, then 'Characteristic Species Method' was applied to try and estimate a strong floristic match to a PCT.

Step 2

Where there was no suitable PCT returned by the tool, the Bionet Vegetation Classification database was utilised, by filtering PCTs as follows to determine the best fit PCT:

1) *South East Corner Bioregion* IBRA entered
2) *South East Coastal Ranges subregion* entered
3) The Vegetation Formation was chosen for the vegetation community
4) Three key dominant upper stratum species (where present inside BAM plot), then
5) Three key dominant mid stratum species (where present inside BAM plot), then
6) Three key dominant lower stratum species (where present inside the Bam plot).
7) The button 'show results' was then chosen to list the PCT summaries. The results were then reviewed and PCTs with the strongest number of 'hits' were further investigated.
8) Information relating to distribution of PCT, landforms, soil types, aspect etc were compared to physical site conditions to further shortlist the best matching PCTs.
9) The PCT with the strongest floristic and spatial match was chosen as the final PCT.

Step 3

The Statewide Vegetation Type Mapping (SVTM) was also reviewed (as another data source) to view PCT mapping within 1km of the proposed development. Justification on the selection of each PCT is outlined in Section 4.2. Locations of BAM plots are shown in Figure 4-9.

2.2.4. Vegetation integrity survey

BAM plots were used to further delineate PCTs into specific zones based on condition, which was determined using the vegetation integrity score (VI score) calculated in the BAM-C and extrapolated out in combination with on-site vegetation stratification and aerial imagery. Vegetation was classified as poor condition for VI scores lower than 15, low condition between 15-30, moderate condition between 30-60, and high condition above 60.

2.3. Threatened flora survey methods

2.3.1. Review of existing information

IBRA regions and subregions, PCTs and BAM Plot data were input into the BAM-C, to determine the threatened flora species which had the potential to occur within the Subject Land. Further databases were reviewed to determine if any additional threatened flora species may be present, which included:

- BioNet species sightings records of threatened flora listed under the BC Act. The search was conducted on 10 April 2024 within a 10km radius surrounding the Subject Land
- PMST for threatened species and populations listed under the EPBC Act. The search was conducted on 04 April 2024 within a 10 km radius surrounding the Subject Land
- ALA species sightings, accessed 14 August 2023.

Existing information was reviewed by researching individual habitat constraints of the identified targeted flora species. This was completed using the NSW DPIE's BioNet threatened biodiversity database (OEH, 2021) and the NSW Threatened Species Profiles (OEH, n.d.) to determine habitat constraints, any microhabitats and the species associated PCTs. This was compared against the vegetation and habitat available within the Subject Land to determine the likely areas of potential habitat for each species.

2.3.2. Habitat constraints assessment

Rapid assessments and vegetation mapping was undertaken in August 2023 to determine potential habitat for threatened flora species within the Subject Land.

Whilst habitat for threatened species was not contiguous across the entire Subject Land, due to the narrow linear nature of the Subject Land, the threatened flora species targeted survey extended the entire length of the boardwalk.

2.3.3. Field surveys

Surveys were undertaken by a BAM accredited ecologist in accordance with *Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method* (DPIE, 2020). Due to the narrow nature of the Subject Land, two linear transects were conducted on foot following the boardwalk's development footprint, from the northern edge (Market Street) first from east to west end. The total length of transects was 4.6 km, which were undertaken over four hours, with an average speed of 1.1 km/h.

The following species, which were identified within the BAM-C (general assessment module) and by the PMST as requiring survey, were targeted:

- Australian Saltgrass *(Distichlis distichophylla)*
- Square Raspwort *(Haloragis exalata subsp. exalata*)
- Narrow-leafed Wilsonia *(Wilsonia backhousei)*
- Round-leafed Wilsonia *(Wilsonia rotundifolia).*

The vegetation was inspected for a maximum distance of 5m either side of the edge of the boardwalk. All traversing was recorded on a Garmin 64 GPS Unit as a track. Note these species did not require further assessment using the BAM-C small area module.

2.4. Threatened fauna survey methods

2.4.1. Review of existing information

IBRA regions and subregions, PCTs and BAM Plot data were input into the BAM-C, to determine the threatened fauna species which had the potential to occur within the Subject Land,. Further databases were reviewed to determine if any additional threatened fauna species may be present, which included:

- BioNet species sightings records of threatened fauna listed under the BC Act. The search was conducted on 10 April 2024 within a 10km radius surrounding the Subject Land
- PMST for threatened species and populations listed under the EPBC Act. The search was conducted on 04 April 2024 within a 10 km radius surrounding the Subject Land
- ALA species sightings, accessed 14 August 2023.

Existing information was reviewed by researching individual habitat constraints of the identified targeted fauna species. This was completed using the NSW DPIE's BioNet threatened biodiversity database (OEH, 2021) and the NSW Threatened Species Profiles (OEH, n.d.) to determine habitat constrains, any microhabitats and the species associated PCTs. This was compared against the vegetation and habitat available within the Subject Land to determine the likely areas of potential habitat for each species.

2.4.2. Habitat constraints assessment

Ten rapid habitat assessment points (RHAP) were undertaken across the Subject Land and immediate surroundings to identify any habitat constraints (e.g. waterbodies, rocky areas, tree hollows) and microhabitats associated with threatened fauna species. In particular, the Subject Land was assessed for containing potential habitat for White-footed Dunnart (*Sminthopsis leucopus*) and Brush-tailed Phascogale (*Phascogale tapoatafa*).

Observations entered into GIS enabled field tablet included habitat type, foliage density, dominant tree species, structure of each stratum (dense, moderate, open), an estimation of litter abundance, maximum, minimum and average diameter at breast height (DBH), presence of hollow bearing trees (HBTs) and rough-barked trees, nests, and photographs also collected for later reference.

An assessment of potential habitat or signs of use by microbats was also undertaken underneath the existing boardwalk structure.

2.4.3. Field surveys

Targeted surveys were undertaken in March 2024 for species returned in the BAM-C (general assessment module):

- Bush Stone-Curlew (*Burhinus grallarius*)
- Eastern Osprey (*Pandion cristatus)*
- Giant Burrowing Frog (*Heleioporus australiacus*)
- Green and Gold Bell Frog (*Litoria aurea*)
- Little Eagle (*Hieraaetus morphnoides)*
- Southern Myotis (*Myotis macropus*)
- Square-tailed Kite (*Lophoictinia isura)*
- Stuttering Frog (*Mixophyes balbus*)
- White-bellied Sea-Eagle (*Haliaeetus leucogaster).*

Incidental observations of non-target amphibian species were also recorded. Methods for survey are detailed below. The BAM-C small area module required surveys only for Stuttering Frog.

Bush Stone-Curlew

Surveys were conducted in accordance with the *2006 Recovery Pan for the Bush Stone-curlew* (DEC, 2006).

Surveys were undertaken between 17 – 20 March 2024. Call playback was undertaken, which consisted of 30 seconds of playback through a 15–23-Watt Transistor megaphone with 4.5 minutes of listening. The method was repeated at three locations across the Subject Land for four consecutive nights.

Southern Myotis

Surveys were conducted in accordance with *'Species credit' threatened bats and their habitats: NSW guide for the Biodiversity Assessment Method* (DPIE, 2020).

Two Anabat Swift recording units were deployed in most suitable habitat across the study area. One Anabat (unit 71) was deployed close to transect 2, facing a small waterbody with various fallen trees within it. Habitat was of moderate suitability and was the best representative habitat for Southern Myotis available.

The second Anabat recorder (unit 72) was placed approximately two metres high on a tree close to transect 3, facing an open saltmarsh area subject to intermittent tidal inundation. The unit was approximately 30m from the high tide line and the saltmarsh had an open canopy fringed by *Melaleuca armillaris*. Both units were deployed for seven nights (17 March – 23 March). Both units were set to 'night mode' and only recorded post sunset and before sunrise each day.

Amphibians

Surveys were conducted in accordance with *NSW Survey guide for threatened frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method* (DPIE, 2020).

Nocturnal transects (total length 500m) were conducted for Giant Burrowing Frog, Stuttering Frog and Green & Golden Bell Frog between 17 March to 24 March 2024. A total of eight nights were devoted to surveying for Giant Burrowing Frog. Four nights survey was devoted to Stuttering and Green & Golden Bell Frog. The required 500m length of transect was split into five separate 100m transects to adequately capture suitable riparian habitat.

Methods undertaken were carried out in the following order and were consistent for each species.

- 5 minutes of aural survey (active listening)
- 2 minutes of call playback (using a tablet with speaker) followed by 2 minutes of active listening for each target species
- 5 minutes of visual surveying (active searching) using standard LED headtorches.

Giant Burrowing Frog and Stuttering Frog were surveyed nights 1- 4, whilst Giant Burrowing Frog and Green and Golden Bell Frog were surveyed on night 5 - 8. Therefore, each survey night targeted two species with a minimum of 18 minutes per call playback, calculated at 12 mins each (given the 5 mins before and after call playback is shared between species).

Raptors

Surveys were undertaken 27-29 February 2024. The whole Subject Land was searched for stick nests. Surveys across the subject land took a period of two hours. Any nests detected were marked with a field GIS enabled tablet.

2.5. Weather conditions

The weather conditions during the field surveys are shown in Table 2-1.

Above average rainfall was experienced in January, however below average rain was experienced in February and March 2024 (Australian Government Bureau of Meteorology, 2024). This below average rain may have influenced *Distichlis distichophylla* blooming, as it is known to bloom after rain (Office of Environment and Heritage, 2022), however the high rainfall experienced in January may have allowed for it to bloom.

Whilst overall rainfall was below average in March, consistent high rainfall was experienced during the amphibian survey period, and therefore was considered ideal conditions to undertake the surveys.

Table 2-1 Survey weather conditions - observations drawn from Merimbula, NSW [BOM station 069147] (Australian Government Bureau of Meteorology, 2024)

Survey undertaken	Date	Time	Temp. min (C°)	Temp. max (C°)	RH 9am [1](%)	Wind max. gust (km/h)	Rainfall (mm) (and past 14 days)	Other conditions relevant to species
Threatened flora transects	27/02/24	10:00am to 6:00pm	16.3	22.7	93	37	0 (7.8)	Below average rainfall of 28.4mm in the month of February 2024 (average rainfall in February is 76.0mm) may have influenced *Distichlis distichophylla* blooming (blooms after rain) (Office of Environment and Heritage, 2022)
BAM Plots	28/02/2024	8:00am to 5:00pm	16.3	27.0	84	39	0.2 (7.8)	-
BAM Plots and habitat mapping	29/02/2024	8:00am to 3:00pm	19.0	26.1	99	33	0 (2.6)	-
Deployed Anabat units Call Playback Amphibian Transects	17/03/24	6:30pm to 12:30am	15	22.5	99	24	1.2 (5.6)	Consistent rain throughout survey. Good for amphibian surveys.
Call Playback Amphibian Transects	18/03/24	7:00pm to 12:00am	15.4	24.7	99	39	15.4 (6.8)	Large downpour throughout the surveys. Very good weather for amphibian surveys.
Call Playback Amphibian Transects	19/03/24	7:00pm to 12:00am	17.2	25.2	92	39	22 (22.2)	Large downpour throughout the surveys. Very good weather for amphibian surveys.
Call Playback Amphibian Transects	20/03/24	7:00pm to 12:00am	16.7	19.7	61	52	16.4 (44.2)	Clear night even with recorded rainfall.

[1] RH = relative humidity. Provided for 9am the following morning as best matches site conditions on survey night.

Survey undertaken	Date	Time	Temp. min (C°)	Temp. max (C°)	RH 9am [1](%)	Wind max. gust (km/h)	Rainfall (mm) (and past 14 days)	Other conditions relevant to species
Amphibian Transects	21/03/24	7:00pm to 12:00am	10.5	20.9	99	33	0 (60.4)	Clear night with little to no wind.
Amphibian Transects	22/03/24	7:00pm to 12:00am	8.2	22.2	79	33	0 (60.4)	Clear night with little to no wind.
Amphibian Transects	23/03/24	7:00pm to 12:00am	11	23.4	94	24	0 (60.2)	Slightly overcast night with little to no wind.
Amphibian Transects Retrieved 2 Anabat units	24/03/24	7:00pm to 12:00am	11.7	22.3	92	20	0 (60.2)	Clear night with little to no wind.

2.6. Limitations

2.6.1. Limitations during February 2024 surveying

Due to surveying in a relatively constrained and linear area within the Subject Land some of the BAM plots had to deviate from the standard size of 20m x 50m to better capture the relevant plant community types (PCTs); Plots 2 and 6 were 10m x 100m in size.

BAM plots had to be selected and not randomly placed due to size limits of relevant PCT habitat available to fit a BAM plot. Additionally, the linear nature of boardwalk makes representative survey difficult. Vegetation within 2m of boardwalk is more disturbed (Figure 2-1) than representative vegetation surveyed in the BAM plot (Figure 2-2) meaning there could be more credits generated from surveying better quality vegetation.

Figure 2-1 Example of more disturbed mangrove vegetation along the boardwalk

Figure 2-2 Higher quality mangrove vegetation where the BAM plot was undertaken

When conducting BAM plot 5, survey efficacy was reduced by the presence of thick Saw Sedge, *Carex* sp. and *Baumea* spp., swampy waterways, logs, and tangled vegetation (Figure 2-3). This plot was positioned within the plant community type (PCT), *Southern Estuarine Swamp Paperbark Creekflat Scrub* (PCT 4056). As a result, in the interest of staff safety the method of surveying was altered: 20m tapes were set out for the plot head and tail and the 50m tape set out parallel with the pathway (on southern longitudinal edge and not centre of BAM plot). Additionally, all litter plots were taken in a single row 2.5m from the margin of the BAM plot due to inaccessibility and tree counts were estimated from the margin of the plot (Figure 2-4). The modification may have also reduced visibility of smaller trees (e.g. regeneration). This is unlikely to have negatively affected the quality of the data, as the plot consisted of very similar litter coverage and representative vegetation throughout and there were very few trees, all of which were visible from the plot margin.

Figure 2-3 Tangled vegetation reduced access at BAM plot 5

Figure 2-4 Tree counts estimated from margin of BAM plot 5

During targeted species surveying, four species were targeted simultaneously. The species were grouped as they share similar growth forms (forbs and sub-shrubs), including two from the same genus. Surveys were undertaken by a single experienced surveyor who walked one side of the boardwalk observing all that was within 5m of the right of the boardwalk development footprint and then walked on the other side of the boardwalk observing all that was within 5m of the left side. This is unlikely to affect the reliability of the surveyor's observations, as they are an experienced botanist, they carried an identification sheet detailing each targeted flora species with them and the survey area was very linear and narrow.

Hollow bearing tree (HBT) surveys undertaken from the ground are inherently inaccurate. Accuracy is dependent on the height of the hollow, the angle of observation as well as the individual surveyors' interpretations. While the observations are considered to reliably reflect the quality and availability of hollows available in the study area, the true characteristics of the hollow (i.e. hollow height, hollow size, and the hollow type) may be slightly different to that recorded.

Rapid assessment points (for flora and habitat) are an efficient method of collecting information across a site, but surveyors may fail to pick up all habitat features compared to a systematic survey. Notwithstanding, the data collected by rapid assessment is considered reliable.

2.6.2. Limitations during March 2024 surveying

Amphibian survey transects had to deviate from the boardwalk to capture riparian habitat. This meant some transects were greater than 50m away from the boardwalk itself. However, this targeted better quality habitat and does not underestimate the presence of amphibians in the development footprint.

Survey transects also differed slightly each night to capture a variety of habitats giving a broader range of results. This may have a slight effect on the consistency of the results, however, will not negatively affect the quality of the data.

Attempts were made to survey dense leaf litter and vegetation within transect 1, however visual surveying was difficult to accomplish in densely vegetated areas because of restricted access (Figure 2-5). Transects were therefore completed along the verge either side of informal tracks and the main path (Figure 2-6). As frogs were heard and seen along these verges, this was considered a suitable survey method.

Figure 2-5 Example of dense understorey vegetation in some areas

Figure 2-6 Informal tracks were used for transects

Transect 5 did not contain any viable habitat for the targeted species. As a result, ecologists elected to move this to a storm water detention pond approximately 300m southwest of Transect 1, on the second night of surveying. This storm water detention pond contained much more suitable habitat for amphibians as there was open water, flowing water, and dense leaf litter habitat present. However, moving this site on the second night may have resulted in a small loss of data over the first night.

Anabat recording units may have had audio interference from rainfall during the first two nights of surveying (17 and 18 of March). As a result, the unit's recordings may contain some unusable data.

2.6.3. Data limitations

The GPS data utilised contains location errors, more accurate surveyor data was not available. The aquatic and terrestrial assessments utilise different techniques. Due to this there is some insignificant overlap in impact areas between the BDAR and Aquatic Assessment Report.

3. Site context

3.1. Assessment area

The Merimbula Boardwalk is a linear development which expands across approximately 1.7 km, with a proposed Subject Land of 1.3 ha. As a linear development the Subject Land is buffered by 500m (known as the assessment area). This buffer encompasses areas of the Merimbula Lake estuary and its shoreline as well as areas of Merimbula's residential and business zones. See Figure 3-5.

3.2. Landscape features

Landscape features identified within the subject land and assessment area (500m buffer) are shown in Figure 3-6. The Subject Land is located along the northern edge of the Merimbula Lake estuary and shoreline. The nearest reserved lands include Bournda Nature Reserve (2.4 km north of the Subject Land) and Beowa National Park (3.3 km south of the Subject Land).

The majority of the Subject Land contains native vegetation, with the exception of the existing boardwalk footprint and directly adjacent to the footprint which has been disturbed. Native vegetation includes a variety of vegetation communities, including forest communities, saltmarsh and mangroves. Within the assessment area (500m buffer), there are patches of native vegetation which extend north west of the assessment area, however the majority of the assessment area encompasses residential and business dwellings.

A discussion of relevant landscape features is provided below.

3.2.1. IBRA bioregions and IBRA subregions

Interim Biogeographical Regionalisation for Australia (IBRA) bioregions are geographically distinct bioregions and subregions based on common climates, geology, landforms and native vegetation (Thackway & Cresswell, 1995). There are 89 bioregions within Australia. The Subject Land falls across one IBRA Bioregion, South East Corner Bioregion and this was entered into the BAM-C (Figure 3-5). The South East Corner Bioregion is an extensive area of 2,532,053 extending from the south-east corner of NSW and extends into Victoria.

The South East Coastal Ranges IBRA subregion spans from south-east NSW into eastern Victoria along the coast. It is characterised by a diversity of natural habitats. These vary from temperate forests and woodlands to wetland and coastal vegetation. The coastal dune pattern is much the same as elsewhere in NSW with an inland forest of various banksia, bangalay (*Eucalyptus botryoides*) and blackbutt (*Eucalyptus pilularis*). Estuaries support small areas of stunted mangrove (*Avicennia marina*) and salt marsh, with a fringe of swamp oak (*Casuarina glauca*). The array of habitats means the ranges are home to a large number of native and threatened species. There are 18 threatened ecological communities in the ranges and more than 140 threatened flora and fauna species found in the subregion. The geology of the Subject Land within the South East Coastal Ranges subregion comprises of the Merimbula Group (Dse) which is made up of sandstone, siltstone, mudstone, and conglomerate.

3.2.2. Rivers, streams, estuaries and wetlands

Waterways within the development site are shown in Figure 3-5. The Subject Land is bordered by a large estuary/ wetland (Merimbula Lake). Merimbula Lake is an intermittently closed tidal lake located on the far south coast of New South Wales. Merimbula lakes wetlands are intertidal. They are known as a nationally important wetland (DCCEEW, 2021).

The estuary is in close proximity to the regional centre of Merimbula, but the majority of the catchment is undeveloped. The estuary has extensive seagrass beds, mangrove, saltmarsh and other wetland habitat. It also supports a large oyster lease. The geology of Merimbula Lake consists of Tertiary sediments including gravel, sand, sandstone, clay and lignite on the southern shores and Upper Devonian sediments of the Merimbula Formation including conglomerate, red and brown shale, sandstone, quartzite, and arkose. Mean annual rainfall for the area is 960mm.

The Subject Land is intersected by four 1st order unnamed ephemeral watercourses and one 2nd order unnamed ephemeral watercourse, all of which are tributaries of Boggy Creek. Boggy Creek, a 5th order watercourse, does not directly intersect with the Subject Land. It is contained within the Merimbula Lake estuary and is fed by several smaller tributary creeks.

An EPBC PMST was completed on 4 April 2024, with no wetlands of international importance (Ramsar Wetlands) identified within close proximity to the Assessment Area.

3.2.3. Habitat connectivity

Areas of habitat connectivity are indicated in Figure 3-6. The Subject Land is directly connected to several habitats due to it bordering on Merimbula Lake, a tidal estuary. The Subject Land is connected to five short and narrow riparian corridors containing ephemeral 1st and 2nd order streams. However, residential land between each corridor limits the connection of these corridors to each other. Parts of the Subject Land on the northern side of the development footprint is in close proximity to residential housing. The Subject Land contains areas of aquatic habitat, which is directly connected to the large area of tidal aquatic habitat available in Merimbula Lake estuary. The Subject Land also contains some limited areas of mangrove and saltmarsh habitat most of which is connected along the extent of the boardwalk structure. This thin strip of vegetation is bordered by residential areas to the north and east, and Merimbula Lake to the south. Terrestrial and some arboreal species will have limited ability to cross Merimbula Lake as it is a large body of water. The vegetation along the edge of Merimbula Lake has high connectivity with larger patches of native vegetation beyond the assessment area, particularly to the north west.

Beyond the assessment area, the narrow band of vegetation is connected to larger patches of terrestrial habitat within the north west, including connectivity to the Bournda Nature Reserve and National Park to the north, and the South East Forest National Park to the west. These areas are recognised as part of Southeast and Tablelands Regional Plan Corridors (SEED, 2024). The aquatic habitat is connected to the wider Merimbula Lake, which joins out to the Merimbula Bay.

3.2.4. Karst, caves, crevices, cliffs, rocks or other features of geological significance

There are no karsts, caves, crevices, cliffs, rocks or other geological features of significance within the Assessment Area. The *Cavernous Karst Environments of NSW* map (DECC, 2007) shows that there are no known karst environments in the region. However, the far south coast is known for numerous sea caves (non-karst) (DECCW, 2011). The subject land is within 2km of rocky headlands and potentially, sea caves.

The Subject Lands surface geology falls in the Merimbula Group (Dse) - sandstone, siltstone, mudstone, and conglomerate. The Subject Land consists of hydrosols and kurosols, but the texture has been identified as sandy loams.

3.2.5. Areas of outstanding biodiversity value

Areas of outstanding biodiversity value are special areas with irreplaceable biodiversity values that are important to the whole of New South Wales, Australia or globally. No areas of outstanding biodiversity value occur within or adjacent to the Subject Land.

3.2.6. NSW (Mitchell) landscapes

The Subject Land falls across three Mitchell Landscapes (Figure 3-5). These are:

- Bodalla – Nadgee Coastal Sands
- Bodalla – Nadgee Coastal Ranges
- Estuary/Water Added.

The dominant Mitchell Landscape within the Subject Land is the Nadgee Coastal Ranges. This was entered into the BAM Calculator.

The Nadgee Coastal Range is identified as "coastal ranges and hills on middle Devonian sandstone, quartzite, conglomerate and siltstone, and Ordovician sandstone, quartzite and phyllite with some granite. Elevation ranges from 0 to 550m" (Mitchell, 2002). Geology includes "thin stony soils on ridges with deeper red-yellow texture-contrast profiles on Ordovician rocks" (Mitchell, 2002). Vegetation communities include "forests of silvertop ash (*Eucalyptus sieberi*), mountain grey gum (*Eucalyptus cypellocarpa*), gully gum (*Eucalyptus smithii*), white ash *(Eucalyptus fraxinoides*), messmate (*Eucalyptus obliqua*), prickly stringybark (*Eucalyptus consideniana*) and red bloodwood (*Corymbia gummifera*). Gullies with cool temperate and sub-tropical rainforest species such as; eastern leatherwood (*Eucryphia moorei*), prickly tree-fern (*Cyathea leichardtiana*), bolwarra (*Eupomatia laurina*), lilly pilly (*Acmena smithii*) and sweet pittosporum (*Pittosporum undulatum*). Open coastal headland heaths on shallow stony soil of bushy needlewood (*Hakea sericea*), giant honey-myrtle (*Melaleuca armillaris*), coast rosemary (*Westringia friticosa*) and dwarfed red bloodwood on shallow soils subject to high salt spray input and frequent fire. Wet button grass (*Gymnoschoenus sphaerocephalus*) swamps on high peaks." (Mitchell, 2002).

3.3. Native vegetation cover

Native vegetation cover within the 500 m assessment area was limited to narrow bands of vegetation along the edges of Merimbula Lake (Figure 3-6), and larger patches extending to the north and north west of the development footprint. Much of the norther portion of the assessment area consisted of residential dwellings, and the southern portion of the assessment area contained Merimbula Lake.

The native vegetation cover within the assessment area was estimated to be 49.63 ha out of a total area of 306.22 ha. Table 3-1 summaries the extent of native vegetation cover within the assessment area. This equates to 16.21% native vegetation coverage and this number was entered into the BAM Calculator for this assessment. See Figure 3-6 showing native vegetation cover. Details on native vegetation within the Subject Land are provided in Section 4.1.

Table 3-1 Native vegetation cover in the assessment area

Assessment area (ha)	306.22 ha
Total area of native vegetation cover (ha)	49.63 ha
Percentage of native vegetation cover (%)	16.21
Class (0-10, >10-30, >30-70 or >70%)	>10-30%

3.4. Additional site context components

Existing boardwalk, pathway and carpark occupies around half of the development footprint. Except for beneath the boardwalk (Figure 3-1), these areas do not contain vegetation and have been excluded from the development footprint (Figure 3-2 to Figure 3-4). Mangrove (e.g. pneumatophores) and saltmarsh vegetation has been assumed to persist beneath the boardwalk and although clearly in a different condition state than

adjacent vegetation, for the purposes of this assessment, condition has been assumed to be that determined by BAM plots.

Figure 3-1 Existing boardwalk

Figure 3-2 Existing pathway

Figure 3-3 Existing viewing platform

Figure 3-4 Existing seating area

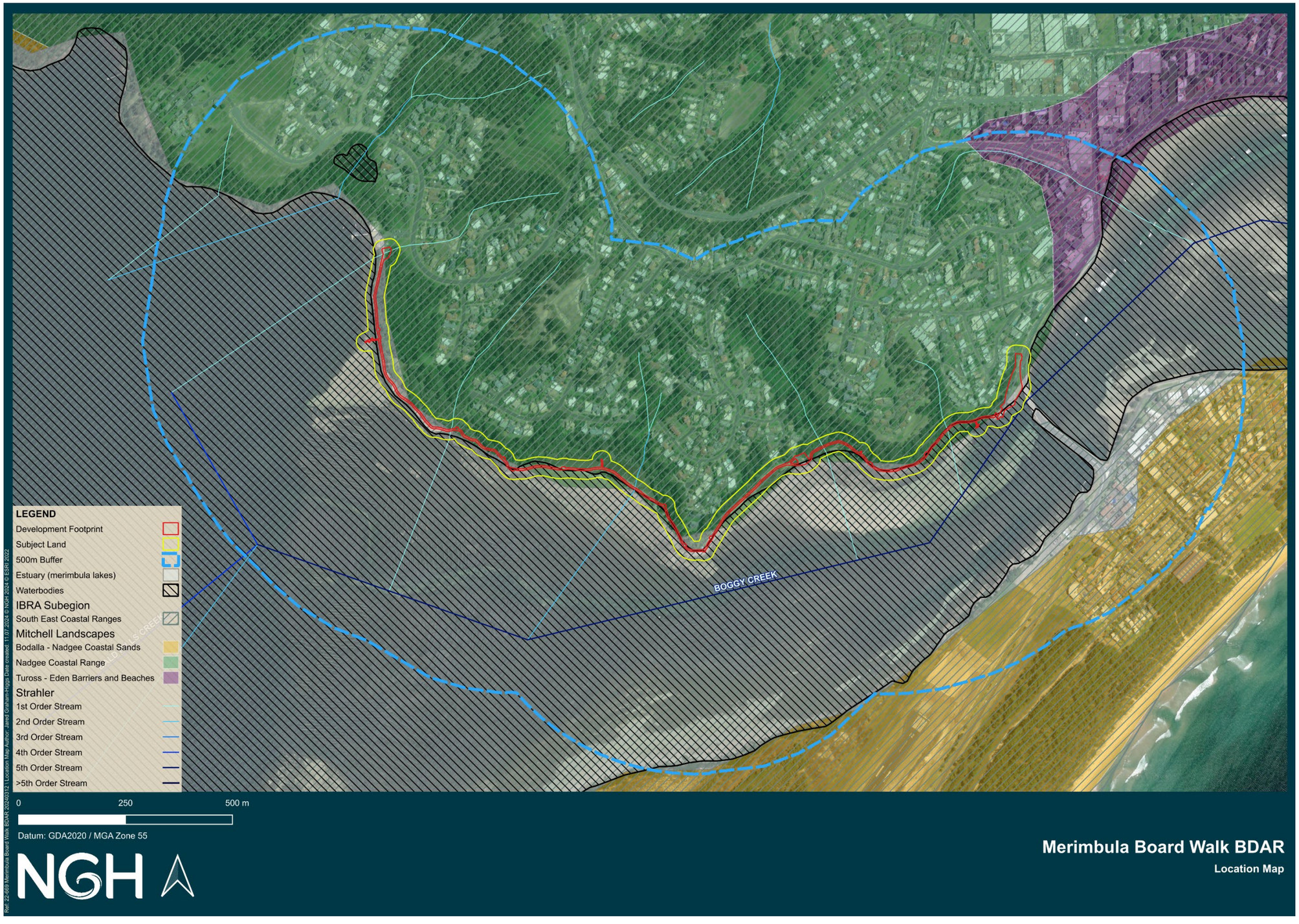

Figure 3-5 Location map

Figure 3-6 Native vegetation extent within the assessment area

4. Native vegetation

4.1. Native vegetation extent

Native vegetation extent refers to areas of vegetation assessed under the BAM. The majority of the Subject Land is dominated by native vegetation. Native vegetation in the form of mangroves, forests and saltmarsh occurs both north and south of the existing boardwalk structure. Aquatic vegetation occurs along the far south of the Subject Land, where it meets the Merimbula Lake estuary.

4.1.1. Changes to the existing native vegetation mapping

A review of existing vegetation mapping, including the SVTM mapping was undertaken prior to field surveys to determine the extent of native vegetation within the Subject Land. The extent of native vegetation was refined following field surveys, which included delineation of the existing boardwalk footprint. Overall, there is a greater extent of native vegetation within the subject land than what is represented on the SVTM.

4.1.2. Areas that are not native vegetation

Areas not containing native vegetation included the existing boardwalk footprint and bare patches associated with these heavy trafficked areas. The existing boardwalk was delineated using aerial imagery and during the field survey using GPS to get an accurate representation of the footprint.

As per the BAM definition of native vegetation, marine vegetation, including seagrasses, was not included as native vegetation for the purposes of this assessment.

4.2. Plant community types (PCTs)

4.2.1. PCT overview

Seven PCTs were identified within the Subject Land, shown in Table 4-1, with detailed descriptions of each PCT provided in the following subsections. Figure 4-8 provides an overview of PCTs across the subject land; detailed maps are given in Appendix F. Section 2.2.3 describes the method of determining PCTs.

Table 4-1 PCTs identified within the subject land

PCT ID	PCT name	Subject land area (ha)
3108	South Coast Scarp Wet Vine Forest	1.84
3639	South Coast Sands Bangalay Littoral Forest	0.88
4054	South Coast Tidal Flats Samolus Paperbark-Grey Box Forest	0.88
4056	Southern Estuarine Swamp Paperbark Creekflat Scrub	0.43
4091	Grey Mangrove-River Mangrove Forest	1.75
4097	Samphire Saltmarsh	0.67
4102	South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh	0.10
Total Area		6.55

4.2.2. PCT 3108 South Coast Scarp Wet Vine Forest

4.2.2.1 PCT overview

A summary of PCT 3108 key features is shown in Table 4-2 and a typical example in Figure 4-1.

Table 4-2 PCT 3108 South Coast Scarp Wet Vine Forest

PCT ID	3108
PCT name	South Coast Scarp Wet Vine Forest
Vegetation formation	Wet Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	South Coast Wet Sclerophyll Forests
Percent cleared in NSW (%)	25.86
Associated TECs	Associated with two TECs: BC Act – *Brogo Wet Vine Forest in the South East Corner Bioregion* EPBC Act - *Brogo Vine Forest of the South East Corner Bioregion*
Extent within subject land (ha)	1.84

PCT 3108 occurs along the eastern half of the development footprint, to the north of the existing boardwalk. The vegetation was dominated by *Eucalyptus bosistoana* (Coast Grey-box) in the overstorey. The midstorey contained a high diversity of shrub species, and was dominated by *Pittosporum undulatum* (Sweet Pittosporum). The ground layer was dominated by exotic species, with total exotic cover of 40%. The dominate species include exotic *Ehrharta erecta* (Panic Veldtgrass), *Pennisetum clandestinum* (Kikuyu Grass), *Erigeron karvinskianus* (Bony-tip Fleabane) and *Asparagus aethiopicus* (Ground Asparagus). Native groundcover species included a mix of grasses, forbs and climbers, including *Dichondra repens* (Kidney

Weed), *Glycine tabacina* (Variable Glycine), *Oplismenus imbecillis* (Creeping Beard Grass) and *Geranium solanderi* (Native Geranium).

Figure 4-1 PCT 3108 South Coast Scarp Wet Vine Forest (NGH, 2024)

4.2.2.2 Condition states

PCT 3108 existed in one condition state within the Subject Land, a moderate condition, due to the high dominance of exotic species within the ground layer.

4.2.2.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. PCT 3108 had a strong floristic/centroid match. Other PCTs returned by the tool included PCT 3639, PCT 3188 and PCT 4133, however these had weak associations and were therefore ruled out. Further investigation of PCTs was undertaken using the Vegetation Information System (VIS) Database. Two further PCTs were investigated, PCT 3453 and PCT 3181. Whilst PCT 3453 contained *Eucalyptus bosistoana* (Coast Grey-box), the landscape position did not match the vegetation community within the Subject Land, as it primarily occurs on steep to moderate, dry granitoid slopes surrounding the Bega and Towamba valleys. PCT 3181 contains *Eucalyptus bosistoana* (Coast Grey-box) as well as a mix of native shrub species recorded within the BAM Plot, and the landscape position is sheltered drainage lines and moist footslopes across valleys within the South East Corner Bioregion.

PCT 3108 was selected due to the strong floristic and centroid match within the Plot to PCT tool. Furthermore, the canopy is often dominated by *Eucalyptus bosistoana* (Coast Grey-box), as was the case in the patch within the Subject Land, and the landscape position had the best match, being found on coastal ranges. Other dominant species within the patch which are found in PCT 3108 include *Pittosporum undulatum* (Sweet Pittosporum)(45% cover), *Exocarpos cupressiformis* (Cherry Ballart)(2% cover), *Melicytus dentatus* (Tree Violet) (0.5% cover), *Acacia mearnsii* (Black Wattle)(0.3% cover) and *Breynia oblongifolia* (Coffee Bush)(0.2% cover).

4.2.2.4 Alignment with BC Act listed TECs

PCT 3108 is associated with the BC Act listed Endangered Ecological Community (EEC) *Brogo Wet Vine Forest in the South East Corner Bioregion*. This PCT within the Subject Land did not conform to the listed EEC, as shown below in Table 4-3.

Table 4-3 Assessment of PCT 3108 against BC Act listed *Brogo Wet Vine Forest in the South East Corner Bioregion* Scientific Committee Determination

Determination	PCT 3108
The overstorey of the forest is dominated by *Eucalyptus tereticornis* with occasional *Eucalyptus bosistoana* and *Eucalyptus baueriana*, with rainforest elements such as *Alectryon subcinereus* and *Ficus rubiginosa*.	Overstorey is dominated by *Eucalyptus bosistoana*.
The open shrubby understorey includes *Acacia implexa, Cassinia trinerva, Deeringia amaranthoides, Hymenanthera dentata* and *Breynia oblongifolia*.	A range of shrubs were recorded, including *Breynia oblongifolia*.
There is a species-rich ground cover of forbs and graminoids. A variety of vines and twiners occur between the shrub and ground layer including *Marsdenia rostrata, Clematis glycinoides, Geitonoplesium cymosum, Glycine clandestina* and *Stephania japonica.*	There was a diverse range of forbs and graminoids in the ground layer, as well as vines such as *Glycine tabacina* and *Geitonoplesium cymosum*.
Brogo Wet Vine Forest is distinguished from other communities in the south east forests of New South Wales by the dominance of *Eucalyptus tereticornis* and the abundance of mesophyll shrubs and vines.	The patch was not dominated by *Eucalyptus tereticornis,* with *Eucalyptus bosistoana* the dominant overstorey species.
Brogo Wet Vine Forest is found in the Brogo - Bega Area and the Candelo - Myrtle Area in the Bega Valley Local Government Area.	The Subject Land is outside the distribution of the Brogo Wet Vine Forest, being located along the edges of Merimbula Lake.
Conclusion	The patch of PCT 3108 does not conform to the BC Act Listed TEC *Brogo Wet Vine Forest in the South East Corner Bioregion*, due to the dominance of *Eucalyptus bosistoana* not *Eucalyptus tereticornis*, as well as being outside the distribution for this community.

4.2.2.5 Alignment with EPBC Act listed TECs

PCT 3108 is associated with the EPBC Act listed EEC *Brogo Vine Forest of the South East Corner Bioregion*. This PCT within the Subject Land conformed to the listed EEC, as shown below in Table 4-4 and Table 4-5.

Table 4-4 Assessment of PCT 3108 against EPBC Act listed *Brogo Vine Forest of the South East Corner Bioregion* key diagnostic characteristics (DAWE, 2022)

Key diagnostic characteristics	PCT 3108
Occurs in New South Wales within the South East Corner Bioregion	Subject Land is located within the South East Corner Bioregion in NSW.
Occurs typically on granitic parent material or Ordovician mudstone parent material. Based on the Australian Soil Classification (DPIE 2021) Kurosols, Kandosols or Dermosols	The Subject Land occurs on Kurosols soils (DPIE, 2021).
Has a canopy dominated by Eucalyptus species and sometimes *Angophora floribunda* (rough-barked apple). At least one of the following species must be present: *Eucalyptus tereticornis* (forest red gum), *E. bosistoana* (coast grey box), *E. globoidea* (white stringybark), *E. globulus subsp. maidenii* (Maiden's blue gum), rough-barked apple.	*Eucalyptus bosistoana* is present as the dominant species in the patch.
Has a discontinuous understorey of small trees, soft-leaved shrubs and vines/climbers, often containing species associated with rainforests or rainforest margins such as *Ficus rubiginosa* (Port Jackson fig), *Alectryon subcinereus* (native quince) and *Pittosporum undulatum* (sweet pittosporum). Other small trees such as *Brachychiton populneus* (Kurrajong), *Acacia implexa* (hickory wattle) and *A. mearnsii* (black wattle) are usually present. During post-fire regenerative phases, these trees may be evident only as dead remains, seedlings or juveniles	Vegetation community has a range of shrub species, including *Pittosporum undulatum* and *Acacia mearnsii*.
Has a moderately-dense to open, species-rich ground layer with cover greater than 25% (can be less for some time after a fire, drought or other major disturbance, or approaching 100% following wetter than average periods), comprising a mix of grasses and ferns with vines and creepers extending into the above strata, except in patches where deep leaf litter suppresses ground layer development.	The understorey contains a range of grasses, forbs and vines, with a native ground cover of 1.8%. The majority of the ground layer is dominated by exotic species. The patch is highly disturbed, being in a high foot traffic area and containing a sew rising main.
Conclusion	The vegetation community within the Subject Land conforms to the EPBC listed EEC, due to occurring on Kurosols soils, containing *Eucalyptus bosistoana*, having an understorey of small trees and soft leaved shrubs, with vines and climbers, and containing a diverse, open ground layer. Go to Table 4-5 to determine if it meets the condition threshold to be considered the listed community.

Table 4-5 Minimum condition thresholds, as per Table 1 of the Approved Conservation Advice (DAWE, 2022)

Condition categories, classes and thresholds	BAM Plot 4 data
High condition ≥ 16 of total native understorey/ground layer species per plot AND ≥ 80% of total understorey/ground layer plant cover per plot is native species	There were 29 native understorey/ground layer species within the plot (inclusive of all flora below canopy layer). Of the total understorey/ground layer cover of 91.7% within the plot, 51.2% is native, which constitutes 55.83% of the proportion of cover being native. Does not meet high condition threshold. 40.5% exotic
Good condition ≥ 10 of total native understorey/ground layer species per plot AND ≥ 50% of total understorey/ground layer plant cover per plot is native species	There were 29 native understorey/ground layer species within the plot (inclusive of all flora below canopy layer). Of the total understorey/ground layer cover of 91.7% within the plot, 51.2% is native, which constitutes 55.83% of the proportion of cover being native. Meets the good condition threshold.
Conclusion	Is considered in good condition. Patch conforms to the listed community.

4.2.3. PCT 3639 South Coast Sands Bangalay Littoral Forest

4.2.3.1 PCT overview

A summary of PCT 3639 key features is shown in Table 4-6 and a typical example in Figure 4-2.

Table 4-6 PCT 3639 South Coast Sands Bangalay Littoral Forest

PCT ID	3639
PCT name	South Coast Sands Bangalay Littoral Forest
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	South Coast Sands Dry Sclerophyll Forests
Percent cleared in NSW (%)	55.15%
Associated TECs	Associated with two TECs: BC Act – *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* EPBC Act - *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia*
Extent within subject land (ha)	0.88

PCT 3639 occurs at the most north western patch of vegetation along the Subject Land. The community is dominated by *Eucalyptus botryoides* (Bangalay), with *Eucalyptus longifolia* (Woolybutt), *Ceratopetalum apetalum* (Coachwood) and *Notelaea longifolia* (Large Mock-olive) also present in the tree layer. The upper

midstorey was dominated by *Pittosporum undulatum* (Sweet Pittosporum), with *Rhagodia candolleana subsp. Candolleana* dominating the lower shrublayer. The groundlayer had a high diversity of native species, including *Gahnia aspera* (Rough Saw-sedge)*, Lomandra longifolia* (Spiny-headed Mat-rush)*, Lepidosperma laterale* (Variable Sword-sedge) and *Rytidosperma* sp.

Figure 4-2 PCT 3639 South Coast Sands Bangalay Littoral Forest

4.2.3.2 Condition states

PCT 3639 existed in one condition state within the Subject Land, a moderate condition (VI score 57.9).

4.2.3.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned four PCTs, PCT 3639, PCT 3260, PCT 3640 and PCT 3445, with all returning weak centroid scores. The characteristic species method within the Plot to PCT tool was utilised. Of the PCTs with similar characteristic species, one PCT was within the correct IBRA Bioregion distribution, PCT 3453. This PCT was further investigated, however was ruled out due to not matching the vegetation description. In particular, this PCT almost always includes *Eucalyptus maidenii* (Maiden's Gum) and stringybarks, whilst there was no *Eucalyptus maidenii* (Maiden's Gum) or stringybark species recorded within this patch in the Subject Land. Furthermore, the shrub to small tree layer of PCT 3453 includes *Indigofera australis* (Australian indigo) and *Acacia* species, and the ground layer is sparse comprising of twiners, graminoids and forbs. The patch of vegetation in the Subject Land was dominated by *Pittosporum undulatum* (Sweet Pittosporum) in the shrub layer, and sedges and rushes in the ground layer, including *Gahnia aspera* (Rough Saw-sedge)*, Lomandra longifolia* (Spiny-headed Mat-rush) and *Lepidosperma laterale* (Variable Sword-sedge).

Further investigation of PCTs was undertaken using the VIS Database. Two further PCTs were investigated, PCT 3638 and PCT 3639. PCT 3638 is mapped on the SVTM, however had a weak floristic match. Furthermore the midstorey of PCT 3638 is dominated by *Banksia serrata* (Old-man Banksia) and *Banksia integrifolia* (Coast Banksia), with these species not recorded within the patch in the Subject Land.

PCT 3639 was considered the best fit PCT. The tree canopy of this PCT is dominated by *Eucalyptus botryoides* (Bangalay), and the midstorey includes *Pittosporum undulatum* (Sweet Pittosporum) with a high to very high cover. The groundcover includes ferns, graminoids, grasses and small climbers, and almost always includes *Lomandra longifolia* (Spiny-headed Mat-rush). This conforms to the patch of vegetation in the Subject Land, which was dominated by *Eucalyptus botryoides* (Bangalay) (15% cover), *Pittosporum undulatum* (Sweet Pittosporum) (60% cover) in the midstorey, and less than 10% total cover in the ground layer, with *Lomandra longifolia* (Spiny-headed Mat-rush) (0.5% cover) present.

4.2.2.4 Alignment with BC Act listed TECs

PCT 3639 is associated with one BC Act Listed TEC, *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions*, which is listed as Endangered. This PCT within the Subject Land conformed to the BC Act listed EEC, as shown below in Table 4-7.

Table 4-7 Assessment of PCT 3639 against BC Act listed *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* Scientific Committee Determination.

Scientific Determination	PCT 3639
It occurs on deep, freely draining to damp sandy soils on flat to moderate slopes within a few km of the sea and at altitudes below 100 m.	Patch occurs on sandy soils on flat area within close proximity to the sea, and at altitudes below 100 m.
Characterised by the assemblage of species listed in paragraph 2 of the scientific determination.	The patch contained the following characteristic species: *Cassytha pubescens* *Dichondra repens* *Eucalyptus botryoides* *Lomandra longifolia* *Notelaea longifolia* *Oplismenus aemulus* *Parsonsia straminea* *Pittosporum undulatum* *Themeda australis.*
The most common tree species include *Eucalyptus botryoides* (Bangalay) and *Banksia integrifolia subsp. integrifolia* (Coast Banksia), while *Eucalyptus pilularis* (Blackbutt) and *Acmena smithii* (Lilly Pilly) may occur in more sheltered situations, and *Casuarina glauca* (Swamp Oak) may occur on dunes exposed to salt-bearing sea breezes.	*Eucalyptus botryoides* was the dominant tree species present.
The open shrub stratum may be dominated by sclerophyllous species, such as *Banksia serrata* (Old Man Banksia), *Leptospermum laevigatum* (Coast Teatree) and *Monotoca elliptica*, or mesophyllous, species, such as *Breynia oblongifolia* (Coffee Bush) *and Pittosporum undulatum* (Sweet Pittosporum), or a combination of both.	*Pittosporum undulatum* is present in the mid storey. The shrub stratum had a cover of approximately 60%.
The groundcover varies from open to dense, and may be sparse where the tree canopy is dense or	The groundcover includes *Lomandra longifolia, Themeda australis* and *Dichondra repens*. The

Scientific Determination	PCT 3639
where there is a thick litter of leaves and branches. Dominant species include *Dianella* spp. (Blue Flax Lilies), *Lepidosperma concavum, Lomandra longifolia* (Spiny-headed Matrush*), Pteridium esculentum* (Bracken), and the *grasses Imperata cylindrica var. major* (Blady Grass), *Microlaena stipoides var. stipoides* (Weeping Grass) and *Themeda australis* (Kangaroo Grass), while herbs, such as *Desmodium gunnii, Dichondra repens* (Kidney Weed), *Pratia purpurascens* (Whiteroot) and *Viola hederacea* (Ivy-leaved Violet), are scattered amongst the larger plants. Vines of *Glycine clandestina, Hardenbergia violacea* (False Sarsparilla), *Kennedia rubicunda* (Running Postman), *Marsdenia rostrata* (Common Milk Vine) and *Stephania japonica var. discolor* (Snake Vine) scramble through the groundcover and occasionally over shrubs or tree trunks	ground cover had a cover of approximately 7.6%. Average litter cover on the ground was 80.4%.
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions is currently known from parts of the Local Government Areas of Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions	Subject Land is within the South East Corner bioregion, in Bega Valley Local Government Area.
Conclusion	The patch of PCT 3639 within the Subject Land conforms to the listed *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC, due to being located on sandy soils and containing *Eucalyptus botryoides* as the dominant tree species.

4.2.2.5 Alignment with EPBC Act listed TECs

PCT 3639 is associated with one EPBC Act listed TEC, *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia*, which is listed as Critically Endangered. It was determined that the patch of PCT 3639 did not conform to this listed TEC, due to not being considered a forest with a closed canopy (>70% projected foliage cover) (Table 4-8).

Table 4-8 Assessment of PCT 3639 against EPBC Act listed , *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* key diagnostic characteristics (TSSC, 2008).

Key Diagnostic Characteristics	PCT 3639
The ecological community occurs in the following IBRA bioregions: Cape York Peninsula (from Princess Charlotte Bay southwards), Wet Tropics, Central Mackay Coast, South Eastern Queensland, NSW North Coast, Sydney Basin and South East Corner.	The Subject Land is within the South East Corner IBRA Bioregion.
Patches of the ecological community occur within	The patch of PCT 3639 occurs adjacent to the

Key Diagnostic Characteristics	PCT 3639
two kilometres of the east coast, including offshore islands, or adjacent to a large body of salt water, such as an estuary, where they are subject to maritime influence.	Merimbula Lake estuary. Merimbula Lake is influenced by the Merimbula Bay tides.
The structure of the ecological community typically is a closed canopy of trees that can be interspersed with canopy gaps that are common in exposed situations or with storm events. Usually, several vegetation strata are present. However, where there is extreme exposure to salt laden winds, these strata may merge into a height continuum rather than occurring as distinct vegetation layers. The canopy forms a mosaic due to canopy regeneration, typically in the form of basal coppice following canopy decapitation due to prevailing salt laden winds and storm events. Wind sheared canopy can be present on the frontal section leading to closed secondary canopies. Emergents may be present, for example, species from the genera *Araucaria* (northern bioregions only), *Banksia* or *Eucalyptus*. The ground stratum of the vegetation typically is very sparse.	The canopy is open, with canopy cover approximately 16% . This is considered to be the usual canopy cover for this patch of vegetation, as it is not influenced by wind and salt spray, due to being located within the protected Merimbula Lake estuary. As such, vegetation does not meet the definition of a closed canopy, (>70% projected foliage cover) and does not meet the characteristics of the TEC.
The ecological community contains a range of plant life forms including trees, shrubs, vines, herbs, ferns and epiphytes. To the north, most plant species diversity is in the tree and shrub (i.e. canopy) layers rather than in lower strata. The converse generally occurs from the Sydney Basin Bioregion southwards. Feather palms, fan palms, large leaved vascular epiphytes and species that exhibit buttressing are generally rare. Ground ferns and vascular epiphytes are lower in diversity in littoral rainforests compared to most other rainforest types.	Patch contains a range of tree, shrubs, vines, herbs and fern species.
Plants with xeromorphic and succulent features are generally more common in littoral rainforest than in hinterland rainforest types. Canopy stem sizes also tend to be smaller compared to that in hinterland rainforest. Trunks rarely host mosses though lichens are usually common.	Xeromorphic species are generally absent from the patch within the Subject Land. A range of canopy stem sizes are present, ranging from <5 cm DBH to 50-79 DBH. Mosses are generally absent from the trunks of canopy species.
Whilst species can be regionally predictable, there may be considerable variation in the composition of individual stands of the ecological community within any given bioregion. Attachment A provides a list of flora species for each relevant bioregion.	Characteristic species present within the patch include: *Acacia mearnsii* *Eucalyptus botryoides* *Ficus sp.* *Notelaea longifolia* *Rhagodia candolleana subsp. candolleana* *Geitonoplesium cymosum* *Parsonsia straminea* *Dichondra repens* *Lepidosperma spp.*

Key Diagnostic Characteristics	PCT 3639
	Lomandra longifolia *Gahnia aspera*
Conclusion	The patch of PCT 3639 within the Subject Land is not considered to conform to the listed *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* TEC. Whilst there are characteristic species present, it does not meet the definition of the community due to not having the structure of a closed thickets or tall closed forest, with a closed canopy (>70% projected foliage cover).

4.2.4. PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

4.2.4.1 PCT overview

A summary of PCT 4054 key features is shown in Table 4-9 and a typical example in Figure 4-3.

Table 4-9 PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

PCT ID	4054
PCT name	South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Vegetation formation	Forested Wetlands
Vegetation class	Coastal Floodplain Wetlands
Percent cleared in NSW (%)	52.91
Associated TECs	No associated TECs
Extent within subject land (ha)	0.88

PCT 4054 occurs along the western half of the development footprint, to the north of the existing boardwalk. The vegetation was dominated by *Eucalyptus botryoides* (Bangalay) in the overstorey. The midstorey contained a moderate diversity of shrub species, dominated by *Melaleuca armillaris subsp. armillaris* (Cream Paperbark) and *Alyxia buxifolia* (Sea Box). The exotic species *Polygala myrtifolia* dominated the groundlayer. There was a high diversity of native ground layer species, with the dominant native species being *Cynodon dactylon* (Couch), *Cassytha pubescens, Dichondra repens* (Kidney Weed)*, Schoenus spp.,* and *Centella asiatica* (Indian Pennywort).

Figure 4-3 PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest (NGH, 2024)

4.2.4.2 Condition states

PCT 4054 existed in one condition state within the Subject Land, a moderate condition, due to the high dominance of exotic species within the groundcover (VI score 37.6).

4.2.4.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned four PCTs (4054, 3640, 3792 and 4117), all of which had weak centroid scores. The characteristic species method within the Plot to PCT tool was utilised. Whilst one PCT, PCT 3966, returned a very strong floristic match, this PCT is not found within the IBRA Bioregion, and therefore was ruled out.

Further investigation of PCTs was undertaken using the VIS Database. Two further PCTs were investigated, PCT 3638 and PCT 3639. PCT 3638 did not have a strong floristic match, as it does not contain *Melaleuca armillaris subsp. armillaris* (Bracelet Honey-myrtle), which was the dominant species in the patch. Furthermore, there was no *Pteridium esculentum* (Common Bracken) within the patch, which is a characteristic species of this PCT. PCT 3639 contains *Melaleuca armillaris subsp. armillaris,* although not as a dominant species, as well as *Eucalyptus botryoides* (Bangalay) as the dominant overstorey species. Due to the patch containing *Melaleuca armillaris subsp. armillaris* as the dominant species, not *Pittosporum undulatum* (Sweet Pittosporum), which is considered the dominant species for PCT 3639, this PCT was ruled out.

The PCTs returned by the Plot to PCT Tool were further investigated. Of the suggested PCTs, one PCT, PCT 4054 had the strongest floristic match. This PCT frequently includes *Melaleuca armillaris subsp. armillaris* in the midstorey, and also contains *Acacia mearnsii* (Black Wattle), which was found within the patch in the Subject Land. Although it is considered a 'placeholder' (low reference sites) PCT, the landscape positioning matches, being found along coastal lake margins. As such, PCT 4054 is considered the best fit PCT.

4.2.5. PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub

4.2.5.1 PCT overview

A summary of PCT 4056 key features is shown in Table 4-10 and a typical example in Figure 4-4.

Table 4-10 PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub

PCT ID	4056
PCT name	Southern Estuarine Swamp Paperbark Creekflat Scrub
Vegetation formation	Forested Wetlands
Vegetation class	Coastal Floodplain Wetlands
Percent cleared in NSW (%)	53.10
Associated TECs	Associated with one TEC: BC Act - *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*
Extent within subject land (ha)	0.43

PCT 4056 occurs towards the eastern end of the development footprint, mainly to the north of the existing boardwalk. The vegetation was dominated by *Eucalyptus botryoides* (Bangalay) in the overstorey. The midstorey contained a high cover of *Melaleuca armillaris subsp. Armillaris* (Cream Paperbark), with *Synoum glandulosum subsp. glandulosum* (Scentless Rosewood) also present. The ground layer was dominated by sedges, including *Carex appressa* (Tall Sedge) and *Gahnia sieberiana* (Red-fruit Saw-sedge) with *Machaerina juncea* (Bare Twig-rush) and *Typha orientalis* (Broadleaf Cumbungi) and exotic *Zantedeschia aethiopica* (Arum Lily), also dominating the ground layer.

Figure 4-4 PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub (NGH, 2024)

4.2.5.2 Condition states

PCT 4056 existed in one condition state within the Subject Land, a moderate condition, due to low diversity of mid storey and ground layer species (VI score 37.6).

4.2.5.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned four PCTs (4102, 4092, 3792 and 4010), all of which returned weak centroid scores. Furthermore, PCTs 4102, 4092 and 4010 are considered placeholder PCTs with limited data. The characteristic species method within the Plot to PCT tool was utilised. Again, four PCTs were returned (4056, 4102, 3038 and 3039), all of which had a 50% characteristic species correlation.

Further investigation of these PCTs was undertaken using the VIS Database. PCT 4056 was considered to contain the strongest match of the key dominant species inside the plot. In particular, this PCT contains *Eucalyptus botryoides* (Bangalay) within the overstorey. *Melaleuca ericifolia* (Swamp Paperbark), whilst not recorded within the BAM plot, was present within the patch, and this species is considered a characteristic species of PCT 4056. Characteristic groundcover species were also present in the patch, including *Gahnia sieberiana* (Red-fruit Saw-sedge) *and Machaerina juncea* (Bare Twig-rush).

4.2.5.4 Alignment with BC Act listed TECs

PCT 4056 is associated with the BC Act listed EEC *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. This PCT within the Subject Land did not conform to the listed EEC, as shown below in Table 4-11.

Table 4-11 Assessment of PCT 4056 against BC Act listed *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Identification Guidelines (DECC, 2007)

Key Indicators	PCT 4056
Is the site on the coastal floodplain of the NSW North Coast, Sydney Basin or South East Corner bioregion?	The Subject Land is in the South East Corner Bioregion.
Is the site associated with humic clay or sandy loams soils?	Site is associated with sandy loams (eSPADE v2.2).
Is the site subject to waterlogging and/or below the highest flood level?	Site is subject to waterlogging, being on the margins of Merimbula Lake.
Is the site dominated by Swamp Oak or Swamp Paperbark?	Whilst *Melaleuca ericifolia* was recorded within the patch, it was not the dominant species in the overstorey. Dominant overstorey species included *Melaleuca armillaris subsp. armillaris* and *Eucalyptus botryoides.*
Are any characteristic shrub and/or groundlayer species present?	Characteristic shrub and groundlayer species present include *Acmena smithii, Lobelia anceps, Baumea juncea* and *Carex appressa*.
Conclusion	The patch within the Subject Land does not conform to this listed TEC, due to the site not being dominated by Swamp Oak or Swamp Paperbark.

4.2.6. PCT 4091 Grey Mangrove-River Mangrove Forest

4.2.6.1 PCT overview

A summary of PCT 3108 key features is shown in Table 4-12 and a typical example in Figure 4-5.

Table 4-12 PCT 4091 Grey Mangrove-River Mangrove Forest

PCT ID	4091
PCT name	Grey Mangrove-River Mangrove Forest
Vegetation formation	Saline Wetlands
Vegetation class	Mangrove Swamps
Percent cleared in NSW (%)	52.96
Associated TECs	No associated TECs
Extent within subject land (ha)	1.75

PCT 4091 occurs along the entire length of the development footprint, predominantly on the southern side of the existing boardwalk, between the Merimbula Lake aquatic areas and the boardwalk. The vegetation was dominated by *Avicennia marina subsp. australasica* (Grey Mangrove) with *Aegiceras corniculatum* (River

Mangrove) also present in the overstorey. Understorey species occurred on the edge of the community, and included *Sarcocornia quinqueflora subsp. quinqueflora*, *Carpobrotus glaucescens* (Pigface) and *Zoysia macrantha* (Prickly Couch).

Figure 4-5 4091 Grey Mangrove-River Mangrove Forest (NGH, 2024)

4.2.6.2 Condition states

PCT 3108 existed in one condition state within the Subject Land, a moderate condition (VI score 53.6).

4.2.6.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned multiple PCTs with strong floristic/centroid matches. These included PCT 4091, 4140, 4097 and 4090. PCT 4140 does not occur within the IBRA Bioregion, being found in South East Queensland and therefore was ruled out. PCT 4097 is considered a saline forbland community dominated by *Sarcocornia quinqueflora subsp. quinqueflora*, and therefore was ruled out as the patch was dominated by mangrove species (often as the only species present). PCT 4090 is a forest or woodland containing both mangroves and *Casuarina glauca* (Swamp Oak), and was ruled out due to the absence of *Casuarina glauca* (Swamp Oak) in the patch.

PCT 4091 was selected due to matching the descriptive attributes and characteristics species of the patch. In particular, this is a mangrove community which is dominated by *Avicennia marina subsp. australasica* (50-60% cover in the patch), with *Aegiceras corniculatum* (River Mangrove) (0.1-0.2% cover in the patch) also present. Ground cover species are sparse and often not present. Groundcover within the patch ranged from absent to 12% cover.

4.2.7. PCT 4097 Samphire Saltmarsh

4.2.7.1 PCT overview

A summary of PCT 4097 key features is shown in Table 4-13 and a typical example in Figure 4-6.

Table 4-13 PCT 4097 Samphire Saltmarsh

PCT ID	4097
PCT name	Samphire Saltmarsh
Vegetation formation	Saline Wetlands
Vegetation class	Saltmarshes
Percent cleared in NSW (%)	54.30
Associated TECs	Associated with three TECs: BC Act – *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* BC Act - *The Shorebird Community occurring on the relict tidal delta sands at Taren Point* EPBC Act - *Subtropical and Temperate Coastal Saltmarsh*
Extent within subject land (ha)	0.67

PCT 4097 is scatted along the development footprint, often adjacent to PCT 4091 patches. The vegetation was dominated by *Juncus kraussii subsp. australiensis* (Sea Rush) and *Sarcocornia quinqueflora subsp. quinqueflora*. *Avicennia marina subsp. australasica* (Grey Mangrove) was also present, although sparser then in the Mangrove vegetation community.

Figure 4-6 PCT 4097 Samphire Saltmarsh (NGH, 2024)

4.2.7.2 Condition states

PCT 3108 existed in one condition state within the Subject Land, a moderate condition (VI score 53.6).

4.2.7.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned multiple PCTs with strong floristic/centroid matches. These included PCT 4097, 4026, 4141 and 4103. PCT 4026 is considered to be a sclerophyll woodland, and therefore was ruled out due to the absence of overstorey tree species. PCT 4141 does not occur in the IBRA Bioregion of the Subject Land.

PCT 4103 is a saline grassland dominated by *Sporobolus virginicus* (Sand Couch) and accompanied by a sparser cover of *Juncus kraussii subsp. australiensis* (Sea Rush) and/or *Sarcocornia quinqueflora subsp. quinqueflora*. PCT 4097 is a saline forbland dominated by *Sarcocornia quinqueflora subsp. quinqueflora*, with *Sporobolus virginicus* (Sand Couch) or *Juncus kraussii subsp. australiensis* (Sea Rush) sparsely in the ground layer. PCT 4097 was considered the best match PCT, as there was no *Sporobolus virginicus* (Sand Couch) within the patch, and both *Juncus kraussii subsp. australiensis*(Sea Rush)(30% cover) and *Sarcocornia quinqueflora subsp. quinqueflora* (15% cover) were the dominant species in the ground layer.

4.2.7.4 Alignment with BC Act listed TECs

PCT 4097 is associated with two BC Act listed TECs:

- *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EEC
- *The Shorebird Community occurring on the relict tidal delta sands at Taren Point* EEC.

An assessment against the scientific determination for the *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EEC is shown in Table 4-14. It was determined that this EEC is present within the Subject Land where patches of PCT 4097 occur.

The Shorebird Community occurring on the relict tidal delta sands at Taren Point EEC is the community of shorebirds that uniquely occurs on the relict marginal shoal of the Georges River that occurs between Taren Point and Shell Point in Botany Bay. As the Subject Land is outside of this region, being in Merimbula, this EEC does not occur within the Subject Land.

Table 4-14 Assessment of PCT 4097 against BC Act listed *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Scientific Committee Determination

Scientific Determination	PCT 4097
Occurs in the intertidal zone on the shores of estuaries and lagoons including when they are intermittently closed along the NSW coast.	The patch occurs on the shores of Merimbula Lake estuary.
Characteristic vascular plant species of Coastal Saltmarsh are: *Baumea juncea* *Isolepis nodosa* *Juncus kraussii* *Samolus repens* *Sarcocornia quinqueflora* *Selliera radicans* *Sporobolus virginicus* *Suaeda australis* *Triglochin striata* *Zoysia macrantha*	The patch contains the following characteristic species: *Juncus kraussii subsp. australiensis* *Sarcocornia quinqueflora subsp. quinqueflora* *Samolus repens* *Suaeda australis*
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions is frequently found as a zone landward of mangrove stands. Occasional scattered mature *Avicennia marina* trees occur through saltmarsh at some sites, and *Avicennia* (and less frequently *Aegiceras corniculatum*) seedlings may occur throughout saltmarsh. In brackish areas dense stands of tall reeds (*Phragmites australis, Bulboschoenus spp., Schoenoplectus spp., Typha spp*.) may occur as part of the community.	The PCT occurs adjacent to a mangrove community, which is dominated by *Avicennia marina subsp. australasica*.
Sarcocornia quinqueflora dominates at lower, and hence more frequently flooded, levels than *Sporobolus virginicus* which dominates the mid saltmarsh, while *Juncus kraussii* and *Baumea juncea* are upper saltmarsh species.	The community within the Subject Land is dominated by *Juncus kraussii subsp. australiensis* (30% cover) and *Sarcocornia quinqueflora subsp. quinqueflora* (15% cover).
Conclusion	PCT 4097 conforms to the BC Act listed EEC *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* due the presence of the characteristic flora species, and occurring along the shores of the Merimbula Lake estuary.

4.2.7.5 Alignment with EPBC Act listed TECs

PCT 4097 is associated with the EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC, which is listed as vulnerable. An assessment against the Key Diagnostic Characteristics for this species, as per the Conservation Advice (DSEWPC, 2013), has determined that this TEC is present within the Subject Land where patches of PCT 4097 occur (see Table 4-15).

Table 4-15 Assessment of PCT 4097 against EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC Key Diagnostic Characteristics

Key diagnostic characteristics	PCT 4097
Occurs south of 23° 37' S latitude - from the central Mackay coast on the east coast of Australia, southerly around to Shark Bay on the west coast of Australia (26° latitude) and including the Tasmanian coast and islands within the above range.	Subject Land is south of 23° 37' S latitude
Occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts	Subject Land is along the coastal margin along estuaries.
Occurs on places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences, but not areas receiving only aerosol spray	The patch occurred within an estuary zone, with tidal connection to Merimbula Lake.
Occurs on sandy or muddy substrate and may include coastal clay pans (and the like)	The vegetation occurred on sandy soils.
Consists of dense to patchy areas of characteristic coastal saltmarsh plant species (i.e. salt tolerant herbs, succulent shrubs or grasses, that may also include bare sediment as part of the mosaic)	Dominant species include salt tolerant species including *Juncus kraussii subsp. australiensis, Sarcocornia quinqueflora subsp. quinqueflora* and *Samolus repens* with an average cover of 47%.
Proportional cover by tree canopy such as mangroves, Melaleucas or Casuarinas is not greater than 50%, nor is proportional ground cover by seagrass greater than 50%	The Mangrove species *Avicennia marina subsp. australasica* is present in low densities, at approximately 5%.
Conclusion	PCT 4097 within the Subject Land conforms to the EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC, due to occurring within an estuary zone within Merimbula Lake, and being dominated by salt tolerant characteristic coastal saltmarsh plant species.

4.2.8. PCT 4102 South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh

4.2.8.1 PCT overview

A summary of PCT 4102 key features is shown in Table 4-16 and a typical example in Figure 4-7.

Table 4-16 PCT 4102 South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh

PCT ID	4102
PCT name	South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
Vegetation formation	Saline Wetlands
Vegetation class	Saltmarshes
Percent cleared in NSW (%)	33.96
Associated TECs	Associated with two TECs: BC Act – *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EPBC Act - *Subtropical and Temperate Coastal Saltmarsh*
Extent within subject land (ha)	0.10

There is one patch of PCT 4102 within the Subject Land, in the middle of the Subject Land to the north of the existing boardwalk. The vegetation was dominated by *Juncus kraussii subsp. australiensis* (Sea Rush), with *Sarcocornia quinqueflora subsp. quinqueflora* and *Samolus repens* (Creeping Brookweed) also present. *Avicennia marina subsp. australasica* (Grey Mangrove) also occurred in the patch with sparse cover. This PCT did not occur within the Development Footprint.

Figure 4-7 PCT 4102 South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh (NGH, 2024)

4.2.8.2 Condition states

PCT 4102 existed in one condition state within the Subject Land, a high condition due to dominance of native species.

4.2.8.3 Justification of PCT selection

The Plot to PCT Tool was utilised to select the PCT. The tool returned multiple PCTs with strong floristic/centroid matches. These included PCT 4097, 4026, 4141 and 4102. PCT 4026 is considered to be a sclerophyll woodland, and therefore was ruled out due to the absence of overstorey tree species. PCT 4141 does not occur in the IBRA Bioregion of the Subject Land.

The patch had a high cover of *Juncus kraussii subsp. australiensis* (Sea Rush)(70% cover), with sparser cover of *Sarcocornia quinqueflora subsp. quinqueflora* (7% cover). As such, PCT 4097 was ruled out, as within this PCT, *Sarcocornia quinqueflora subsp. quinqueflora* is the dominant species, and *Juncus kraussii subsp. australiensis* (Sea Rush) occasionally occurs as very sparse cover.

PCT 4102 was selected, as whilst limited information is available, it was considered to have a strong match in the Plot to PCT Tool. Furthermore, it occurs as a sedgeland/rushland, with the ground layer dominated by *Juncus kraussii subsp. australiensis* (Sea Rush), as was the case for the patch within the Subject Land.

4.2.8.4 Alignment with BC Act listed TECs

PCT 4102 is associated with the BC Act listed TEC *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. An assessment against the Scientific Committee Determination was undertaken, as shown in Table 4-17 below. It was determined that this EEC is present within the Subject Land where patches of PCT 4102 occur.

Table 4-17 Assessment of PCT 4102 against BC Act listed *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Scientific Committee Determination

Scientific Determination	PCT 4102
Occurs in the intertidal zone on the shores of estuaries and lagoons including when they are intermittently closed along the NSW coast.	The patch occurs on the shores of Merimbula Lake estuary.
Characteristic vascular plant species of Coastal Saltmarsh are: *Baumea juncea* *Isolepis nodosa* *Juncus kraussii* *Samolus repens* *Sarcocornia quinqueflora* *Selliera radicans* *Sporobolus virginicus* *Suaeda australis* *Triglochin striata* *Zoysia macrantha*	The patch contains the following characteristic species: *Juncus kraussii subsp. australiensis* *Sarcocornia quinqueflora subsp. quinqueflora* *Samolus repens*
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions is frequently found as a zone landward of mangrove stands. Occasional scattered mature *Avicennia marina* trees occur through saltmarsh at some sites, and *Avicennia* (and less frequently *Aegiceras corniculatum*) seedlings may occur throughout saltmarsh. In brackish areas dense stands of tall reeds (*Phragmites australis, Bulboschoenus spp.,*	The PCT occurs adjacent to a mangrove community, and scattered *Avicennia marina subsp. australasica* are present within the patch.

Scientific Determination	PCT 4102
Schoenoplectus spp., Typha spp.) may occur as part of the community.	
Sarcocornia quinqueflora dominates at lower, and hence more frequently flooded, levels than *Sporobolus virginicus* which dominates the mid saltmarsh, while *Juncus kraussii* and *Baumea juncea* are upper saltmarsh species.	The community within the Subject Land is dominated by *Juncus kraussii subsp. australiensis* (70% cover) and *Sarcocornia quinqueflora subsp. quinqueflora* (7% cover).
Conclusion	PCT 4102 conforms to the BC Act listed EEC *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* due the presence of the characteristic flora species, and occurring along the shores of the Merimbula Lake estuary.

4.2.8.5 Alignment with EPBC Act listed TECs

PCT 4102 is associated with the EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC, which is listed as vulnerable. An assessment against the Key Diagnostic Characteristics for this species, as per the Conservation Advice (DSEWPC, 2013), has determined that this TEC is present within the Subject Land where patches of PCT 4102 occur (see Table 4-18).

Table 4-18 Assessment of PCT 4102 against EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC Key Diagnostic Characteristics

Key diagnostic characteristics	PCT 4102
Occurs south of 23° 37' S latitude - from the central Mackay coast on the east coast of Australia, southerly around to Shark Bay on the west coast of Australia (26° latitude), and including the Tasmanian coast and islands within the above range.	Subject Land is south of 23° 37' S latitude
Occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts	Subject Land is along the coastal margin along estuaries.
Occurs on places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences, but not areas receiving only aerosol spray	The patch occurred within an estuary zone, with tidal connection to Merimbula Lake.
Occurs on sandy or muddy substrate and may include coastal clay pans (and the like)	The vegetation occurred on sandy soils.
Consists of dense to patchy areas of characteristic coastal saltmarsh plant species (i.e. salt tolerant herbs, succulent shrubs or grasses, that may also include bare sediment as part of the mosaic)	Dominant species include salt tolerant species including *Juncus kraussii subsp. australiensis* and *Sarcocornia quinqueflora subsp. quinqueflora* with an average cover of 77%.
Proportional cover by tree canopy such as	The Mangrove species *Avicennia marina subsp.*

Key diagnostic characteristics	PCT 4102
mangroves, Melaleucas or Casuarinas is not greater than 50%, nor is proportional ground cover by seagrass greater than 50%	*australasica* is present in low densities, at approximately 2%.
Conclusion	PCT 4102 within the Subject Land conforms to the EPBC Act listed *Subtropical and Temperate Coastal Saltmarsh* TEC, due to occurring within an estuary zone within Merimbula Lake, and being dominated by salt tolerant characteristic coastal saltmarsh plant species.

Figure 4-8 PCTs and TECs within the subject land map

4.3. Threatened ecological communities

TECs identified within the subject land are listed in Table 4-19 and their extent is shown on Figure 4-8. Detailed figures are given in Appendix F.

Table 4-19 TECs within the subject land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within subject land (ha)
Brogo Vine Forest of the South East Corner Bioregion	20430	Not listed	Endangered	PCT 3108	1.84
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	20035	Endangered	Not listed	PCT 3639	0.88
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	10866	Endangered	Not listed	PCT 4097 PCT 4102	0.77
Subtropical and Temperate Coastal Saltmarsh	20408	Not listed	Endangered	PCT 4097 PCT 4102	0.77

4.4. BAM Calculator entry

There are limitations to the number of PCTs and TECs that can be entered into the BAM-C for the small area module. According to BAM-C *User Guide* (DCCEEWa, 2024) where there is more than one PCT or two TECs, the dominant TEC/PCT is entered and all areas of the smaller non-dominant communities are placed into vegetation zones of the dominant community.

Consultation was undertaken with south-east region BCS for assistance in determining the best way to capture the values of each PCT within these limitations, also taking into account the Commonwealth saltmarsh TEC community and concerns of DPI-Fisheries to capture loss of mangroves. It was decided that a separate small area child case would be created for each TEC type, thereby capturing all PCTs and generating accurate offset trading groups.

PCT number	Area in subject land (ha)	Area in development footprint (ha)	TEC	BAM-C details
3108	1.84	0.06	*Brogo Vine Forest of the South East Corner Bioregion* (EPBC Act)	Child case 49718 Zone 1
4054	0.88	0.04	No	Child case 49718 Zone 2
4091	1.75	0.13	No	Child case 51513 Zone 1
4097	0.67	0.08	*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (BC Act) *Subtropical and Temperate Coastal Saltmarsh* (EPBC Act)	Child case 51513 Zone 2 (combined with 4102 in small area BAM-C case)
4102	0.1	0	*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (BC Act) *Subtropical and Temperate Coastal Saltmarsh* (EPBC Act)	Child case 51513 Zone 3 (combined with 4097 in small area BAM-C case)
3639	0.88	0.06	*Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* (BC Act)	Child case 51563 Zone 1
4056	0.43	0.02	No	Child case 51563 Zone 2

4.5. Vegetation zones

Seven vegetation zones were identified within the Subject Land (Table 4-20); these are shown in Figure 4-9. One vegetation zone (Vegetation Zone 7_4102_high), was outside of the development footprint, and therefore was not included in the BAM-C, as there will be no direct impacts to this vegetation zone.

There was one vegetation zone per PCT, with condition determined by presence of structural elements (such as overstorey species for woodland PCTs) and vegetation integrity score (VI Score). In particular, patches with a VI Score of >60 were considered to be of high condition, and patches with a VI Score of 30-60 were considered to be of moderate condition.

Table 4-20 Vegetation zones and patch sizes within the development footprint and subject land

Vegetation zone ID	PCT	Condition	Subject Land Area (ha)	Development Footprint Area (ha)	Patch size	No. BAM plots (required under the BAM)	No. BAM plots completed	No. BAM plots used in BAM-C	Plot IDs used in assessment
1_3108	3108 South Coast Scarp Wet Vine Forest	Moderate	1.84	0.06	>100 ha	1	1	1	Plot 4
2_3639	3639 South Coast Sands Bangalay Littoral Forest	Moderate	0.88	0.06	>100 ha	1	1	1	Plot 8
3_4054	4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest	Moderate	0.88	0.04	>100 ha	1	1	1	Plot 7
4_4056	4056 Southern Estuarine Swamp Paperbark Creekflat Scrub	Moderate	0.43	0.02	>100 ha	1	1	1	Plot 5
5_4091	4091 Grey Mangrove-River Mangrove Forest	High	1.75	0.13	>100 ha	1	2	2	Plot 1, Plot 2
6_4102_4097	4097 Samphire Saltmarsh	High	0.67	0.08	>100 ha	1	1	1	Plot 6
7_4102	4102 South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh	High	0.10	0.0	>100 ha	0	1	0	Plot 3

Figure 4-9 Vegetation zones and BAM plots across subject land

4.6. Vegetation integrity (vegetation condition)

The minimum number of plots as per Table 3 of the BAM was completed within each vegetation zone. There was one BAM plot located within each vegetation zone, with the exception of Vegetation Zone 5, where two BAM plots were sampled.

The results of the plot field data can be found in Appendix D.1 and photos of each plot are shown in Appendix D.2. The plot data from the BAM plots were entered into the BAM-C. The results of the vegetation integrity assessment are provided in Table 4-21. Benchmark data contained within the BAM-C was used to assess vegetation integrity attributes in each zone.

One vegetation zone, Vegetation Zone 7, was located outside of the development footprint, and therefore there will be no direct impacts to this Vegetation Zone. A BAM plot was undertaken within this vegetation zone, and the VI Score is shown in Table 4-21, however it was not included in the BAM-C due to not being directly impacted.

Table 4-21 Current vegetation integrity scores for each vegetation zone within the Subject Land

Vegetation zone ID	PCT/Zone	Composition condition score	Structure condition score	Function condition score	Vegetation Integrity Score	Hollow bearing trees present?
1_3108	3108_Moderate	64.8	32.1	73.9	53.6	Yes
2_3639	3639_Moderate	70.2	43.4	63.8	57.9	No
3_4054	4054_Moderate	64.4	22.2	37.2	37.6	Yes
4_4056	4056_Moderate	40.2	34.8	38.2	37.7	Yes
5_4091	4091_High	51.7	100	N/A*	71.9	Yes
6_4102_4097	4097_High	51.9	100	N/A*	72	No
7_4102	4102_High	51.9	98.7	N/A*	71.6	Yes

*Only the functional attribute high threat weed cover is collected within saline wetlands and as such no function condition score is generated

5. Habitat suitability for threatened species

Numerous fauna species were spotted opportunistically and during surveys in the subject land including more than 30 bird species, more than 14 mammal species (Appendix D.6), five amphibians (Appendix D.3) and three reptiles (Appendix D.6). Opportunistic fauna records indicate that a diverse habitat is provided in the study area, suitable for a range of arboreal, terrestrial and wetland species. Habitat features and selected fauna records across the subject land are shown in Figure 5-13.

Man-made structures

A culvert midway along the walkway (Figure 5-1) and the existing timber boardwalk (Figure 5-2) were inspected for habitat values. The boardwalk itself does not appear to provide microbat roost habitat due to:

- Simple structure using narrow wood (as opposed to large size planks and logs for bridges and large jetties) with few spaces, crevices or hollows
- The open structure of the underside including gaps in planking with underside being exposed to elements including sun, wind and rain
- High pedestrian use of the boardwalk.

The culvert provides wet habitat connectivity from between patches of *Melaleuca* swamp habitat; a Water Rat *Hydromys chrysogaster* was observed using the culvert as a passage.

Figure 5-1 Culvert connects area of swampy habitat

Figure 5-2 Boardwalk does not provide microbat roosting habitat

Habitat structure and features

The intertidal zone provides sandy and muddy substrate and nearby oyster leases provide foraging opportunities for shorebirds (Figure 5-3 and Figure 5-4). (Note: oyster leases are outside of the subject land). Rapid habitat assessments found that habitat structure varied over the subject land but overall understory density was medium to high (Figure 5-5 and Figure 5-6) and midstory density was medium. Rough-barked trees were ubiquitous, litter and fallen timber varied with high quantities recorded at HRAPs 2, 7, 8 and 9 (Figure 5-13).

Figure 5-3 Intertidal zone with sandy/muddy substrate

Figure 5-4 Oyster leases with foraging and roosting birds

Figure 5-5 Dense native understorey in eucalypt forest

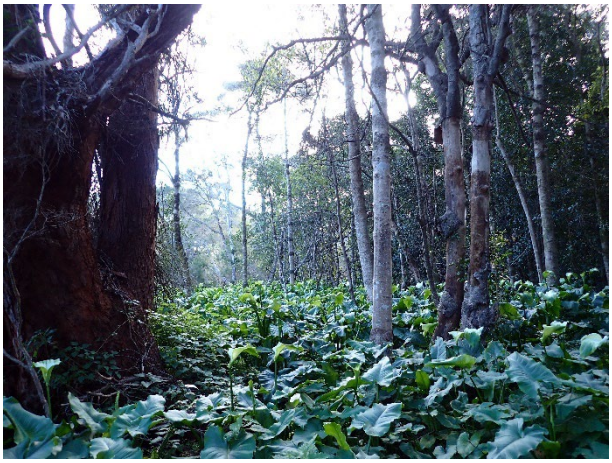

Figure 5-6 Dense exotic understorey in wetter areas

Figure 5-7 Typical cluster of dreys in *Melaleuca* stand

Figure 5-8 White-headed Pigeon on nest

Small patches of *Allocasuarina littoralis* occur along the eastern ridgeline in PCT 3108 (Figure 5-13); these areas were searched for feeding signs of Glossy Black-cockatoo – no chewed cones (orts) were found. Stick nest surveys throughout the Subject Land did not find any raptor stick nests but located numerous Ring-tailed Possum *Pseudocheirus peregrinus* dreys (Figure 5-7) and small bird nests (Figure 5-8).

Microbats

Microbats were seen during evening surveys flying along walkways in forest and swarming around a tree. Anabat surveys revealed that at least eight species occur in the subject land (Table 5-1). Several indistinct species complexes were also identified which included Southern Myotis *(Myotis macropus)* as potentially present. Full details are provided in Appendix D.8. Potentially present species credit species with habitat constraints present were added into the BAM-C.

Table 5-1 Microbat species recorded as being present or potentially present in the study area

Species	Common name	Listing status	Credit type	Detection
Austronomus australis	White-striped Freetail Bat	Not listed	n/a	Present
Chalinolobus gouldii	Gould's Wattled Bat	Not listed	n/a	Present
Chalinolobus morio	Chocolate Wattled Bat	Not listed	n/a	Present
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable (NSW)	Ecosystem	Potentially present
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable (NSW)	Ecosystem	Potentially present
Miniopterus oriane oceanensis	Large Bent-winged Bat	Vulnerable (NSW)	Ecosystem	Potentially present
Myotis macropus	Southern Myotis	Vulnerable (NSW)	Species	Potentially present
Nyctophillus geoffroyi	Lesser Long-eared Bat	Not listed	n/a	Potentially present
Nyctophillus gouldi	Gould's Long-eared Bat	Not listed	n/a	Potentially present
Ozimops ridei	Ride's Free-tailed Bat	Not listed	n/a	Present
Rhinolophus megaphyllus	Eastern Horseshoe Bat	Not listed	n/a	Present

Species	Common name	Listing status	Credit type	Detection
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat	Vulnerable (NSW)	Ecosystem	Potentially present
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable (NSW)	Ecosystem	Potentially present
Scotorepens orion	Eastern Broad-nosed Bat	Not listed	n/a	Potentially present
Vespadelus darlingtonia	Large Forest Bat	Not listed	n/a	Potentially present
Vespadelus vulturnus	Little Forest Bat	Not listed	n/a	Potentially present

Hollow-bearing trees

Hollow-bearing trees are present at low frequency and despite several large individuals, the average DBH of trees is fairly low (10-40cm). Seventeen hollow-bearing trees were identified in the Subject Land. Details are given in AppendixD.6. Hollows were located in mangroves, *Melaleuca* trees and eucalypts (Figure 5-9 to Figure 5-12).

Threatened species

Three threatened species were recorded incidentally during site surveys over February – March 2024:

- Grey-headed Flying Fox *Pteropus poliocephalus* - foraging in forest
- Pied Osytercatcher *Haematopus longirostris* – foraging in intertidal zone
- Eastern Curlew *Numenius madagascariensis* – foraging on oyster leases.

Locations of these records are shown in Figure 5-14.

Figure 5-9 Hollow-bearing mangrove

Figure 5-10 Hollow-bearing *Melaleuca* stump

Figure 5-11 Hollow-bearing eucalypt

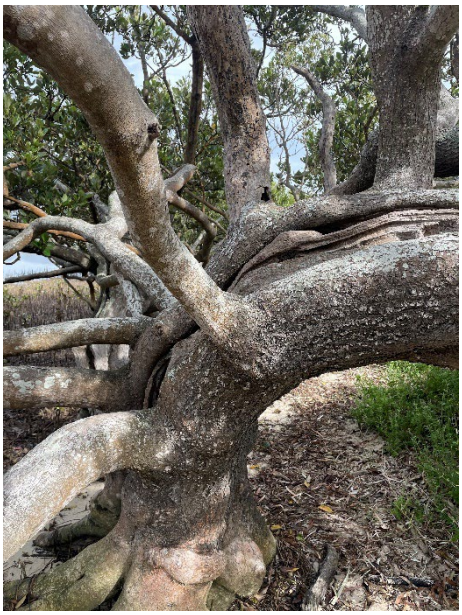

Figure 5-12 Hollow in mangrove

Important habitat maps for threatened species

Important habitat maps have been created for a small number of highly mobile species which may be missed during targeted surveys to identify areas that are considered essential to support the species (NSW DPIE, 2024). Two important habitat maps intersect with the Subject Land:

- Swift Parrot
- Migratory Shorebirds.

The Migratory Shorebirds important habitat map includes habitat for species that are listed under NSW and/or Commonwealth legislation: Sanderling *(Calidris alba)*, Curlew Sandpiper *(Calidris ferruginea)*, Great Knot *(Calidris tenuirostris)*, Greater Sand-plover *(Charadrius leschenaultia)*, Lesser Sand-plover *(Charadrius*

mongolus), Broad-billed Sandpiper *(Limicola falcinellus)*, Black-tailed Godwit *(Limosa limosa)*, Terek Sandpiper *(Xenus cinereus)*, Red Knot *(Calidris canutus)*, Eastern Curlew *(Numenius madagascariensis)*, Bar-tailed Godwit *(Limosa lapponica baueri).* The Migratory Shorebirds mapped within the habitat map in the development footprint include: Eastern Curlew (*Numenius madagascariensis*) andBar-tailed Godwit (*Limosa lapponica baueri*).

The extent of the important habitat mapping in and around the Subject Land is shown in Figure 5-13 as 'Migratory Shorebirds Important Areas'. Habitat evaluation was undertaken (presented in Appendix C.7) for EPBC Act listed species. Results are discussed in Appendix C.5.

Figure 5-13 Habitat features and selected fauna records in the subject land

Figure 5-14 Threatened species recorded during site surveys (February - March 2024)

5.1. Identification of threatened species for assessment

5.1.1. Ecosystem credit species

The following ecosystem credit species shown in Table 5-2 were returned by the BAM-C as being associated with the PCTs present inside the development footprint. These species are assumed to occur with suitable habitat onsite and contribute to ecosystem credits. Two ecosystem credit species were excluded: Comb-crested Jacana *(Irediparra gallinacean)* based on vagrancy on the NSW south coast and Australasian Bittern (*Botaurus poiciloptilus)* based on lack of suitable habitat. One ecosystem credit species was added. Eastern False Pipistrelle *(Falsistrellus tasmaniensis)* as the species was identified as 'potentially present' during field surveys. Although it is not associated with any of the PCTs identified in the subject land, it is associated with closely related PCTs such as PCT 3638 South Coast Sands Bangalay Forest. Therefore, it was added to child case 51563 Zone 1 (PCT 3639).

Table 5-2 Ecosystem credit species predicted by the BAM-C

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	Moderate
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	Endangered	No	BAM-C	Excluded – no brackish or freshwater wetlands present; only estuarine.	N/A	N/A
Sanderling (Foraging)	*Calidris alba*	Vulnerable	Not listed	Yes	BAM-C	Included	4056 Moderate 4091 High 4097 High	High
Red Knot (Foraging)	*Calidris canutus*	Not listed	Endangered	Yes	BAM-C	Included	4056 Moderate 4091 High 4097 High	High
Curlew Sandpiper (Foraging)	*Calidris ferruginea*	Endangered	Critically Endangered	Yes	BAM-C	Included	4054 Moderate 4056 Moderate 4091 High 4097 High	High

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
Gang-gang Cockatoo (Foraging)	*Callocephalon fimbriatum*	Endangered	Endangered	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate	Moderate
South-eastern Glossy Black-Cockatoo (Foraging)	*Calyptorhynchus lathami lathami*	Vulnerable	Vulnerable	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High	High
Spotted Harrier	*Circus assimilis*	Vulnerable	Not listed	No	BAM-C	Included	4054 Moderate 4056 Moderate 4097 High	Moderate
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	Vulnerable	Vulnerable	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate	High
Varied Sittella	*Daphoenositta chrysoptera*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	Moderate

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
Spotted-tailed Quoll	*Dasyurus maculatus*	Vulnerable	Endangered	No	BAM-C	Included	3108 Moderate 4056 Moderate 4091 High	High
White-fronted Chat	*Epthianura albifrons*	Vulnerable	Not listed	No	BAM-C	Included	4091 High	Moderate
Beach Stone-curlew (Foraging)	*Esacus magnirostris*	Critically Endangered	Not listed	Yes	BAM-C	Included	4091 High 4097 High	High
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Vulnerable	Not listed	No	Survey	Included	3639 Moderate	High
Little Lorikeet	*Glossopsitta pusilla*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate	High
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	Vulnerable	Not listed	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	High
Little Eagle	*Hieraaetus*	Vulnerable	Not listed	Yes	BAM-C	Included	3108 Moderate	Moderate

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
(Foraging)	*morphnoides*						3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	Vulnerable	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	High
Comb-crested Jacana	*Irediparra gallinacea*	Vulnerable	Not listed	No	BAM-C	Excluded – Vagrant one record on NSW far south coast from 1991 (Bermagui, ~70km north)	N/A	N/A
Black Bittern	*Ixobrychus flavicollis*	Vulnerable	Not listed	No	BAM-C	Included	3639 Moderate 4091 High 4097 High	Moderate
Swift Parrot (Foraging)	*Lathamus discolor*	Endangered	Critically Endangered	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate	Moderate

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
							4056 Moderate 4091 High 4097 High	
Bar-tailed Godwit *(baueri)* (Foraging)	*Limosa lapponica baueri*	Not listed	Vulnerable	Yes	BAM-C	Included	4056 Moderate 4091 High 4097 High	High
Black-tailed Godwit (Foraging)	*Limosa limosa*	Vulnerable	Endangered	Yes	BAM-C	Included	4091 High 4097 High	High
Square-tailed Kite (Foraging)	*Lophoictinia isura*	Vulnerable	Not listed	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4091 High	Moderate
South-eastern Hooded Robin	*Melanodryas cucullata cucullata*	Endangered	Endangered	No	BAM-C	Included	3108 Moderate 3639 Moderate 4054 Moderate 4056 Moderate 4097 High	Moderate
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate 4091 High	High

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
Large Bent-winged Bat (Foraging)	*Miniopterus orianae oceanensis*	Vulnerable	Not listed	Yes	BAM-C	Included	3108 Moderate 4056 Moderate 4091 High 4097 High	High
Turquoise Parrot	*Neophema pulchella*	Vulnerable	Not listed	No	BAM-C	Included	3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	High
Eastern Curlew (Foraging)	*Numenius madagascariensis*	Not listed	Critically Endangered	Yes	BAM-C	Included	4056 Moderate 4091 High 4097 High	High
Olive Whistler	*Pachycephala olivacea*	Vulnerable	Not listed	No	BAM-C	Included	3639 Moderate	Moderate
Eastern Osprey (Foraging)	*Pandion cristatus*	Vulnerable	Not listed	Yes	BAM-C	Included	3639 Moderate 4054 Moderate 4056 Moderate 4091 High 4097 High	Moderate
Scarlet Robin	*Petroica boodang*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate	Moderate
Flame Robin	*Petroica phoenicea*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate	Moderate

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
Golden-tipped Bat	*Phoniscus papuensis*	Vulnerable	Not listed	No	BAM-C	Included	3108 Moderate 4056 Moderate 3639 Moderate	High
Grey-headed Flying-fox (Foraging)	*Pteropus poliocephalus*	Vulnerable	Vulnerable	Yes	BAM-C	Included	3108 Moderate 3639 Moderate 4056 Moderate 4091 High	High
Pilotbird	*Pycnoptilus floccosus*	Vulnerable	Vulnerable	No	BAM-C	Included	3108 Moderate 3639 Moderate	Moderate
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Vulnerable	Not listed	No	BAM-C	Included	4091 High	High
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Vulnerable	Not listed	No	BAM-C	Included	4091 High	High
Little Tern (Foraging)	*Sternula albifrons*	Endangered	Not listed	Yes	BAM-C	Included	4091 High	High
Eastern Hooded Dotterel (Foraging)	*Thinornis cucullatus cucullatus*	Critically Endangered	Vulnerable	Yes	BAM-C	Included	3108 Moderate 4056 Moderate 4091 High 4097 High	High
Rosenberg's Goanna	*Varanus rosenbergi*	Vulnerable	Not listed	No	BAM-C	Excluded – Vagrant.	(Child case 51563)	High

Common Name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Associated PCT & veg zones	Sensitivity to potential gain
		BC Act	EPBC Act					
						Subject Land is outside species' known distribution2F[2]		

[2] (Smith, Scott, & Keogh, 2007)

5.1.2. Species credit species

The BAM-C small area module predicted 13 species credit species to occur within the development footprint (Table 5-3 and Table 5-4). Under the BAM, these generate species credits unless:

1. They are excluded because key habitat features don't exist, or they are geographically limited. Some species may also be excluded because important habitat mapping does not exist inside the Subject Land, or
2. Habitat components are lacking such that they could not occur (microhabitats), or
3. Survey effort has demonstrated they are not present.

Criteria 1 and 2 are addressed in Table 5-3 and Table 5-4 below. There were no additional threatened species returned from BioNet database searches. Threatened species returned from PMST searches were evaluated and assessed in the first instance using a desktop habitat evaluation which is presented in Appendix C (based on field survey of habitat) and then Assessments of Significance where relevant.

Three additional species credit species were added to the BAM-C:

- Pied Oystercatcher – opportunistically observed foraging adjacent to subject land
- Southern Myotis – 'potential' record obtained adjacent to subject land during Anabat surveys.
- Eastern Curlew – though not associated with PCT 3108 or PCT 4054, due to its inclusion within the Migratory Shorebirds important habitat map in the development footprint it was added to child case 49718.

Table 5-3 Species credit species PCT associations and BAM-C child case number

Species	BAM-C child case #			PCT associations or within important habitat map in development footprint						
	49718	51513	51563	3108	4054	4091	4097	4102	3639	4056
Large-eared Pied Bat			✓						✓	✓
Beach Stone-curlew		✓				✓	✓	✓		
Pied Oystercatcher		✓					✓	✓		
Swift Parrot	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Large Bent-winged Bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stuttering Frog	✓			✓	✓					
Southern Myotis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Orange-bellied Parrot	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brush-tailed Rock-wallaby	✓			✓	✓					
Scrub Turpentine	✓			✓	✓					

Species	BAM-C child case #			PCT associations or within important habitat map in development footprint						
Eastern Curlew	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Eastern Hooded Dotterel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sooty Owl	✓			✓	✓					
Warty Ziera	✓			✓	✓					

Table 5-4 Candidate flora species identified in BAM-C and included/excluded from assessment

Specific Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
Rhodamnia rubescens **Scrub Turpentine**	North of -35.90° latitude only[1] Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.[2]	Very High	CE	CE	No suitable habitat within the Subject Land.	Excluded	Subject Land is south of -35.90° latitude	n/a
Zieria tuberculata **Warty Zieria**	Rocky areas[1] Monzonite outcrops or within 50m[1] Within 15 km of Central Tilba[1]	High	V	V	No habitat components occur within the Subject Land.	Excluded	Subject Land is outside of geographic restriction, being further than 15 km of Central Tilba	n/a

Table 5-5 Candidate fauna species identified in BAM-C and included/excluded from assessment

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
Calidris ferruginea Curlew Sandpiper (Breeding)	As per Important Habitat Map[1]	High	E	CE	N/A	Excluded	Not on Important Shorebird habitat mapping within the Subject Land	N/A
Chalinolobus dwyeri Large-eared Pied Bat	Cliffs[1] Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels[1] North of Batemans Bay[1]	Very High	V	E	Whilst there are no cliffs onsite, there are potential cliffs within 2 kms of the Subject Land	Excluded	Subject Land is outside of geographic limitation, being south of Batemans Bay.	N/A
Esacus magnirostris Beach Stone-curlew (Breeding)	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. Beach Stone-	High	CE	Not listed	Breeding habitat is present as the Subject Land provides vegetation and mangroves.	Excluded	Vagrancy - the breeding population of Beach Stone-curlew is confined to the north coast (NSW Scientific Committee, 2008)	N/A

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
	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[2]							
Haematopus longirostris Pied Oystercatcher	Within 100m of estuarine areas and the ocean[1]	High	E	Not listed	Within 100m of estuarine areas and the ocean[1]	Included	N/A	VZ 6_4102_4097 High
Lathamus discolor Swift Parrot (Breeding)	As per Important Habitat Map[1]	High	E	CE	Subject Land is within the Important Habitat Map	Included	N/A	VZ 1_3108 Moderate VZ 2_3639 Moderate VZ 3_4054 Moderate VZ 4_4056 Moderate VZ 5_4091 High

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
								VZ 6_4102_4097 High
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	Caves[1] Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave[1] " observation type code "E nest-roost[1] " with numbers of individuals >500[1]	Very High	V	Not listed	There are no caves or structures suitable for breeding within the Subject Land	Excluded	Existing boardwalk structure does not provide suitable breeding habitat for this species. As per the Recovery Plan, the structure of maternity roosts needs to be of a specific shape, arch caves with dome roofs, and caves need to be high and deep enough to allow juvenile bats to learn to fly safely inside and have indentations in the roof (DERM, 2011).	N/A
Mixophyes balbus Stuttering Frog	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great	Very High	E	V	Suitable habit in the form of wet forest present within the Subject	Included	N/A	VZ 1_3108 Moderate VZ 3_4054 Moderate

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
	Dividing Range[2]				Land			
Myotis Macropus Southern Myotis	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	High	V	Not listed	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	Included	N/A	VZ 1_3108 Moderate VZ 2_3639 Moderate VZ 3_4054 Moderate VZ 4_4056 Moderate VZ 5_4091 High VZ 6_4102_4097 High
Neophema chrysogaster Orange-bellied Parrot	Spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also	Moderate	CE	CE	Subject Land contains sheltered coastal habitat, and samphire herbland.	Excluded - Vagrant	There are no records within the locality, with the closest BioNet records approximately 237 km north of the Subject Land (OEH,	N/A

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
	inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland[2]						2021). Species main distribution in winter is south-eastern South Australia and southern Victoria, with only occasional records in NSW. As such, is considered to be a vagrant species within the Subject Land.	
Numenius madagascariensis Eastern Curlew (Breeding)	As per Important Habitat Map	High	Not listed	CE	Subject Land is within the Important Habitat Map	Included	N/A	VZ 1_3108 Moderate VZ 2_3639 Moderate VZ 3_4054 Moderate VZ 4_4056 Moderate VZ 5_4091 High VZ 6_4102_4097 High

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
Petrogale penicillata Brush-tailed Rock-wallaby	Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines[1]	Very High	E	V	There are no rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines within 1 km of the Subject Land	Excluded	Absence of habitat constraints - There are no rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines within 1 km of the Subject Land.	N/A
Thinornis cucullatus cucullatus Eastern Hooded Dotterel (Breeding)	In eastern Australia, Eastern Hooded Dotterel usually breed from August to March on sandy ocean beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 m of the fore-dune, mostly within 5 m of the high-water mark, but occasionally among or behind dunes.[2]	High	CE	V	No breeding habitat present.	Excluded	Subject Land is not considered to contain breeding habitat, as it is not located along a sandy beach or sand-dune for nesting.	N/A

Species Credit Species	Habitat components and geographic limitations	Sensitivity to gain class	Listing status		Habitat components and abundance on site	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
			BC Act	EPBC Act				
Tyto tenebricosa Sooty Owl					Hollow-bearing trees: 1 HBT with >20cm entrance diameter (#HBT 8). Tree species and hollow height not recorded. HBT 8 outside development footprint (retained).	No	Habitat degraded – habitat within development footprint subject to high levels of pedestrian and domestic animal disturbance; potentially suitable habitat occurs adjacent to footprint not within.	N/A

[1] BAM-C, [2] BioNet Species Profile, [3] SPRAT Profile, [4] TBDC

5.2. Presence of candidate species credit species

Table 5-6 lists candidate species credit species that were included in the BAM-C. As per Appendix L BAM 2020, these species require targeted surveys or further assessment.

Table 5-6 Determining the presence of candidate fauna species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required?
		BC Act	EPBC Act			
Pied Oystercatcher	*Haematopus longirostris*	E	Not Listed	Observed opportunistically	Yes	Yes
Swift Parrot	*Lathamus discolor*	E	CE	Within important habitat mapped area	Yes	Yes
Eastern Curlew	*Numenius madagascariensis*	Not listed	CE	Within important habitat mapped area	Yes	Yes
Stuttering Frog	*Mixophyes balbus*	E	V	Targeted survey	No	No
Southern Myotis	*Myotis macropus*	V	Not listed	Anabat survey	Yes	Yes

5.3. Threatened species surveys

The methods for targeted threatened species surveys are outlined in Section 2.4. Presented below is a summary of the targeted species surveys undertaken for the draft BDAR v1 using the general assessment module. Some of the original target species are no longer candidate species using the small area module. Nonetheless, for completeness, the full survey effort is shown for flora in Table 5-7 and fauna in Table 5-8. Candidate species are in bold.

Table 5-7 Threatened species surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method (transects or grids)	Timing of survey – within recommended period?	Effort (hours & no. people)		
Flora						
Australian Saltgrass	*Distichlis distichophylla*	Parallel field traverses 5 m either side of existing boardwalk infrastructure	Yes 27 February 2024	One person per transect, 4 hour total survey effort, total transect distance 4.6 km	No	No
Square Raspwort	*Haloragis exalata subsp. exalata*	Parallel field traverses 5 m either side of existing boardwalk infrastructure	Yes 27 February 2024	One person per transect, 4 hour total survey effort, total transect distance 4.6 km	No	No
Narrow-leafed Wilsonia	*Wilsonia backhousei*	Parallel field traverses 5 m either side of existing boardwalk infrastructure	Yes 27 February 2024	One person per transect, 4 hour total survey effort, total transect distance 4.6 km	No	No
Round-leafed Wilsonia	*Wilsonia rotundifolia*	Parallel field traverses 5 m either side of existing boardwalk infrastructure	Yes 27 February 2024	One person per transect, 4 hour total survey effort, total transect distance 4.6 km	No	No

Table 5-8 Threatened species surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
Fauna						
Bush Stone-Curlew	*Burhinus grallarius*	Call playback and spotlighting	Yes 17 – 20 March 2024 15 mins per survey	15 mins x 4 nights x 2 observers = 2 survey hours	No	No
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Stick nest searches	No 27 February 2024	All of Subject land searched for stick nests = 2 hours	No	No
Giant Burrowing Frog	*Heleioporus australiacus*	Call playback Active search	Yes 17 – 20 March 2024 (4 nights)	Each survey = 12 mins x 2 call playbacks per transect x 5 transects = 120 mins per night 8 nights total = 960 minutes (2 observers = 32	No	No

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
				hours)		
Little Eagle	*Hieraaetus morphnoides*	Stick nest search	No 27 February 2024	All of Subject land searched for stick nests = 2 hours	No	No
Green and Gold Bell Frog	*Litoria aurea*	Call playback Active search	Yes 21 – 24 March 2024 (4 nights)	Each survey = 12 mins x 2 call playbacks per transect x 5 transects = 120 mins per night 4 nights total = 480 minutes (2 observers = 16 hours)	No	No
Square-tailed Kite	*Lophoictinia isura*	Stick nest search	No 27 February 2024	All of Subject land searched for stick nests = 2 hours	No	No
Stuttering Frog	*Mixophyes balbus*	Call playback Active search	Yes 17 – 20 March 2024	Each survey = 2 call playbacks per transect (12 minutes	No	No

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
			(4 nights)	each) x 5 transects = 120 mins per night 4 nights total = 480 minutes (2 observers = 16 hours)		
Southern Myotis	*Myotis macropus*	Anabat recording	Yes 17 – 23 March 2024 (7 nights)	7 nights passive analysis	Potential	Yes

Figure 5-15 Survey effort and targeted survey location map

5.3.1. Area and location of suitable habitat for a species credit species (species polygon)

For each species credit species which were determined to be present (including potentially present) or likely to use suitable habitat on the subject land (as per important habitat maps), a species polygon has been created. Species polygon maps are provided in Appendix F. Justification for each species polygon and the total area of the species polygon is shown in Table 5-9. Species may be listed as having Serious and Irreversible Impacts (SAII). EPBC Act listed species that are present within the subject land are shown in Table 5-10.

Table 5-9 Results for present species (recorded, important habitat mapping or SAII)

Common name	Scientific name	Biodiversity risk weighting	SAII entity	Habitat constraints / microhabitats present on the subject land / vegetation zone	Extent (ha) of suitable habitat present within development footprint	TBDC species specific recommendations e.g. buffers, general comments	Species polygon justification	Habitat condition in species polygons (vegetation integrity score)
Pied Oystercatcher	*Haematopus longirostris*	2	No		0.08 ha	Species was recorded in study area.	Species polygon created within associated PCTs listed in the TBDC.	VZ 6_4102_4097: 72
Swift Parrot	*Lathamus discolor*	3	Yes	Important Habitat Mapping within all Vegetation Zones	0.16 ha	The species is considered present and the part of the subject land that is within the important habitat map forms the species polygon used to generate species credits.	Species polygon created for all vegetation zones within important habitat mapping.	VZ 1_3108: 53.6 VZ 2_3639: 57.9 VZ 3_4054: 37.6 VZ 4_4056: 37.7 VZ 5_4091: 71.9 VZ 6_4102_4097: 72
Southern Myotis	*Myotis macropus*	2	No	Permanent waterbodies	0.39	Habitat constraints (high tide mark for tidal waterbodies) and surrounding habitat (associated PCTs)	Species polygon created for associated vegetation zones to high tide mark.	VZ 1_3108: 53.6 VZ 2_3639: 57.9 VZ 3_4054: 37.6 VZ 4_4056: 37.7 VZ 5_4091: 71.9 VZ 6_4102_4097: 72
Eastern Curlew	*Numenius madagascariensis*	3	Yes	Important Habitat Mapping within	0.24 ha	The species was recorded in study	Species polygon created for all	VZ 1_3108: 53.6 VZ 2_3639: 57.9

Common name	Scientific name	Biodiversity risk weighting	SAII entity	Habitat constraints / microhabitats present on the subject land / vegetation zone	Extent (ha) of suitable habitat present within development footprint	TBDC species specific recommendations e.g. buffers, general comments	Species polygon justification	Habitat condition in species polygons (vegetation integrity score)
				most Vegetation Zones		area and the part of the subject land that is within the important habitat map forms the species polygon used to generate species credits.	associated PCTs within important habitat mapping.	VZ 3_4054: 37.6 VZ 4_4056: 37.7 VZ 5_4091: 71.9 VZ 6_4102_4097: 72

Table 5-10 Results for EPBC Act listed species present (recorded or with important habitat within the subject land)

Common name	Scientific name	Abundance – No. individual plants present on subject land (flora with count as measure)	Extent (ha) of suitable habitat present on site (species with area as measure)
Swift Parrot	*Lathamus discolor*	n/a	0.16
Eastern Curlew	*Numenius madagascariensis*	n/a	0.24

6. Identifying prescribed biodiversity impacts

The following prescribed impacts have been identified within the Subject Land (Table 6-1). Where threatened entities are referred to, this includes species that were identified through BioNet and PMST searches, or that were returned in draft v1 of the BDAR (not using the small area streamlined assessment module).

Table 6-1 Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Potential impact	Threatened entities that use, are likely to use, or are part of the habitat feature.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	No karst, caves, crevices, cliffs, rock or other geological features of significance inside the subject land.	No	N/A
Human-made structures	Yes	Human-made structures were located inside the subject land being the Merimbula Boardwalk and associated infrastructure including culverts. Following a site investigation and analysis, it was concluded that the structure does not support microbat roost habitat (e.g. Southern Myotis (*Myotis macropus*)). Refer to Figure 5-2.	No	N/A
Non-native vegetation	No	Non-native vegetation occurs within subject land as weeds and gardens.	Yes	Long-nosed Potoroo Southern Brown Bandicoot
Habitat connectivity	Yes	There is habitat connectivity within the subject land likely to be indirectly impacted by construction activities, being; Linear vegetation adjacent to the boardwalk which connects to larger patches of vegetation outside the Subject Land & Merimbula Lake Estuary and associated aquatic habitat for wading birds. Following a site investigation and analysis, it was concluded that both habitat corridors support a range of threatened species. Refer to Section 8.3.3 for further information about how this habitat was identified as a prescribed biodiversity impact.		<u>Forest and shrubland vegetation</u> Gang-gang Cockatoo Swift Parrot <u>Aquatic habitat</u> Sanderling Red Knot Curlew Sandpiper Pied Oystercatcher Bar-tailed Godwit Black-tailed Godwit Eastern Curlew Little Tern Southern Myotis
Waterbodies, water quality	Yes	Waterbodies impacted directly/indirectly include Merimbula Lake, four 1st order	Yes	<u>Aquatic habitat</u>

Feature	Present	Description of feature characteristics and location	Potential impact	Threatened entities that use, are likely to use, or are part of the habitat feature.
and hydrological processes		ephemeral watercourses and one 2nd order unnamed ephemeral watercourse. Waterbodies can be seen on Figure 5-13. Following a site investigation and analysis, it was concluded that Merimbula Lake supports a range of threatened species. Refer to Figure 8-1 and Section 8 for further information about how this habitat was identified as a prescribed biodiversity impact.		Sanderling Red Knot Curlew SandpiperPied Oystercatcher Bar-tailed Godwit Black-tailed Godwit Eastern Curlew Little Tern Southern Myotis
Vehicle strikes	Yes	The proposed activity is unlikely to increase in traffic around subject land due to pre-existing access.	No	N/A

Stage 2: Impact assessment (biodiversity values and prescribed impacts

7. Avoid and minimise impacts

7.1. Avoiding and minimising direct/indirect impacts on project location and design)

The proposal is located where there is an existing boardwalk structure. The existing boardwalk is beginning to show signs of needing repair, in particular, some sections have subsided resulted in a cambered walkway, and other sections show instability (with noticeable movement) during use.

The existing boardwalk is frequented by both locals and tourists and is valued for the scenic attraction the walk provides. It is often subject to heavy usage and impact, mainly from organised running events. The current width of the boardwalk (1.5m) is insufficient to allow people with prams to easily pass each other. Due to this, it was determined by BVSC that the boardwalk required upgrading, with the upgrade identified as an opportunity to improve the quality of recreational infrastructure in the area.

The development footprint will be located in the same footprint as the existing infrastructure. The following changes have been made to avoid impacts to biodiversity:

- Two additional small lookouts/platforms originally planned were scrapped in favour or upgrading existing platforms to minimise biodiversity impacts.
- The original masterplan included lighting along the whole length of the boardwalk to allow safe nighttime use. This was highlighted as a concern for fauna generally and shorebirds particularly. The lights will now be confined to already lit areas around the carparks.
- Clearing of vegetation has been avoided as much as possible, with the development footprint width being 3m across the majority of the Subject Land, which includes the width of the existing boardwalk structure and disturbance (2m). Note that the development footprint excludes the existing gravel pathway (refer to Section 8.1.1). Impacts to vegetation and habitat outside of this development footprint will be avoided.
- Construction materials will be stored within existing disturbed and exotic vegetation areas to avoid the requirements for additional laydown areas.

Additionally, construction methods have been carefully planned to minimise impacts, as follows:

- In sensitive areas (namely saltmarsh and mangrove), 'Type 3' construction methodology would be employed, involving a small excavator to install the piles and FRP mesh using the new boardwalk as the work platform, thereby reducing adjacent impacts (Figure 7-1). A similar incremental construction methodology has recently been successfully used for the Huskisson Mangrove Boardwalk Upgrade completed by Shoalhaven City Council involving the demolishment of existing boardwalk in sections and subsequent construction of new boardwalk in those sections. For more information, including photos of the process please refer to the website Huskisson Mangrove Boardwalk Upgrade | Shoalhaven City Council (nsw.gov.au).
- Bog mats will be used in wet areas to minimise damage and compaction.
- Where possible, mangroves will be lopped to accommodate the widened boardwalk rather than removed.

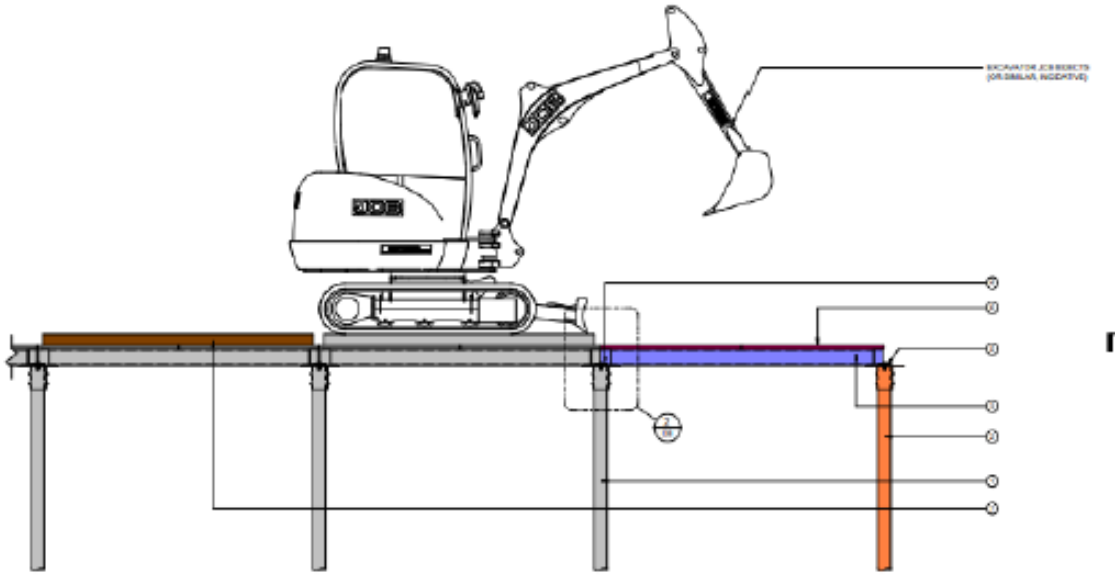

Figure 7-1 'Type 3' construction methodology in sensitive areas

Specific mitigation strategies have been developed to reduce residual risks to biodiversity (see Section 8.4).

7.2. Avoid and minimise prescribed impacts

Prescribed impacts relevant to this proposal include habitat connectivity, human made structures and water quality, water bodies and hydrological processes.

As the development footprint is located within the existing boardwalk footprint, the location of the proposal could not be changed to further minimise impacts. Impacts to habitat connectivity have been avoided by ensuring that the proposal will clear the minimum amount of vegetation as possible, with the development footprint the minimum width required to undertake the works.

The proposal involves upgrading the existing boardwalk structure. As such, impacts to this human made structure cannot be avoided. This existing human made structure will be replaced.

7.3. Other measures considered

Not applicable.

7.4. Summary of measures to avoid and minimise impacts

Table 7-1 summarises findings from Ch 8.2 & 8.2 to document the measures to avoid and minimise direct, indirect and prescribed impacts.

Table 7-1 Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome	Timing	Responsibility
Locate boardwalk in existing	Minimal clearing of TECs and	Planning	BVSC

Action	Outcome	Timing	Responsibility
footprint	threatened species habitat required (total 0.24 ha) along 1.7 kms; average 0.5m clearing depth either side of existing footprint.		
Scrapped plans for additional lookouts and platforms	Reduced biodiversity impact with development footprint over existing footprint.	Planning	BVSC
Scrapped plans for lighting along boardwalk	Reduced biodiversity impact particularly for shorebirds	Planning	BVSC
Laydown within existing areas	Minimised vegetation areas trampled and damaged.	Planning	BVSC
Bog mats in wet areas	Minimise compaction and damage to waterlogged soils.	Construction	Contractor
Small machinery utilised	Minimise clearing width.	Planning	BVSC
'Type 3' methodology	Minimise impacts to sensitive areas (mangrove and saltmarsh).	Construction	Contractor

8. Impact assessment

Assumptions

It is assumed that all activities associated with the development will be contained wholly within the development footprint, including stockpiles and machinery manoeuvring.

8.1. Direct impacts

8.1.1. Residual direct impacts

The construction and operational phases of the proposal have the potential to impact biodiversity values at the site that cannot be avoided via impact minimisation and avoidance measures. This would occur through residual direct impacts, such as vegetation lopping, habitat clearance (and associated noise and disturbance) and ongoing existence of infrastructure (which may create barriers to movement and generate noise and disturbance). These are summarised in Table 8-1.

Along the pathway, direct impact areas have been determined by subtracting areas of existing terrestrial disturbance (e.g. ~2m width, refer to Figure 5-7) from the development footprint (three metres width). So where the path already exists and the intention is to simply improve drainage or surfacing, this is not calculated as an impact as native vegetation and threatened species habitat does not occur within the existing pathway.

However, as the boardwalk upgrade includes removal and replacement, in these sections the development footprint includes the entire three metre width. Also note that in all vegetation zones, the vegetation integrity following development has been assumed as zero – that is, complete removal has been assumed. In fact, this is unlikely. The development has been planned to ensure low residual impact upon saltmarsh and mangrove communities via a raised boardwalk (maintaining tidal regime and minimising compaction during operation) and using FRP mesh platforms (maintaining access to light for saltmarsh during operation). Measures have been developed (refer to Section 7.1) to minimise impacts during construction such as ‘Type 3 methodology’ compaction, trampling and vegetation removal. For example, mangroves will be lopped rather than removed as much as possible.

However, it was decided not to use partial loss scores in the assessment as this requires consideration of management controls over the impacted area for the life of the project and because the extent of the regeneration of saltmarsh and mangrove communities in the development footprint post-construction is uncertain (NSW DCCEEW, 2024).

Table 8-1 Residual direct impacts to biodiversity during the construction and operational phases

Describe impact	BC Act status	EPBC Act Status	SAII entity	Project phase/timing of impact	Extent
Clearing for construction: reduction in community extent and integrity					
Bangalay Sand Forest of Sydney Basin and South East Corner Bioregions TEC	E	Not listed	No	Construction	0.06 ha
Brogo Vine Forest of the South East Corner Bioregion TEC	Not listed	E	No	Construction	0.06 ha
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC	E	Not listed	No	Construction	0.08 ha
Subtropical and Temperate Coastal Saltmarsh TEC	Not Listed	E	No	Construction	0.08 ha
Native vegetation (all PCT zones – inclusive of TECs)	n/a	n/a	n/a	Construction	0.39 ha
Habitat loss (including HBT, fallen timber); displacement of resident fauna, injury or death of fauna					
Haematopus longirostris Pied Oystercatcher	E	Not listed	No	Construction	0.08 ha
Lathamus discolor Swift Parrot	E	CE	Yes	Construction	0.16 ha
Numenius madagascariensis Eastern Curlew	Not listed	CE	Yes	Construction	0.24 ha

Describe impact	BC Act status	EPBC Act Status	SAII entity	Project phase/timing of impact	Extent
Myotis Macropus Southern Myotis	V	Not listed	No	Construction	0.39 ha

8.1.2. Changes in vegetation integrity scores

The clearing proposed will reduce the vegetation integrity scores in all six vegetation zones to zero, as shown in Table 8-2 below.

Table 8-2 Change in VI Score for each vegetation zone as a result of identified impacts

Vegetation zone	PCT ID	Condition	Area (ha)	Before development				After development				Change in VI score
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	
1_3108	3108	Moderate	0.06	64.8	32.1	73.9	53.6	0	0	0	0	-53.6
2_3639	3639	Moderate	0.06	70.2	43.4	63.8	57.9	0	0	0	0	-57.9
3_4054	4054	Moderate	0.04	64.4	22.2	37.2	37.6	0	0	0	0	-37.6
4_4056	4056	Moderate	0.02	40.2	34.8	38.2	37.7	0	0	0	0	-37.7
5_4091	4091	High	0.13	51.7	100	N/A	71.9	0	0	0	0	-71.9
6_4021_4097	4097	High	0.08	51.9	100	N/A	72	0	0	0	0	-72
7_4021	4102	High	0	51.9	98.7	N/A	71.6	51.9	98.7	N/A	71.6	0

8.1.3. Loss of hollow-bearing trees

Surveys identified 17 HBTs within the vegetation zones mapped in the Subject Land (Figure 5-13). Of these, three would be removed including:

- HBT 4 (*Melaleuca* stag with small hollow)
- HBT 5 (*Melaleuca* stag with small hollow)
- HBT 12 (stag with medium spout).

HBT clearing has been avoided as much as possible and mitigation measures have been implemented for residual impacts to HBTs including nest box installation (see Section 8.4).

A full HBT inventory is included in Appendix D.6

8.2. Indirect impacts

Indirect impacts are those that are not directly related to clearing of native vegetation. For this proposal, the main indirect impacts include the following:

- Inadvertent impacts on adjacent habitat or vegetation.
- Reduced viability of adjacent habitat due to edge effects.
- Increased risk of starvation, exposure and loss of shade or shelter.
- Transport of weeds and pathogens from the site to adjacent vegetation.
- Cumulative loss of breeding habitat and competition for remaining resources.
- Inhibition of nitrogen fixation and increased soil salinity.
- Rubbish dumping.
- Earthworks and mobilisation of sediments.
- Increased risk of fire.

Table 8-3 summarises all indirect impacts associated with this proposal.

Table 8-3 Potential indirect impacts to biodiversity during the construction and operational phases

Indirect impact	Impacted entities	Extent	Frequency/timing	Duration	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation Accidental clearing or impacts to vegetation can occur where clearing boundaries are not delineated, or where machinery or materials are stockpiled within driplines of trees.	PCT 3108, PCT 3639, PCT 4054, PCT 4056, PCT 4091, PCT 4097, PCT 4102 *Brogo Vine Forest of the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions TEC* *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC Threatened fauna species	Surrounding vegetation	Irregular during construction phase	Short-term	Direct loss of native flora and fauna habitat Potential for injury and mortality of fauna during clearing of fauna habitat and habitat trees Increased edge effects Likelihood of inadvertent impacts or clearing is high if boundaries are not clearly delineated. Consequence would be moderate for TECs and threatened fauna habitat and low for other habitat and native vegetation.
Reduced viability of adjacent habitat due to edge effects Edge effects can occur where works and/or development occur in close proximity to vegetation, and can include invasion by exotic species, and increase in edge ratios	*Brogo Vine Forest of the South East Corner Bioregions TEC* *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions TEC* *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC PCT 3108, PCT 3639, PCT 4054,	Within 200m of woodland and habitat edges	Ongoing during construction and operational phase	Long-term	Unmitigated, the likelihood of weed spread during the construction phase is high. The consequence is moderate in low to moderate quality forest and high in high quality forest.

Indirect impact	Impacted entities	Extent	Frequency/timing	Duration	Likelihood and consequences
as a result of clearing patches.	PCT 4056, PCT 4091, PCT 4097				
Increased risk of starvation, exposure and loss of shade or shelter Through vegetation removal and edge effects, potential exists for sheltering locations to be impacted.	Threatened fauna species Adjacent hollow bearing trees that may be used by threatened species such as birds, forest owls, microbats and arboreal mammals	Entire site and surrounding vegetation	Ongoing during construction and operational phase	Long-term	The likelihood of such impacts upon threatened fauna (and flora for shading) is low given the already disturbed nature of most of the Development Footprint, and the presence of the existing boardwalk structure. The consequence on bioregional persistence is low as impacts to shelter habitat confined to narrow Development Footprint, and the shelter is already impacted by the existing boardwalk footprint.
Transport of weeds and pathogens from the site to adjacent vegetation Construction and operation involve the movement of machinery and personnel which have the potential to transfer weed seed, and soil containing pathogens.	*Brogo Vine Forest in the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC Threatened fauna species	Entire site and surrounding vegetation	Irregular during construction and operational phase	Long-term	The subject land is heavily weed infested and is surrounded by urban areas and gardens. Minor loss of native flora and fauna habitat. The combined impacts are likely to be minor in nature if they occur at all and would result in a negligible consequence for bioregional persistence.
Cumulative loss of breeding habitat and competition for	Hollow-bearing trees to be lost may be suitable for: Gang-gang Cockatoo	Three HBTs within the Developmen	Regular during construction phase	Short term	High likelihood of loss of habitat due to the removal of HBTs Moderate consequence for Southern

Indirect impact	Impacted entities	Extent	Frequency/timing	Duration	Likelihood and consequences
remaining resources A reduction in the number of HBTs in the landscape leads to competition and resource stress within both threatened and non-threatened hollow-dependent fauna.	Yellow-bellied Sheath-tailed Bat Southern Myotis Eastern Coastal Free-tailed Bat	t Footprint			Myotis: the trees to be removed provide low quality habitat due to isolation from other vegetation (refer to Figure 5-13)
Inhibition of nitrogen fixation and increased soil salinity Increased soil salinity has the potential to occur as a result of vegetation removal impacting groundwater, bringing salt to surface.	*Brogo Vine Forest in the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC	Unknown	Construction phase	Short-term	It is unlikely that any adverse impact on soil microbial life and soil salinity will be made through the development.
Rubbish dumping Increased traffic through construction, in addition to public access of the boardwalk during operation may allow for dumping of rubbish	*Brogo Vine Forest of the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC	Entire site and surrounding vegetation	Construction and operation	Long-term	High likelihood, particularly during the operation phase, from visitors to the boardwalk. Moderate consequence of contamination of surrounding habitat with rubbish if this is not managed.

Indirect impact	Impacted entities	Extent	Frequency/timing	Duration	Likelihood and consequences
Earthworks and mobilisation of sediments Increased sediment load within waterways and soil movement have potential to occur as a result of construction works.	*Brogo Vine Forest of the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC	Entire site and surrounding vegetation	Construction	Short-term	High likelihood during construction works. High consequence, particularly if impact occurs to surrounding waterway, if not managed.
Increased risk of fire Access by additional persons during construction has potential to inadvertently increase risk of fire.	*Brogo Vine Forest of the South East Corner Bioregion* TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* TEC *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC Threatened fauna species	Entire site and surrounding vegetation	Regular during construction phase	Short-term	Low likelihood of occurrence. High consequence should a bushfire result in biodiversity impacts.

8.3. Prescribed impacts

The following prescribed biodiversity impacts are relevant to the proposal:

- Impacts of development on human made structures and non-native vegetation
- Impacts of development on habitat connectivity
- Impacts of development on water quality, water bodies and hydrological processes.

These are discussed in detail below, as well as details of any threatened entities potentially impacted by these actions.

8.3.1. Human made structures

Nature and extent

The Subject Land contains an existing 1.7km boardwalk wooden structure using small gauge timber (Figure 5-2), which is unlikely to contain roosting or breeding habitat for microbat species, including the threatened Southern Myotis. This existing structure will be removed to allow for the upgrade of the boardwalk. The Subject Land contains a culvert which is unlikely to be used for roosting microbats but does provide habitat connectivity for some species (e.g. Water Rat) between swampy areas.

Duration and consequence

The boardwalk and culverts would be temporarily removed during construction, and replaced with the new similar structures. The replacement structures would have similar (low) habitat values, and thus the consequence is considered negligible.

8.3.2. Non-native vegetation

Nature and extent

Exotic vegetation dominates ground stratum of PCT 3108 and PCT 4054 in areas close to residential gardens and drainage lines, including grasses and forbs (Figure 5-6). Other garden escapee weeds occur throughout the Subject Land under eucalypt forests. In these areas, the ground stratum is dense and moist and may provide good habitat for small ground-dwelling mammals such as Long-nosed Potoroo (assumed present).

Duration and consequence

Such areas would be ‘trimmed’ through veg removal (PCT 3108 - VZ 1_3108 - 0.06 ha and PCT 4054 – VZ 3_4054 - 0.04ha). The consequence would be minor to negligible due to being a small scale of works and similar habitat abundant elsewhere in the subject land.

8.3.3. Impacts of development on habitat connectivity

Vegetation within the Subject Land provides connectivity to habitat within the locality. In particular, terrestrial habitat is connected to large patches vegetation to the west and small patches of vegetation immediately north of the Subject Land. There is also connectivity to aquatic habitat, with the Subject Land located on the northern edge of Merimbula Lake, which connects to Merimbula Bay.

The proposed works will have a negligible effect on the habitat connectivity for threatened species locally and within the wider region, as the Subject Land is already fragmented by residential development, and the

larger patches of vegetation to the west of the Subject Land will remain undisturbed. The site in its current form is connected to surrounding vegetation only in the west, where this vegetation eventually connects to Bournda Nature Reserve and South East Forest National Park. No terrestrial connectivity exists to the east, due to being dissected by Market Street, with beach dunes immediately east of this road.

The proposal will result in the removal or disturbance of up to 0.39 ha of native vegetation, within a landscape consisting of linear vegetation patches and residential and commercial developments, and on a highly and frequently trafficked site. The proposed development footprint is unlikely to alter any of the existing broad habitat connectivity in the area, this is due to the development footprint being placed almost directly over the previous development footprint from the original boardwalk structure with only a few minor alterations to placement and width.

The proposal is unlikely to significantly influence habitat connectivity or existing fragmentation patterns within nearby corridors. The removal of vegetation for the development footprint consists of habitat that exists in a disturbed condition. The majority of threatened species have been assumed present within the Subject Land, and it is unknown if a population persists which would be disturbed. Bird species reliant on aquatic habitat would be minimally impacted during the construction phase only as connectivity to Merimbula Lake would remain.

Directly at the Subject Land, there is a chance of an area with excellent canopy connectivity of *Melaleuca* being disrupted; this may affect common species such as Sugar Gliders and Ring-tailed Possums.

8.3.4. Impacts of development on water quality, water bodies and hydrological processes

Nature

Five intermittent 1st and 2nd order (Strahler) streams bisect the Subject Land along with marine wetlands making up two of the vegetation zones (mangrove and saltmarsh). Streams occur as small intermittent rivulets (Figure 8-1), and swampy vegetated depressions (Figure 8-2).

Figure 8-1 Example of small stream with pondage

Figure 8-2 Example of swampy depression

Extent

The extent of impact would be minor, with clearing to occur one metre with side of the existing disturbance footprint. Impacts to marine ecosystems is discussed fully in the Aquatic Impact Assessment. Culverts will need replacement in some areas and these provide habitat connectivity (Figure 5-1) albeit not crucial as the

connected habitat is a small lakeside fragment (approximately 10 x 10m of Melaleuca swamp) near Bodalla Place.

Duration

Disturbance to waterways would be temporary in nature (during the construction period only) as culverts and boardwalk is replaced and upgraded.

Consequences

There is some potential to disturb habitat connectedness for some species with culvert replacement, but as this connection is not crucial for movement and disturbance temporary, the consequences are likely to be low.

8.4. Mitigating residual impacts – management measures and implementation

Impacts that cannot be avoided must be mitigated. Presented here is an identification of mitigation measures to address residual direct and indirect, prescribed impacts that were identified in the previous section as moderate or above likelihood. Mitigation measures proposed to manage impacts, including proposed techniques, timing, frequency, responsibility for implementing each measure, risk of failure, and an analysis of the consequences of any residual impacts are provided in Table 8-4 and Table 8-5.

Summary of mitigations for residual direct impacts:

- Offsets under the BOS.
- Unexpected finds procedure during clearing phase for habitat loss including removal of hollow-bearing trees.
- Nest box installation to replace hollows lost in the Subject Land.

Summary of mitigations for indirect impacts:

- Inadvertent impacts of adjacent habitat or vegetation can be mitigated through clear physical demarcation of the boundary between areas to be retained and areas slated for clearing
- Edge effects can be mitigated through control of weeds
- Transport of weeds and pathogens can be mitigated by a basic soil and clearing separation system.
- Rubbish dumping during the construction phase can be mitigated through standard high quality construction practices including maintaining a clean site and depositing rubbish at suitable facilities
- Mobilisation of sediments can be mitigated through application of standard erosion and sediment control practices.

Table 8-4 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure Impact	**Methods/technique**	**Timing**	**Frequency**	**Responsibility**	**Likely efficacy**	**Matters of National Environmental Significance (MNES)**
DIRECT IMPACTS						
Offset Clearing for construction impacts	Use Biodiversity Offset Scheme to offset impacts to biodiversity as calculated in this document.	Post-approval Prior to Construction	One-off	BVSC	High	*Brogo Vine Forest of the south east corner bioregion* TEC *Subtropical and Temperate Coastal Saltmarsh* TEC
Offset Habitat loss, displacement of resident fauna, injury or death of fauna	Use Biodiversity Offset Scheme to offset impacts to biodiversity as calculated in this document.	Post-approval Prior to Construction	One-off	BVSC	High	Sanderling Red Knot Curlew Sandpiper Gang-gang Cockatoo South-eastern Glossy Black-cockatoo Swift Parrot Bar-tailed Godwit Black-tailed Godwit Eastern Curlew
Unexpected finds procedure Loss of hollow-bearing trees	Unexpected finds procedure to be developed in case of encountering animal during hollow tree removal. All site personnel to be familiar with procedure.	Pre-construction During construction	Ongoing during construction	BVSC Contractor	High	n/a
Nest box installation Loss of hollow-bearing trees	Three hollows to be removed to be replaced at 1:1 ratio on	Pre-construction	One-off	BVSC	High	n/a

Mitigation measure Impact	Methods/technique	Timing	Frequency	Responsibility	Likely efficacy	Matters of National Environmental Significance (MNES)
	healthy eucalypt trees based on dimension attributes of those cleared.					
INDIRECT IMPACTS						
Clear physical demarcation of development footprint Inadvertent impacts on adjacent habitat or vegetation, including trampling.	CEMP to include: Demarcation (flagging) of vegetation for retention. Physical demarcation required; not to rely on operators' GPS.	Pre-clearance	One-off	BVSC Contractor	High	Sanderling Red Knot Curlew Sandpiper Gang-gang Cockatoo South-eastern Glossy Black-cockatoo Swift Parrot Bar-tailed Godwit Black-tailed Godwit Eastern Curlew
Weed control and hygiene protocol Edge effects, weeds and pathogens.	Separate soil and cleared vegetation stockpile sites for areas with high weed cover.	During construction	Ongoing during construction	Contractor	High	*Brogo Vine Forest of South East Corner Bioregion TEC* *Subtropical and Temperate Coastal Saltmarsh* TEC
Clear demarcation of works area Edge effects, risk of exposure / loss of shelter	As already listed, clear physical demarcation of retained vegetation to avoid impacting adjacent areas.	Pre-clearing During construction	Ongoing during construction	Contractor	High	Sanderling Red Knot Curlew Sandpiper Gang-gang Cockatoo South-eastern Glossy Black-cockatoo

Mitigation measure Impact	Methods/technique	Timing	Frequency	Responsibility	Likely efficacy	Matters of National Environmental Significance (MNES)
						Swift Parrot Bar-tailed Godwit Black-tailed Godwit Eastern Curlew
High quality construction practices Rubbish dumping	CEMP will include: List or map of lawful locations for dumping construction rubbish. Requirement for the construction contractor to maintain a clean site.	Post-approval During construction	Ongoing during construction	BVSC Contractor	High	Sanderling Red Knot Curlew Sandpiper Bar-tailed Godwit Black-tailed Godwit Eastern Curlew
Sediment and erosion controls Reduce mobilisation of sediments and other pollutants	CEMP to include: Erosion and sediment control practices in line with the 'Blue Book' *Managing Urban Stormwater: soils and construction Vol1* (Landcom 2004). Council inspection to ensure adherence.	Post-approval During construction	Ongoing during construction	BVSC Contractor	High	Sanderling Red Knot Curlew Sandpiper Bar-tailed Godwit Black-tailed Godwit Eastern Curlew
PRESCRIBED IMPACTS						
None proposed.						

Table 8-5 Mitigation measures implementation

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Performance criteria (linked to monitoring and evaluation strategy)	Adaptive management threshold (trigger for adaptive management plan/actions)	Management response (when triggered)
Offset	Credit liability is to be calculated and paid within required time frame. Inspection to ensure physical demarcation of clearing limits installed and abided by.	Credit settled. Vegetation clearing kept within assessed limits.	Clearing limits insufficient to capture all construction activities.	Commence project modification process.
Unexpected finds procedure	Weekly check-in with construction contractor to discuss any unexpected finds & response. Log to record details of above discussion stored on project file.	Contractor is able to activate unexpected finds procedure appropriately, with support from BVSC as necessary. Weekly discussion log can be retrieved for inspection.	Contractor does to activate unexpected finds procedure appropriately.	Provide information, training and support to contractor to ensure compliance.
Nest box installation	Proformas to record details of nest box orders and installation including number, sizes, location and date.	Nest boxes installed prior to clearing commencing. Proformas can be retrieved for inspection.	Nest boxes are not installed prior to clearing. Proformas have not recorded relevant information.	Clearing to cease until nest boxes installed. Survey to be undertaken to record details of next boxes installed.
Clear physical demarcation of development footprint	Weekly check of demarcated boundaries to ensure integrity. Log of weekly checks to record findings and actions.	Log shows demarcation undertaken, maintenance actioned as required and accidental encroachment on adjacent areas has been avoided.	Log cannot be retrieved. Vegetation clearing and other has extended beyond development footprint. Boundary of development footprint requires altering to allow impact into adjacent areas.	Commence checks and logs as soon as possible. Consult with BCD. Commence project modification process.
Weed control and hygiene	Weekly inspections to ensure	Log shows action undertaken	Stockpiles are consistently not	Education, information and

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Performance criteria (linked to monitoring and evaluation strategy)	Adaptive management threshold (trigger for adaptive management plan/actions)	Management response (when triggered)
protocol	stockpiles kept separate. Log of weekly checks to record findings and actions.	with maintenance actioned as required.	separated.	support provided to contractor to ensure compliance.
High quality construction practices	Weekly inspections to ensure rubbish is appropriately dealt with and site is well maintained. Log of weekly checks to record findings and actions.	Log shows site is consistently tidy with maintenance actioned as required.	Poor quality practices are consistently found.	Consultation with construction contractor with reference to the *Protection of the Environment Operations Act 1997*
Sediment and erosion controls	Contractor to undertake daily inspections of sediment and erosion controls. Council to undertake weekly inspections of controls. Log of weekly checks to record findings and actions.	Log shows consistent adherence with maintenance actions as required.	Poor quality practices are consistently found.	Consultation with construction contractor with reference to the *Protection of the Environment Operations Act 1997.*

9. Serious and irreversible impacts (SAII)

The principles used to determine if a development will have serious and irreversible impacts include impacts that:

- Will cause a further decline of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to be in a rapid rate of decline, or
- Will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or
- Impact on the habitat of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very limited geographic distribution, or
- Impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

9.1. Assessment for serious and irreversible impact on biodiversity values

Further assessment has been undertaken for three SAII entities, as outlined in Table 9-1. Figures showing species polygons and records for SAII entities are given in Appendix F.

Table 9-1 Entities at risk of an SAII

Common name	Scientific name	Reason for inclusion in assessment
Curlew Sandpiper	*Calidris ferruginea*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal
Swift Parrot	*Lathamus discolor*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal
Eastern Curlew	*Numenius madagascariensis*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal

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

Curlew Sandpiper

Actions to avoid and minimise direct and indirect impacts

The following actions have been undertaken to avoid and minimise direct and indirect impacts (including mitigation measures):

- Existing footprint used as basis for proposed boardwalk upgrade
- Access to sensitive areas of the site by barge in estuary rather than overland
- Offset clearing impacts
- Clear physical demarcation of clearing extent / retained vegetation.

Current status

The current status of Curlew Sandpiper is shown in Table 9-2. Refer to Appendix F for figures.

Table 9-2 current status – Curlew Sandpiper

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Evidence of rapid decline (Principle 1)			
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate)	Australian population reduction of 53% over 3 generations. NSW population reduction ≥80% in 3 generations.	(Cth DCCEEW, 2023a) TBDC	
Evidence of small population size (Principle 2)			
Current population size in NSW	Australia: 40,100 mature individuals. NSW - Unknown. Best estimate: 2 nationally important (host 0.1% of population) sites in NSW for Curlew Sandpiper: ~<400 individuals	(Cth DCCEEW, 2023a; Weller, et al., 2020)	Population estimates for NSW were not found in literature cited.
Decline in species' population size in 3 years or one generation	Unknown	(Cth DCCEEW, 2023a)	Decline given for 3 generations in cited literature, or average annual decline of 6.4% between 1993 – 2021.
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations	40,100	(Cth DCCEEW, 2023a)	Estimates range from 8,100 - 125,300
Evidence of limited geographic range (Principle 3)			
Extent of occurrence (ha)	Australia: 10,900,000km^2	(Cth DCCEEW, 2023a)	Range 10,400,000 – 11,400,000 km^2
Area of occupancy (ha)	Australia: 8,000km^2	(Cth DCCEEW, 2023a)	Range 8,000 – 12,000km^2

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Number of threat-defined locations	Unknown Yellow Sea overseas identified as a site of threatening processes.	(Cth DCCEEW, 2023a)	Specific locations not identified for Australia
Whether the species' population is likely to undergo extreme fluctuations	Unknown	n/a	No information available

Impact assessment

Table 9-3 Impact assessment –Curlew Sandpiper

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Number of individuals (mature and immature) present in the subpopulation on the subject land	Merimbula Lake is not listed as nationally significant for Curlew Sandpiper, thus <0.01% (40 individuals) may occur from time to time.	(Weller, et al., 2020)	Parts of subject land mapped as important habitat area but this appears not to be specific to Curlew Sandpiper and is generalised for all threatened migratory shorebirds
Number of individuals (mature and immature) present as a percentage of total NSW population (%)	<0.01%	See above	See above
Number of individuals (mature and immature) to be impacted by the proposal	Merimbula Lake is 1000 ha. Extent of habitat in subject land <1ha (0.01% of lake). No individuals potentially impacted ~0.040	(Weller, et al., 2020) (lake size, 0.01% population number) (ALA, 2024; FSCB, 2016-2023)	There are 4 ALA records in Merimbula between 1999-2017; without counts. Far South Coast Birdwatchers newsletter suggest species not regular at Merimbula Lake.
Individuals (mature and immature) to be impacted by	0.01%	Previous row entry	Low confidence due to no surveys undertaken and

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
the proposal as a percentage of total NSW population (%)			local population details not published but extrapolated from other information.
Area of habitat to be impacted (ha) (for species measured by area only)	0.33 ha foraging habitat	Calculated by GIS, PCT association and field vegetation survey	High
Area of the species' geographic range to be impacted by the proposal (ha)	None – extent of occurrence (based on geographic range) is far greater than area of occupancy at any one time. This would not be affected by the proposal.	(Cth DCCEEW, 2023a)	n/a
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%)	n/a	n/a	n/a
Individuals impacted	No individuals will be directly impacted, some habitat will be impacted		
Viability of a fragmented population	Not applicable – population would not be fragmented by the proposal	n/a	n/a

Swift Parrot

Actions to avoid and minimise direct and indirect impacts

The following actions have been undertaken to avoid and minimise direct and indirect impacts (including mitigation measures):

- Existing footprint used as basis for proposed boardwalk upgrade
- Access to sensitive areas of the site by barge in estuary rather than overland
- Offset clearing impacts
- Clear physical demarcation of clearing extent / retained vegetation.

Current status

The current status of Swift Parrot is shown in Table 9-4. Refer to Appendix F for figures.

Table 9-4 current status - Swift Parrot

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Evidence of rapid decline (Principle 1)			
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate)	Population reduction of >=80%	TBDC	n/a
Evidence of small population size (Principle 2)			
Current population size in NSW	There is a single, panmictic migratory population in Australia Population size uncertain	(Cth DCCEEW, 2024)	n/a
Decline in species' population size in 3 years or one generation	Existence of species threatened in short-term (2-5 yrs)	(EPBC TSSC, 2016) (NSW TSSCb, 2020)	n/a
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations	Up to 1000 mature individuals Populations fluctuations influenced by many variables including climatic impacts and flowering of key foraging species.	(Cth DCCEEW, 2024)	n/a
Evidence of limited geographic range (Principle 3)			
Extent of occurrence (ha)	57,000km2	(EPBC TSSC, 2016)	n/a
Area of occupancy (ha)	Foraging area: 7.5 km2 to 98 km2	(EPBC TSSC, 2016)	n/a
Number of threat-defined locations	Unknown		No information available
Whether the species' population is likely to	Possible	(Cth DCCEEW, 2024)	Uncertain

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
undergo extreme fluctuations			

Impact assessment

Table 9-5 Impact assessment – Swift Parrot

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Number of individuals (mature and immature) present in the subpopulation on the subject land	Unknown Spotted Gum forests on south coast named as important winter habitat. Fewer records occur south of Bega than other coastal areas in NSW Small to medium flocks (3-16 birds) regularly recorded around Merimbula.	(Cth DCCEEW, 2024) BioNet Atlas of Living Australia (ALA)	Parts of subject land mapped as important habitat area but no details available.
Number of individuals (mature and immature) present as a percentage of total NSW population (%)	Unknown, assume 25%	See above	Assumption based on relative density of ALA records compared to rest of coastal state
Number of individuals (mature and immature) to be impacted by the proposal	Unknown, assume up to 3-16, based on records flocks around Merimbula. 0.39 ha of associated PCT to be cleared in a linear strip alongside existing disturbed area.	ALA	Low confidence due to no surveys undertaken and local population details not published but extrapolated from other information.

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%)	0.3%-1.6% of estimated 1000 mature individuals	Previous row entry	Low confidence due to no surveys undertaken and local population details not published but extrapolated from other information.
Area of habitat to be impacted (ha) (for species measured by area only)	0.24 ha foraging habitat	Calculated by GIS, field survey and areas of mapped important habitat.	High
Area of the species' geographic range to be impacted by the proposal (ha)	None – extent of occurrence (based on geographic range) is far greater than area of occupancy at any one time. This would not be affected by the proposal.	(EPBC TSSC, 2016)	n/a
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%)	n/a	n/a	n/a
Individuals impacted	No individuals will be directly impacted, some habitat will be impacted		
Viability of a fragmented population	Not applicable – population would not be fragmented by the proposal	n/a	n/a

Eastern Curlew

Actions to avoid and minimise direct and indirect impacts

The following actions have been undertaken to avoid and minimise direct and indirect impacts (including mitigation measures):

- Existing footprint used as basis for proposed boardwalk upgrade
- Access to sensitive areas of the site by barge in estuary rather than overland
- Offset clearing impacts
- Clear physical demarcation of clearing extent / retained vegetation.

Current status

The current status of Eastern Curlew is shown in Table 9-6. Refer to Appendix F for figures.

Table 9-6 current status – Eastern Curlew

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Evidence of rapid decline (Principle 1)			
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate)	Population reduction of 82%	(Cth DCCEEW, 2023)	There is some uncertainty as to population decline; may be less but this is unconfirmed.
Evidence of small population size (Principle 2)			
Current population size in NSW	Unknown. Population spreads around the Australian coastline; with both nationally (>0.1% population) and internationally (>1% population) important sites for this species. Best estimate: with 12 nationally important & 2 internationally important sites in NSW for Eastern Curlew: 1,120 individuals	(Cth DCCEEW, 2024; Weller, et al., 2020)	Population estimates for NSW were not found in literature cited.
Decline in species' population size in 3 years or one generation	Unknown	n/a	Decline given for 3 generations in cited literature
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations	22,500 mature individuals	(Cth DCCEEW, 2023)	n/a
Evidence of limited geographic range (Principle 3)			
Extent of occurrence (ha)	Australia: 10, 400, 000km^2	(Cth DCCEEW, 2023)	n/a

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Area of occupancy (ha)	Australia: 13, 000 km^2	(Cth DCCEEW, 2023)	n/a
Number of threat-defined locations	Unknown	n/a	No information available
Whether the species' population is likely to undergo extreme fluctuations	Unknown	n/a	No information available

Impact assessment

Table 9-7 Impact assessment – Eastern Curlew

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Number of individuals (mature and immature) present in the subpopulation on the subject land	Merimbula Lake is not listed as nationally significant for Eastern Curlew, thus <0.1% (35 individuals) may occur from time to time.	(Weller, et al., 2020)	Parts of subject land mapped as important habitat area but no details available.
Number of individuals (mature and immature) present as a percentage of total NSW population (%)	<0.1%	See above	See above
Number of individuals (mature and immature) to be impacted by the proposal	Merimbula Lake is 1000 ha. Extent of habitat in subject land <1ha (0.01% of lake). No individuals potentially impacted ~0.035	(Weller, et al., 2020) (lake size, 0.1% population number)	2 Eastern Curlews were seen from the subject land foraging on oyster leases ~30m from shore during field inspection.
Individuals (mature and immature) to be impacted by the proposal as a percentage	0.01%	Previous row entry	Low confidence due to no surveys undertaken and local population details not

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
of total NSW population (%)			published but extrapolated from other information.
Area of habitat to be impacted (ha) (for species measured by area only)	0.24 foraging habitat	Calculated by GIS, PCT association and field vegetation survey	High
Area of the species' geographic range to be impacted by the proposal (ha)	None – extent of occurrence (based on geographic range) is far greater than area of occupancy at any one time. This would not be affected by the proposal.	(Cth DCCEEW, 2023)	n/a
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%)	n/a	n/a	n/a
Individuals impacted	No individuals will be directly impacted, some habitat will be impacted		
Viability of a fragmented population	Not applicable – population would not be fragmented by the proposal	n/a	n/a

10. Impact summary

10.1. Determine an offset requirement for impacts

10.1.1. Impacts on native vegetation and TECs or ecosystem credits

An offset is required for all impacts of development on PCTs that are associated with:

a) A vegetation zone that has a vegetation integrity score≥15 where the PCT is representative of an endangered or critically endangered ecological community, or
b) A vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or
c) A vegetation zone that has a vegetation integrity score ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

The PCTs and vegetation zones requiring offset, and the ecosystem credits required, are documented in Appendix E and mapped in Figure 4-8. The associated credit classes for ecosystem credits generated are detailed in Table 10-1 below.

Table 10-1 Impacts that require an offset - ecosystem credits

Vegetation zone	PCT/Zone	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number ecosystem credits required
1_3108	3108 Moderate	EPBC Act - *Brogo Vine Forest of the South East Corner Bioregion*	0.06	53.6	0	-53.6	2	2
2_3639	3639 Moderate	BC Act - *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions*	0.06	57.9	0	-57.9	2	2
3_4054	4054 Moderate	N/A	0.04	37.6	0	-37.6	1.75	1
4_4056	4056 Moderate	N/A	0.02	37.7	0	-37.7	1.75	1
5_4091	4091 High	N/A	0.13	71.9	0	-71.9	1.75	4
6_4102_4097	4097 High	BC Act - *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EPBC Act - *Subtropical and Temperate Coastal Saltmarsh*	0.08	72	0	-72	2	3
Total ecosystem credits								**13**

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

The BAM-C generated offset obligations for five candidate species, which are listed in Table 10-2 below.

Table 10-2 Impacts that require an offset - species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	No. of species credits required	Suitable IBRA subregion for offset
Pied Oystercatcher	*Haematopus longirostris*	E	Not listed	VZ 6_4102_4097: 0.08	2	Child case 51513: 3 **Species total: 3**	Any in NSW
Swift Parrot	*Lathamus discolor*	E	CE	VZ 1_3108: 0.04 VZ 2_3639: 0.01 VZ 3_4054: 0.03 VZ 4_4056: 0.01 VZ 5_4091: 0.07 VZ 6_4102_4097: 0.001	3	Child case 49718: 3 Child case 51513: 4 Child case 51563: 2 **Species total: 9**	Any in NSW
Southern Myotis	*Myotis macropus*	V	Not listed	VZ 1_3108: 0.06 VZ 2_3639: 0.06 VZ 3_4054: 0.04 VZ 4_4056: 0.02 VZ 5_4091: 0.13 VZ 6_4102_4097: 0.08	2	Child case 49718: 3 Child case 51513: 8 Child case 51563: 3 **Species total: 15**	Any in NSW
Eastern Curlew	*Numenius madagascariensis*	Not listed	CE	VZ 1_3108: 0.04 VZ 3_4054: 0.02 VZ 4_4056: 0.01 VZ 5_4091: 0.1 VZ 6_4102_4097: 0.08	3	Child case 49718: 3 Child case 51513: 9 Child case 51563: 1 **Species total: 13**	Any in NSW
Total species credits						**40**	

10.1.3. Offsets required under the EPBC Act

Appendix C provides a thorough consideration of entities listed under EPBC Act, including database searches and habitat evaluation. Assessments of Significance (AoS) were undertaken for the following communities and species with potential for impacts:

Communities

- *Brogo Vine Forest of the South East Corner bioregion* TEC
- *Subtropical and Temperate Coastal Saltmarsh* TEC.

Threatened species

- Curlew Sandpiper (*Calidris ferruginea)*Swift Parrot *(Lathamus discolor)*
- Eastern Curlew *(Numerius madagascariensis)*

Migratory species

In addition to the species listed above:

- Eastern Curlew *(Numerius madagascariensis)*
- Curlew Sandpiper (*Calidris ferruginea).*

The AoS concluded that a significant impact due to the activities associated with the proposal for species listed under the EPBC Act was unlikely. Thus, the proposal is not considered to require a referral or offsets in accordance with the EPBC Offsets Policy.

10.2. Impacts that do not require further assessment

Table 10-3 identifies impacts which do not require further assessment for ecosystem credits (as per BAM Section 9.3).

Aquatic areas are subject to environmental assessment under the *Fisheries Management Act 1994*, therefore do not require further assessment for ecosystem credits under the BAM. The Aquatic Assessment Report provides this assessment.

Hardstand areas, such as the existing carpark located at the eastern end of the Subject Land, has no value to any threatened entities assessed, and therefore does not require further assessment. The existing boardwalk structure contains potential habitat, therefore has been assessed as a prescribed impact within section 8.3.1.

Table 10-3 Impacts that do not need further assessment for ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
Aquatic areas	Along the southern edge of the Subject Land, adjacent to Merimbula Lake	Is subject to environmental assessment under the Fisheries Management Act.
Hardstand areas such as carpark	Eastern end of the Subject Land	Does not contain value to any threatened entities assessed.
Upgrade of existing gravel path	Centre of development footprint where boardwalk does not occur	The existing gravel path is compacted and bare of native vegetation and does not provide habitat to any threatened terrestrial entities assessed.

11. Biodiversity credit report

The biodiversity credit reports are found in Appendix E, with a summary provided in Table 11-1 and Table 11-2 below.

11.1. Ecosystem credits

Table 11-1 Ecosystem credit class and matching credit profile

PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA region
3108-South Coast Scarp Wet Vine Forest	South Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	EPBC Act - *Brogo Vine Forest of the South East Corner Bioregion*	*Brogo Vine Forest of the South East Corner Bioregion* This includes PCT's: 3108	Yes	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site
3639-South Coast Sands Bangalay Littoral Forest	South Coast Sands Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	BC Act - *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions*	*Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* This includes PCT's: 3546, 3638, 3639, 3640	No	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site
4054-South	Coastal	Forested	N/A	Coastal	No	South East Coastal Ranges,

PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA region
Coast Tidal Flats Samolus Paperbark-Grey Box Forest	Floodplain Wetlands	Wetlands		Floodplain Wetlands >=50% and <70%		Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.
4056-Southern Estuarine Swamp Paperbark Creekflat Scrub	Coastal Floodplain Wetlands	Forested Wetlands	N/A	Coastal Floodplain Wetlands >=50% and <70%	No	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.
4091-Grey Mangrove-River Mangrove Forest	Mangrove Swamps	Saline Wetlands	N/A	Mangrove Swamps >=50% and <70%	No	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.
4097-Samphire Saltmarsh	Saltmarshes	Saline Wetlands	*Coastal Saltmarsh in the New South*	*Coastal Saltmarsh in the New South Wales North*	No	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock,

PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA region
			Wales North Coast, Sydney Basin and South East Corner Bioregions	*Coast, Sydney Basin and South East Corner Bioregions* This includes PCT's: 4040, 4094, 4095, 4096, 4097, 4101, 4102, 4103		Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

11.2. Species credits

Table 11-2 Species credit class and matching credit profile

Species credit	Attributes shared with matching credits				
	Name of threatened species	Kingdom	BC Act status	EPBC Act status	IBRA region
Pied Oystercatcher	Pied Oystercatcher	Aves	E	Not listed	Any in NSW
Swift Parrot	Swift Parrot	Aves	E	CE	Any in NSW
Southern Myotis	Southern Myotis	Mammalia	V	Not listed	Any in NSW
Eastern Curlew	Eastern Curlew	Aves	Not listed	CE	Any in NSW

12. Conclusion

NGH has prepared this BDAR on behalf of Bega Valley Shire Council to assess the biodiversity impacts of the proposed Merimbula Boardwalk upgrades using the Biodiversity Assessment Method (BAM, 2020) as required under the *Biodiversity Conservation Act, 2017.*

In this BDAR, biodiversity impacts have been assessed through comprehensive mapping and assessment completed in accordance with the BAM (2020). Using state vegetation mapping and on-ground vegetation stratification, seven PCTs were identified within the Subject Land, six of which are within the development footprint:

1. PCT 3108 South Coast Scarp Wet Vine Forest (Moderate condition).
2. PCT 3639 South Coast Sands Bangalay Littoral Forest (Moderate condition).
3. PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest (Moderate condition).
4. PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub (Moderate condition).
5. PCT 4091 Grey Mangrove-River Mangrove Forest (High condition).
6. PCT 4097 Samphire Saltmarsh (High condition).

PCT 3108 was identified as meeting the criteria for the EPBC Act listed TEC *Brogo Vine Forest of the South East Corner Bioregion.* PCT 3936 was identified as meeting the criteria for the BC Act listed TEC *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions*. PCT 4097 was identified as meeting the criteria for the BC Act listed TEC *Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* and EPBC Act listed TEC *Subtropical and Temperate Coastal Saltmarsh.*

A total of 17 hollow-bearing trees were identified within the Subject Land. Of these, three could not be avoided and are expected to be removed within the development footprint. Presence was confirmed for five candidate species credit species either through important habitat mapping or targeted survey. The remaining were excluded based on absence of suitable habitat or through targeted surveys. Based on the above, the credit requirement for the proposed Merimbula Boardwalk has been defined in Table 12-1 and Table 12-2.

Mitigation measures have been outlined to reduce the direct, indirect, and prescribed impacts to biodiversity. The credits will be retired in accordance with the Biodiversity Offset Scheme.

Table 12-1 Ecosystem credit requirement

Zone ID	PCT ID	PCT name	Zone area (ha)	Vegetation integrity score	Ecosystem credits required
1	3108	South Coast Scarp Wet Vine Forest	0.06	53.6	2
2	3639	South Coast Sands Bangalay Littoral Forest	0.06	57.9	2
3	4054	South Coast Tidal Flats Samolus Paperbark-Grey Box Forest	0.04	37.6	1
4	4056	Southern Estuarine Swamp Paperbark Creekflat Scrub	0.02	37.7	1
5	4091	Grey Mangrove-River Mangrove Forest	0.13	71.9	4

Zone ID	PCT ID	PCT name	Zone area (ha)	Vegetation integrity score	Ecosystem credits required
6	4097	Samphire Saltmarsh	0.08	72	3

Table 12-2 Species credit requirement

Species	Area (Ha)	Sensitivity to gain	Biodiversity risk weighting	Species credits required
Pied Oystercatcher	0.08	High	2	3
Swift Parrot	0.16	High	3	9
Southern Myotis	0.39	High	2	15
Eastern Curlew	0.24	High	3	13

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Appendix A BDAR requirements compliance

Table 13-1 Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
Introduction	Chapters 2 and 3	Information	
		Introduction to the biodiversity assessment including:	–
		☐ brief description of the proposal	1.1.3
		☐ identification of subject land boundary, including: ☐ operational footprint ☐ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	1.1
		☐ general description of the subject land	1.1.2
		☐ sources of information used in the assessment, including reports and spatial data	1.4
		☐ identification and justification for entering the BOS	1.2
		Maps and tables	
		☐ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1-1
Landscape	Sections 3.1 and 3.2, Appendix E	Information	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Identification of site context components and landscape features, including:	
		☐ general description of subject land topographic and hydrological setting, geology and soils	3.2
		☐ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	3.3
		☐ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	3.2.1
		☐ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	3.2.2
		☐ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	3.2.2
		☐ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	3.2.3
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	3.2.4
		☐ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	3.2.5
		☐ any additional landscape features identified in any SEARs for the proposal	n/a
		☐ NSW (Mitchell) landscape on which the subject land occurs	3.2.6
		☐ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	2
		Maps and tables	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		☐ Site Map ☐ Property boundary ☐ Boundary of subject land ☐ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☐ Landscape features identified in BAM Subsection 3.1.3	Figure 1-1
		☐ Location Map ☐ Digital aerial photography at 1:1,000 scale or finer ☐ Boundary of subject land ☐ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☐ Landscape features identified in BAM Subsection 3.1.3 ☐ Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 3-5
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	
		☐ IBRA bioregions and subregions ☐ rivers, streams and estuaries ☐ wetlands and important wetlands ☐ connectivity of different areas of habitat ☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if	Figure 3-5

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		required, soil hazard features ☐ areas of outstanding biodiversity value occurring on the subject land and assessment area ☐ any additional landscape features identified in any SEARs for the proposal ☐ NSW (Mitchell) landscape on which the subject land occurs	
		Data	
		☐ All report maps as separate jpeg files	
		Individual digital shape files of:	
		☐ subject land boundary	
		☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	
		☐ cadastral boundary of subject land	
		☐ areas of native vegetation cover	
		☐ landscape features	
Native vegetation	Chapter 4, Appendix A and Appendix H	Information	
		☐ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	4.1
		☐ Provide justification for all parts of the subject land that do not contain native vegetation (as	4.1.2

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		described in BAM Subsection 4.1.2)	
		☐ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	4.1.1
		☐ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	2.2.3 and 2.2.4
		☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	
		For each PCT within the subject land, describe:	
		☐ PCT name and ID	4.2
		☐ vegetation class	4.2
		☐ extent (ha) within subject land	4.2
		☐ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	4.2
		☐ plant species relied upon for identification of the PCT and relative abundance of each species	4.2
		☐ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	4.2 and 4.3
		☐ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	4.2

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Describe the vegetation integrity assessment of the subject land, including:	
		☐ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	4.4
		☐ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	4.4
		☐ area (ha) of each vegetation zone	4.4
		☐ assessment of patch size (as described in BAM Subsection 4.3.2)	4.4
		☐ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	4.4
		☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	4.5
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	n/a
		☐ identify the PCT or vegetation class for which local benchmark data will be applied	n/a
		☐ identify published sources of local benchmark data (if benchmarks obtained from published sources)	
		☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	n/a
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	n/a

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Maps and tables	
		☐ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 3-6
		☐ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 4-8
		☐ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 4-9
		☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 4-9
		☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 4-8
		☐ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 4-9
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	4.5
		☐ composition condition score ☐ structure condition score ☐ function condition score ☐ presence of hollow bearing trees	
		Data	
		☐ All report maps as separate jpeg files	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		☐ Plot field data (MS Excel format)	Appendix D.1
		☐ Plot field datasheets	Appendix D.1
		Digital shape files of:	'.shp folder'
		☐ PCT boundaries within subject land	
		☐ TEC boundaries within subject land	
		☐ vegetation zone boundaries within subject land	
		☐ floristic vegetation survey and vegetation integrity plot locations	
Threatened species	Chapter 5	Information	
		Identify ecosystem credit species likely to occur on the subject land, including:	
		☐ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	5.1.1
		☐ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.1
		☐ justification for addition of any ecosystem credit species to the list	5.1.1
		Identify species credit species likely to occur on the subject land, including:	
		☐ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	5.1.2
		☐ justification and supporting evidence for exclusions based on geographic limitations, habitat	5.1.2

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	
		☐ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	5.1.2
		☐ justification for addition of any species credit species to the list	n/a
		From the list of candidate species credit species, identify:	
		☐ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☐ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☐ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	5.2
		Present the outcomes of species credit species assessments from:	
		☐ threatened species survey (as described in BAM Section 5.2.4)	5.3
		☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	n/a
		Where survey has been undertaken include detailed information on:	
		☐ survey method and effort (as described in BAM Section 5.3)	5.3
		☐ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	5.3

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		☐ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	5.3
		☐ survey personnel and relevant experience	Table a)
		☐ describe any limitations to surveys and how these were addressed/overcome	2.6
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	n/a
		Where use of local data is proposed (BAM Subsection 1.4.2):	
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	n/a
		☐ provide written confirmation from the decision-maker that they support the use of local data	n/a
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	
		☐ the unit of measure for each species is documented	5.3.1

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		for species assessed by area:	
		☐ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	5.3.1
		☐ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	5.3.1
		for species assessed by counts of individuals:	
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	n/a
		☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	n/a
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	n/a
		☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	n/a
		Maps and tables	
		☐ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	5.1.1
		☐ the ecosystem credit species removed from the list	
		☐ the sensitivity to gain class of each species	
		☐ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		☐ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	
		☐ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	
		☐ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	5.1.2
		☐ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	Figure 5-14 Appendix E
		Data	
		☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species	
		☐ Survey locations including GPS coordinates of any plots, transects, grids	
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals	
		☐ Species polygon map in jpeg format	
		☐ Expert reports and any supporting data used to support conclusions of the expert report	
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	
Prescribed impacts	Chapter 6	Information	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Identify potential prescribed biodiversity impacts on threatened entities, including:	
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☐ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☐ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☐ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	6
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	6
		☐ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	6
		☐ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	6
		☐ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	6
		Where the proposed development is for a wind farm:	
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	n/a

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	n/a
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	n/a
		Where the proposal may result in vehicle strike:	
		☐ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	n/a
		Maps and tables	
		☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	n/a
		☐ Map showing location of potential vehicle strike locations	n/a
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	n/a
		Data	
		☐ Digital shape files of prescribed impact feature locations	
		☐ Prescribed impact features map in jpeg format	
Avoid and minimise impacts	Chapter 7	Information	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed	7

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	
		☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	n/a
		☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	7.1
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	n/a
		☐ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	n/a
		☐ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	7.1 and 7.2
		☐ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	7.3
		☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	n/a
		Maps and tables	
		☐ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	7.4
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	n/a
		☐ Maps demonstrating indirect impact zones where applicable	n/a

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Data	
		Digital shape files of:	
		☐ alternative and final proposal footprint	n/a
		☐ direct and indirect impact zones	
		☐ Maps in jpeg format	
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	Information	
		☐ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	8.1
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	8.2
		☐ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	8.2
		☐ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	8.2
		☐ reporting any limitations or assumptions, etc. made during the assessment	8
		☐ identification of the threatened entities and their habitat likely to be affected	8
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	8.3

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	
		☐ karst, caves, crevices, cliffs, rocks and other features of geological significance	n/a
		☐ human-made structures	8.3.1
		☐ non-native vegetation	8.3.2
		☐ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	8.3.3
		☐ movement of threatened species that maintains their life cycle	8.3.3
		☐ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	8.3.4
		☐ assessment of the impacts of wind turbine strikes on protected animals	n/a
		☐ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	n/a
		☐ evaluate the consequences of prescribed impacts	8.3
		☐ describe impacts that are uncertain	8.3
		☐ document limitations to data, assumptions and predictions	8.3
		Maps and tables	
		☐ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	8.1

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Data	
		N/A	
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	Information	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	
		☐ techniques, timing, frequency and responsibility ☐ identify measures for which there is risk of failure ☐ evaluate the risk and consequence of any residual impacts	8.4
		☐ document any adaptive management strategy proposed	8.4
		Identification of measures for mitigating impacts related to:	
		☐ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☐ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☐ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	8.4
		☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	8.4
		Maps and tables	
		☐ Table of measures to be implemented before, during and after construction to mitigate and	8.4

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		manage impacts of the proposal, including action, outcome, timing and responsibility	
		Data	
		N/A	
Impact summary	Chapter 9	Information	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	
		☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	9
		☐ for each TEC, report the extent of the TEC in NSW	n/a
		☐ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	9.1.1
		☐ for each threatened species, report the population size in NSW	9.1.1
		☐ documenting assumptions made and/or limitations to information ☐ documenting all sources of data, information, references used or consulted ☐ clearly justifying why any criteria could not be addressed	9.1.1
		☐ Identification of impacts requiring offset in accordance with BAM Section 9.2	10.1
		☐ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	n/a
		☐ Identification of areas not requiring assessment in accordance with BAM Section 9.3	10.2

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Maps and tables	
		☐ Map showing the extent of TECs at risk of an SAII within the subject land	n/a
		☐ Map showing location of threatened species at risk of an SAII within the subject land	n/a
		Map showing location of:	
		☐ impacts requiring offset	Appendix E
		☐ impacts not requiring offset	Appendix E
		☐ areas not requiring assessment	
		Data	
		Digital shape files of:	
		☐ extent of TECs at risk of an SAII within the subject land	
		☐ location of threatened species at risk of an SAII within the subject land	
		☐ boundary of impacts requiring offset	
		☐ boundary of impacts not requiring offset	
		☐ boundary of areas not requiring assessment	
		☐ Maps in jpeg format	
Impact summary	Chapter 10	Information	

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	11
		☐ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H)	11.2
		☐ change in vegetation integrity score (BAM Subsection 8.1.1)	
		☐ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	
		☐ biodiversity risk weighting for each	11.2
		☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	11.2
		Maps and tables	
		☐ Table of PCTs requiring offset and the number of ecosystem credits required	10.1
		☐ Table of threatened species requiring offset and the number of species credits required	10.1
		Data	
		☐ Submitted proposal in the BAM Calculator	
Biodiversity credit report	Chapter 10	Information	
		☐ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	11
		☐ BAM credit report in pdf format	Appendix E

BDAR section	BAM ref.	BAM requirement	Section reference in the BDAR
		Maps and tables	
		☐ Table of credit class and matching credit profile	11
		Data	
		☐ BAM credit report in pdf format	Appendix E

Appendix B Biodiversity values map and threshold tool report

Document follows overleaf.

Department of Planning and Environment

Biodiversity Values Map and Threshold Report

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

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

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

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

Biodiversity Values Map and Threshold Report

Date of Report Generation		04/06/2024 3:52 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	**Does the development Footprint intersect with BV mapping?**	yes
1.2	Was ALL BV Mapping within the development footprinted added in the last 90 days? (dark purple mapping only, no light purple mapping present)	no
1.3	**Date of expiry of dark purple 90 day mapping**	N/A
1.4	**Is the Biodiversity Values Map threshold exceeded?**	yes
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	**Size of the development or clearing footprint**	12,941.1 sqm
2.2	**Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint)	11,970.9 sqm
2.3	**Method for determining Minimum Lot Size**	LEP
2.4	**Minimum Lot Size** (10,000sqm = 1ha)	00 sqm
2.5	**Area Clearing Threshold** (10,000sqm = 1ha)	2,500 sqm
2.6	**Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance)	yes

REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)	**yes**

What do I do with this report?

• If the result above indicates the BOS Threshold has been exceeded, your local council may require a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor.

• If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is '"likely to significantly affect threatened species" as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.

• If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.

• If all Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

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

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the Guide for reviewing area clearing threshold results from the BMAT Tool.

Acknowledgement

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

Signature: _____ Date:_____

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

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Biodiversity Values Map and Threshold Tool

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

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

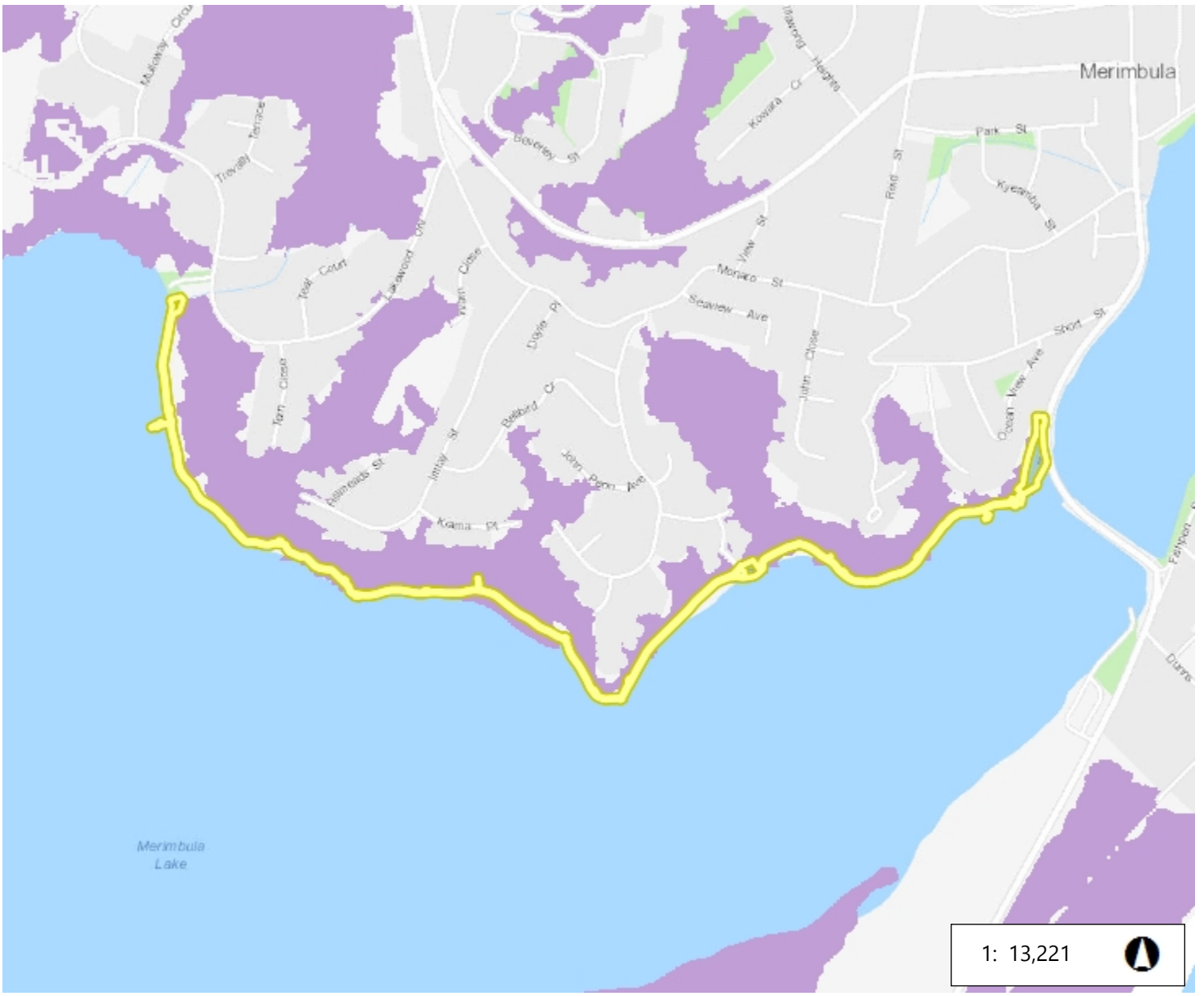
This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

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

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

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

Biodiversity Values Map



671.6 0 335.82 671.6 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

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

Legend

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

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Imagery © Airbus DS/Spot Image 2016

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

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

Appendix C Matters of national environmental significance

C.1 Database search results

An EPBC Act Protected Matters Report was generated on 4 April 2024 to identify Matters of National Environmental Significance (MNES) that have the potential to occur within 10km of the development footprint (Appendix C.8). Those relevant to this BDAR include:

- 5 listed threatened ecological communities (TECs)
- 97 listed threatened species
- 57 listed migratory species.

The potential for these MNES to occur at the site are discussed below.

C.2 Summary of habitat in subject land

The Subject Land contains a diverse range of habitats. These habitats include saline wetlands, salt marshes, dry sclerophyll open forest, forested wetlands, mangroves, exotic lawn, as well as low-quality native vegetation, consisting of a mixture of exotic and naturalised species. Additionally, parts of the Subject Land overlap with aquatic habitat which is assessed separately in an Aquatic Assessment.

C.3 Ramsar wetlands of international importance

The EPBC Protected Matters Report identified no Ramsar Wetlands of International Importance upstream or downstream of the Subject Land.

C.4 Threatened ecological communities (TECs)

The EPBC Protected Matters Report identified five Threatened Ecological Communities, two of which are considered 'likely to occur' in the Subject Area, shown in Table 13-2.

Table 13-2 TECs within the subject land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within subject land (ha)
Brogo Vine Forest of the South East Corner Bioregion	20430	Not Listed	E	Veg Zone 1: PCT 3108 Moderate	1.84 ha
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	20405	Not Listed	CE	Associated with PCT 3639 but vegetation zone within the Subject Land does not conform to the diagnostic characteristics.	N/A

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within subject land (ha)
Lowland Grassy Woodland in the South East Corner Bioregion	20390 (EPBC Act listed community) 20070 (BC Act listed community)	E	CE	Does not conform to any vegetation zones within the Subject Land.	N/A
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	20383	Not Listed	CE	Does not conform to any vegetation zones within the Subject Land.	N/A
Subtropical and Temperate Coastal Saltmarsh	20408	Not Listed	V	PCT 4097 High (VZ 2_4102_4097) PCT 4102 High (VZ 3_4102)	0.77 ha

C.5 Threatened species

The EPBC Protected Matters Report identified 97 threatened species in total with the potential to occur within the search area, which included 17 flora species and 80 fauna species. A habitat evaluation was conducted for each species to evaluate the likelihood of occurrence and potential for impact. The full list of species is provided in the Habitat Evaluation Table in Appendix C.7. Note: marine species have been excluded from the Habitat Evaluation Table.

Of these entities, five were considered likely to be impacted by the proposal. Due to the avoid and minimise actions incorporated into the project, the habitat impacts to migratory species would be minimal and short-term, however Curlew Sandpiper is listed as a NSW SAII species These entities were:

Communities

- *Brogo Vine Forest of the South East Corner bioregion* TEC
- *Subtropical and Temperate Coastal Saltmarsh* TEC.

Threatened species

- Curlew Sandpiper (*Calidris ferruginea)*
- Swift Parrot *(Lathamus discolor)*
- Eastern Curlew *(Numerius madagascariensis)*

Detailed assessment in the form of an Assessment of Significance under the EPBC Act was undertaken for these entities, with the results contained in Appendix C.9.

C.6 Migratory species

The EPBC Protected Matters Report identified 57 listed migratory species with the potential to occur within the search area. Of the 57 listed migratory species, many were identified as having potential to occur but

only one species considered potential to be impacted: Curlew Sandpiper (*Calidris ferruginea).* The full list of species is provided in the Habitat Evaluation Table in Appendix C.7. Due to the avoid and minimise actions incorporated into the project, the habitat impacts to migratory species would be minimal and short-term, however Curlew Sandpiper is listed as a NSW SAII species and thus, any impact may have greater consequences. An Assessment of Significance under the EPBC Act was undertaken Curlew Sandpiper, presented in Appendix C.9.

C.7 MNES habitat evaluation

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations listed for the locality in the NSW BioNet Database[3] and those identified as potentially occurring in the area according to the Commonwealth EPBC Protected Matters Search Tool[4].

V = Vulnerable; E = Endangered; CE = Critically Endangered; M = Migratory (EPBC Act)

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat:

- Present: Potential or known habitat is present within the study area
- Marginal: Habitat present that could be used by a species on occasion but not preferred
- Absent: No potential or known habitat is present within the study area.

Likelihood of occurrence:

- Known: Species was recorded during the project-related field investigations (>75%)
- Likely: Species have a high probability of occurring within the study area (>50% but <75%)
- Potential: Species have a moderate probability of occurring in the study area (>25% but <50%)
- Unlikely: Species have a low probability of occurring in the study area, though may be known or predicted within the broader locality (<25%).

Possibility to be impacted:

- No: The proposal would not impact this species or its habitats. No Assessment of Significance (AoS) is necessary.
- Unlikely: Although habitat may be impacted, the entity is unlikely to be impacted. A justification is provided for each relevant species. No Assessment of Significance (AoS) is necessary.
- Possible: Habitat to be impacted and the entity may be impacted. An AoS has been applied to these entities.
- Yes: The proposal may impact this species or its habitats. An AoS has been applied to these entities.

Note: Migratory marine species have been excluded from this habitat as it is not considered to be oceanic.

Entities highlighted in red/pink have a high potential to be impacted by the proposal.

[3] BioNet is administered by the NSW Office of Environment & Heritage (OEH) and is an online database of fauna and flora records that contains over four million recorded sightings.
[4] This online tool is designed for the public to search for matters protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). It is managed by the Commonwealth Department of the Environment and Energy.

Table 13-3 MNES habitat evaluation table

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Threatened Ecological Communities							
Brogo Vine Forest of the South East Corner Bioregion		E	The community's northern limit is Moruya River, southern limit is Towamba. Eucalypt-forest best represented by a canopy of eucalypts with an occasional substratum of rainforest trees, with an open, shrubby mid story and diverse groundcover of forbs, grasses, ferns. Vines and climbers in the ground and mid story layer as well as the presence of figs are a key diagnostic feature for this TEC. The community typically occurs on steep, often rocky slopes with a northerly aspect. Sometimes the community may also occur on relatively flat terrain and infrequently in gullies. The community typically occurs on soils derived from granitoid substrates, rarely on other volcanic or sedimentary soils. These soils are mapped primarily as Kurosols, Kandosols and Dermosols, with a small proportion in the north of its range occurring on other soils such as Vertosols and Tenesols (DPIE 2021). The community is found at elevations up to 500 m above sea level (ASL), but the majority occurs between elevations of 200 m to 290 m ASL. The majority of the community occurs in areas with mean annual rainfall of 900 mm to 1050 mm, although it can be found in drier areas (e.g. down to approximately 820 mm) and wetter areas closer to the	Known within 10km	Present PCT analysis tool indicated that Plot 4 could classify as this TEC (PCT 3108). PCT is 3108 is listed in table 6 of the conservation advice to be equivalent to this TEC. Table 1 of the EPBC condition thresholds was reviewed. Patch size = 1.84 ha (small contiguous patch). BAM Plot 4 is	Known	Possible - Boardwalk expansion may impact a small area. AoS undertaken (Appendix C.9).

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			coast (e.g. up to 1290 mm). Key canopy species include *E. tereticornis, A. floribunda, E. bosistoana, E. globoidea, Ficus rubiginosa*, *Brachychiton populneus.*		CLASS B2 >10 total native understory species & >50% of understory is native.		
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia		CE	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia typically occurs close to the coast from northern Queensland southwards to eastern Victoria and on offshore islands. It occurs as a series of naturally disjunct and localised stands. The appearance of this ecological community and its plant species can vary greatly depending on location, but it appears as a complex of rainforest and vine thickets. The vegetation generally is structurally diverse, with native trees, shrubs, vines and ground layers all potentially being present. The vegetation typically has a closed canopy.	Known within 10km	Absent No PCTs within the Subject Land conform to this TEC.	Unlikely	No
Lowland Grassy Woodland in the South East Corner Bioregion		CE	Lowland Grassy Woodland in the South East Corner bioregion is the name given to the ecological community associated with rain shadow areas of the south coast and hinterland of New South Wales. Typically the community comprises an open tree canopy, a near-continuous groundcover dominated by grasses and herbs, sometimes with layers of	Known within 10km	Absent No PCTs within the Subject Land conform to this TEC.	Unlikely	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			shrubs and/or small trees. Undisturbed stands of the community may have a woodland or forest structure. Small trees or saplings may dominate the community in relatively high densities after partial or total clearing. The community also includes 'derived' native grasslands which result from removal of the woody strata from the woodlands and forests. Lowland Grassy Woodland in the South East Corner bioregion is currently known to occur within the Bega Valley, Eurobodalla and Palerang Local Government Areas, but may occur elsewhere in the bioregion. Major occurrences are found to the west of Batemans Bay, around Moruya, in the Araluen valley, in the Cobargo - Bega – Candelo area, the Towamba Valley and near Tanja.				
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria		CE	Generally, occurs as a tall open forest to woodland, but there may be localised areas of closed forest and/or low forest, often associated with disturbance (including flooding). The canopy may be dominated by a single eucalypt species, or by a mix of several eucalypt species (including hybrids) from the two genera Eucalyptus and Angophora, notably: *Angophora floribunda* (Rough-barked Apple), A. subvelutina (Broad-leaved Apple), and members of the 'red gum' group of eucalypts (Exsertaria), notably Eucalyptus tereticornis (Forest Red Gum, Red Irongum) and E. amplifolia (Cabbage Gum). Occurs	Known within 10km	Absent Although landscape could contain this TEC, none of the representative BAM were plots classified as this TEC during PCT analysis.	Unlikely	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates. Distributed from around Sale, on the south-east coast of Victoria, to around Raymond Terrace, just north of Newcastle on the New South Wales east coast.				
Subtropical and Temperate Coastal Saltmarsh		V	This community occurs in coastal areas under regular or intermittent tidal influence. Consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5 m height.	Known within 10km	Present	Known Development footprint will impact on some of this TEC during construction and from the structure itself.	Possible - Boardwalk expansion may impact small area (0.06 ha). AoS undertaken (Appendix C.9).
Threatened Flora Species							
Acacia georgensis	Bega Wattle	V	Typically occurs on well-drained, shallow soils at sites with considerable exposed rock. The sites where it is found represent a range of different environments with correspondingly varied vegetation; in general, other tree species are uncommon but can include Veined Olive (*Notelaea venosa*), Hickory Wattle (*Acacia implexa*), Forest Red Gum (*Eucalyptus tereticornis*), Woollybutt (*E.*	6 (2016 to 2023)	Absent – no suitable habitat within subject land. soil depth in most areas of the subject land is >50cm. Soil is poorly	Unlikely – some local sightings recorded nearby subject land. However, subject land is not considered suitable.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			longifolia), Bega Mallee (*E. spectatrix*) and Gully Gum (*E. smithii*). Only occurs in the far South East of NSW with known sites at Kianinny Bay in Bournda National Park, on Dr George Mountain, Wadbilliga National Park and in Bemboka and Coolangubra Sections (one location on cliffs above the Towamba River) of the South East Forests National Park.		drained.		
Amphibromus fluitans	River Swamp Wallaby-grass, Floating Swamp Wallaby-grass	V	Grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels. Habitats in south-western NSW include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with *Potamogeton* and *Chamaeraphis* species. The species is virtually aquatic, often with only the flower heads above the water. It has been recorded recently in lagoons beside the Murray River near Cooks Lagoon (Shire of Greater Hume), Mungabarina Reserve, East Albury, at Ettamogah, Thurgoona (Charles Sturt University Campus), near Narranderra, and also further west along the Murray River (near Mathoura) and in Victoria. There is a recent record of this species near Laggan in Upper Lachlan Shire. It is also found in Victoria and in Tasmania.	0	Absent – no suitable habitat within subject land. Area too saline to support this species.	Unlikely – no local sightings recorded and no suitable habitat. Existing wetlands are brackish and have very thick cover.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Astrotricha crassifolia	Thick-leaf Star-hair	V	Thick-leaf Star hair grows on dry ridgetops to 300 m altitude and is associated with very rich heath or dry sclerophyll woodland on sandstone. It flowers in Spring. Occurs near Patonga (Gosford LGA), and in Royal NP and on the Woronora Plateau (Sutherland and Campbelltown LGAs). There is also a record from near Glen Davis (Lithgow LGA).	0	Absent – subject land does not contain suitable habitat. While the subject land contains dry sclerophyll forest, the area is not 300m above sea level and there are no ridgetops present.	Unlikely – no local sightings recorded, known locations are not proximal to the subject land and no suitable habitat.	No
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	V	Generally found in grassy sclerophyll woodland on well-drained clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Can also be found in open forest with a heathy or sedgy understory. Known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	0	Marginal – some suitable habitat present in subject land, being the drier forested vegetation (not dominated by native grasses, instead dominated by Kikuyu). Not associated with	Potential – no local sightings recorded nearby subject land. But habitat is somewhat suitable.	No – no suitable habitat was identified within development footprint that would cause significant impacts

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
					any mapped PCTs onsite.		
Calochilus pulchellus	Pretty Beard Orchid, Pretty Beard-orchid	E	At Vincentia the species grows in low Scribbly Gum dominated woodland with a low wet heath understorey. The soil is a sandy loam overlying sandstone. In Booderee National Park it grows in a tall heathy association. In Morton National Park on the Little Forest Plateau it occurs in low heath among scattered clumps of emergent eucalypts and Banksia in shallow coarse white sand over sandstone, in a near-escarpment area subject to strong orographic precipitation. It has been recorded in three sites over a range of 40 km on the South Coast of NSW, at altitudes from 20-560 m above sea level. All currently known sites are within the Shoalhaven Local Government Area.	0	Absent – no suitable habitat within subject land. No forest with heathy understory present.	Unlikely - no local sightings recorded, known locations are not proximal to the subject land and no suitable habitat.	No
Correa baeuerlenii	Chef's Cap	V	The species is found in damp gullies, on the banks of streams and on rocky slopes. Occurs in riparian sites within forests of various eucalypts, including Silvertop Ash (*Eucalyptus sieberi*), Yellow Stringybark (*E. muelleriana*), Blue-leafed Stringybark (*E. agglomerata*) and Spotted Gum (*Corymbia maculata*), or she-oak woodland. It may also be	0	Absent – no suitable habitat present within subject land. Not associated with the PCTs identified.	Unlikely - no local sightings recorded, known locations are not proximal to the subject	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			found in near-coastal rocky sites. Has been recorded between Nelligen (on Nelligen Creek and the Buckenbowra River) and Mimosa Rocks National Park.			land and no suitable habitat.	
Corunastylis rhyolitica	Pambula Midge-orchid, Rhyolite Midge Orchid	E (listed as Genoplesium rhyoliticum)	All of the documented sites where the Rhyolite Midge Orchid occurs have very shallow soil overlying rhyolite rock. Vegetation is often dominated by lichens and/or moss. Other species which may be present include Tick Bush *Kunzea ambigua*, Giant Honey-myrtle *Melaleuca armillaris*, Long-leaved Platysace *Platysace lanceolata*, Ralston's Leionema *Leionema ralstonii* and Tangled Pseudanthus *Pseudanthus divaricatissimus*. The Rhyolite Midge Orchid is endemic to a narrow strip of NSW south coast. Known from only six sites.	0	Absent – no suitable habitat within subject land. Soil depth is too deep >50cm and site does not occur above rhyolite rock.	Unlikely - no local sightings recorded and no suitable habitat.	No
Cryptostylis hunteriana	Leafless Tongue-orchid	V	The species occurs mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. It prefers open areas in the understorey of forested communities. The soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi),* Red Bloodwood (*Corymbia gummifera*) and Black	0	Marginal – Some coastal swamp, forest and dry sclerophyll woodland present, however none of the PCTs found onsite	Unlikely – no local sightings recorded but suitable habitat is present within subject land.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*).		correlate with known records for this species.		
Glycine latrobeana	Clover Glycine, Purple Clover	V	Occurs mainly in grassland and grassy woodland habitats, less often in dry forests, and rarely in heathland. Populations occur from sea level to c. 1,200 m. In Victoria, plants grow in a range of soil types including alluvial soils, and those derived from sandstones, mudstones, granite and basalt. Soils are usually clay, but may have high loam content. Tasmanian populations occur on a well-drained basalt, dolerite or sandstone substrates (Lynch 1994). The NSW population is in subalpine grassland (at about 1300 m asl).	0	Absent – No grassy woodland PCTs onsite.	Unlikely - no local sightings recorded. No suitable habitat within the subject area.	No
Haloragis exalata subsp. exalata	Square Raspwort	V	Haloragis exalata subsp. exalata is presently known from a range of vegetation types, all of which appear to have a history of recurrent disturbance. It appears to be a post-disturbance coloniser, based on observations of large numbers of plants on disturbed roadsides, cleared power-line easements, and recently burnt or flooded areas. Square Raspwort appears to require protected and shaded damp situations in riparian habitats.	0	Marginal – some areas of protected and shaded habitat available. Area within subject land is also disturbed.	Unlikely- no local records and none found during targeted surveying.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Leionema ralstonii	Ralston's Leionema	V	The species is largely confined to dry, rocky habitats. It is most likely to be found in dry shrub communities but can also occur in open forest. Endemic to the coastal ranges of south-east NSW between Eden and Pambula.	1 (1915)	Absent - suitable habitat does not exist within subject land.	Unlikely - No suitable habitat within the subject area. No recent records within the locality.	No
Persicaria elatior	Knotweed, Tall Knotweed	V	Grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance. Recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests).	0	Marginal – Swamp forest communities contain thick saw sedge or are a closed forest making microhabitat conditions unsuitable.	Unlikely - no local sighting recorded. No suitable habitat within the subject area.	No
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	Recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs. Has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout	0	Marginal – Contains some dry sclerophyll forest with friable soils. Landscape is not rocky slopes or steep	Unlikely - no local records and would have been easily detected during BAM survey if present. No suitable habitat	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			near Tallong, Bungonia State Conservation Area, the Yerranderie area, Kanangra-Boyd National Park, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria.		gullies.	within subject land.	
Pomaderris parrisiae	Parris' Pomaderris	V	Found on skeletal soils in rocky shrubland or tall open forest chiefly on escarpment ranges. Has been recorded in Egan Peaks Nature Reserve, Wadbilliga National Park (near Wadbilliga Trig.) and South East Forests National Park (Brown Mountain / Cochrane Dam area).	0	Absent – no suitable habitat present within subject land.	Unlikely - no local sightings recorded, known locations are not proximal to the subject land and no suitable habitat.	No
Thesium australe	Austral Toadflax, Toadflax	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast, in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Often found in association with Kangaroo Grass (*Themeda triandra*).	0	Absent – no suitable habitat present within subject land.	Unlikely - no local sightings recorded, known locations are not proximal to the subject land and no suitable habitat.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Westringia davidii	null	V	Largely restricted to shallow organic loam soils fringing rocky outcrops. This narrow niche is an ecotone between open forest dominated by Silvertop Ash (*Eucalyptus sieberi*) and the rocky outcrops which support a mosaic of shrubland, scattered herbs and shrubs and bare rock. Endemic to rocky outcrops above 250 m in elevation in the coastal ranges to the west of Eden and Pambula in NSW.	0	Absent – no suitable habitat present within subject land. Subject land is below 250m in elevation. Identified PCTs are not associated.	Unlikely - no local sightings recorded and no suitable habitat.	No
Zieria formosa	Shapely Zieria	E	Occurs on the north-east aspect of an upper, moderately steep slope of a 'break-away' area above a small valley. The soil is skeletal, grey sandy loam and there is much exposed surface rock. Associated vegetation includes *Acacia mearnsii, Commersonia fraseri, Dodonea triquetra, Prostanthera nivea, Pittosporum undulatum, Kunzea ambigua,* and *Leptospermum flavescens*. Only a single population is known. It occupies an area of about 1 hectare on private land located about 5 km west of Pambula on the NSW far south coast.	12 (overlayed recordings from 1980's to 2006)	Absent - no suitable habitat present within subject land. Identified PCTs not associated.	Unlikely – only one persistent local sighting recorded and no suitable habitat.	No
Zieria parrisiae	Parris's Zieria	CE	Occurs in a gully on a north east facing mid-slope. Soil is skeletal grey loam overlying rhyolite rock, with scattered with broken rhyolite rocks and boulders. Known from only one population, which is split between two main patches located about 200 m	0	Absent - no suitable habitat present within subject land. Identified PCTs	Unlikely – no local sighting recorded and no suitable habitat.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			apart in a gully on private property about 15 km west of Pambula on the NSW far south coast.		are not associated.		
Threatened Fauna Species							
Actitis hypoleucos	Common Sandpiper	M	Found along all coastlines of Australia and in many areas inland. The population that migrates to Australia breeds in the Russian far east. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves and is mostly found around muddy margins or rocky shores and rarely on mudflats.	3 (1998 to 2013)	Present – foraging habitat. Mangroves and coastal wetland (PCT 4091 and 4097).	Potential – local records Merimbula Lake.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.
Anthochaera phrygia	Regent Honeyeater	CE	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak, that inhabit woodlands that support a significantly high abundance and species richness of	3 (1982 to 2021)	Marginal – some foraging habitat present within subject	Unlikely – some local records nearby subject	No suitable habitat was identified within

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			bird species, and have 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. A generalist forager, although mainly feeds on the nectar from a relatively small number of eucalypts that produce high volumes of nectar eg. Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important eg. Lower Hunter Spotted Gum forests support regular breeding events. Flowering of associated species such as *Eucalyptus eugenioides* and other Stringybark species, and *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from *Amyema miquelii, A. pendula* and *A. cambagei* are also utilised. When nectar is scarce, lerp and honeydew can comprise a large proportion of the diet. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Nests in horizontal branches or forks in tall mature eucalypts, mistletoes and Sheoaks. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands.		land. No suitable breeding habitat in subject land	land.	development footprint that would cause significant impacts

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Aphelocephala leucopsis	Southern Whiteface	V	Occurs across southern and central Australia, from the Great Victorian Desert and Nullarbor Plain, and across most of SA, VIC and NSW, extending into southern QLD, generally avoiding coastal areas in the higher rainfall zones. Inhabits open woodlands from near arid habitats, such as Acacia scrub and hummock grassland, through to the wetter grassy woodlands of south-eastern Australia, where Eucalypts dominate.	0	Absent – no foraging or breeding habitat. No wet grassy woodlands, Acacia dominant scrub or hummock grassland present in the subject land.	Unlikely – no local records and subject land occurs in a coastal area which is typically avoided.	No - no suitable habitat was identified within development footprint that would cause significant impacts
Apus pacificus	Fork-tailed Swift	M	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They forage aerially, up	1 (2017)	Present – foraging habitat present within subject land being saltmarsh.	Unlikely May forage occasionally but limited local records.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			to hundreds of metres above ground, but also less than 1 m above open areas or over water. They often occur in areas of updraughts, especially around cliffs. They sometimes feed aerially among tree-tops in open forest. They probably roost aerially, but are occasionally observed to land.				
Botaurus poiciloptilus	Australasian Bittern	E	Favours permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. and *Eleocharis.* Foraging usually takes place in freshwater wetlands rarely in estuaries or tidal wetlands. Feeding platforms may be constructed over deeper water from reeds trampled by the bird. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds. Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges.	2 (1982 to 1999)	Marginal – semi-suitable tidal wetland foraging habitat and breeding habitat is available. However, coastal wetlands present in subject land are considered brackish (PCT 4091 and 4102).	Unlikely – species typically forage in freshwater wetlands.	No
Calidris acuminata	Sharp-tailed Sandpiper	V, M	The Sharp-tailed Sandpiper spends the non-breeding season in Australia. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations	4 (1982 to 2018)	Present – suitable foraging habitat (PCT 4091 and	Potential – some local records.	Unlikely – development footprint minimised

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			and in both freshwater and saline habitats. The species utilises fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds. On migration, the species forages and roosts on rocky and sandy beaches, freshwater habitats, and inland saltwater habitats.		4097).		and mangrove removal avoided, construction short-term, operational does not change current landuse.
Calidris alba	Sanderling	M	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand, then dart back up the beach as each wave breaks. Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.	1 (1991)	Marginal – some potential suitable foraging habitat is present within the subject land. Contains saline wetland – which they have been recorded at on occasion) and mudflat habitat (PCT 4091 and 4102).	Potential – Within mapped important habitat for migratory shorebirds.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Calidris canutus	Red Knot, Knot	V, M	A non-breeding migratory visitor from Arctic regions of Siberia. In NSW, it is recorded in small numbers along some of the major river estuaries and sheltered embayments of the coastline, in particular the Hunter River estuary. This environment is used as a staging area for birds to rest and replenish fat resources; large numbers arrive in September then most move south to Victoria by October. A rare visitor to wetlands away from the coast with a few records (mostly during southward migration) as far west as Lake Menindee and the Riverina. 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. Birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. Rarely found on inland lakes or swamps.	2 (2010)	Present – subject land contains some foraging habitat. Occurs in intertidal estuaries and intertidal sand/ mud flats as well as occasionally terrestrial saline wetlands (PCT 4091 and 4102).	Potential – Within mapped important habitat for migratory shorebirds.	No - rare visitor, minimal habitat impact, as proposal includes upgrading an existing boardwalk.
Calidris ferruginea	Curlew Sandpiper	CE, M	Generally, occupies littoral and estuarine habitats, and in NSW 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. Roosts	4 (1999 to 2017)	Present – subject land contains foraging habitat. Development footprint	Likely – some local records occur nearby subject land / within mapped important habitat for	Possible – SAII species. AoS undertaken

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			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. Feeds on worms, molluscs, crustaceans, insects and some seeds. Distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration.		boarders on a sheltered intertidal estuary. Intertidal mudflats are also present (PCT 4091 and 4102).	migratory shorebirds.	
Calidris melanotos	Pectoral Sandpiper	M	In NSW, it is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum.	0	Present – subject land contains foraging habitat. Occurs in intertidal estuaries, saltmarshes and fringing sand/ mud flats (PCT 4091 and 4102). Glasswort samphire (Sarcocornia quinqueflora) is	Potential – no local records however habitat present is suitable for foraging.	No, not recorded locally.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
					also present within the development footprint.		
Calidris ruficollis	Red-necked Stint	M	It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions and found inland in all states when conditions are suitable. Have been observed in coastal estuaries and wetlands. The Red-necked Stint probably travels in flocks and has been observed to feed in dense flocks.	2 (1982 to 2017)	Present – subject land contains foraging habitat. Occurs in coastal estuaries and wetlands (PCT 4091 and 4102).	Potential – limited local records of sightings.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.
Callocephalon fimbriatum	Gang-gang Cockatoo	E	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	57 (1968 to 2023)	Present – foraging and breeding. Dry sclerophyll forest and HBT.	Likely – recent local records in nearby areas.	Unlikely – development footprint and tree removal minimised, habitat degraded.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora)* woodland and occasionally in temperate rainforests. In NSW, it is distributed from the south-east coast to the Hunter region, inland to the Central Tablelands and south-west slopes, and regularly in the ACT. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Nests in eucalypt tree hollows greater than 10cm in diameter & 9m above the ground.				
Calyptorhynchus lathami	South-eastern Glossy Black-Cockatoo	V	Uncommon, but widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. Dependent on large hollow-bearing eucalypts for nest sites. Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak *(Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.	51 (1978 to 2023)	Present – foraging and breeding. Dry sclerophyll forest, HBT, *Allocasuarina.*	Potential – recent local records nearby subject land.	Unlikely – development footprint and tree removal minimised, habitat degraded.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V, M	In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. 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.	0	Present – subject land contains some foraging habitat. Occurs in intertidal estuaries and intertidal sand/ mud flats (PCT 4091 and 4102).	Potential – no local records known	No, not recorded locally
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	V	Found in eucalypt woodlands (including Box-Gum, stringybarks or other rough-barked eucalypts) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and *Eucalyptus camaldulensis* Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. The subspecies is less commonly found on coastal plains and ranges. Usually not found in woodlands with a dense shrub layer. Fallen timber is an important habitat component for foraging. Hollows in standing dead or live trees and tree stumps are essential for nesting. Western boundary of the range of *Climacteris*	6 (1997 to 2020)	Marginal – open grassy understory is dominated by kikuyu in dry open forests present in the subject land . Some fallen timer present for foraging habitat. Some tree hollows present for breeding.	Potential – some local records occur in the area surrounding the development footprint.	No - no suitable habitat was identified within development footprint that would cause significant impacts to foraging habitat (fallen logs) or hollow bearing trees (breeding

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			picumnus victoriae runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell.				habitat)
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo	M	Found in woodlands, forest and riparian area. Nests in cup shaped nests of other species such as honeyeaters, flycatchers.	0	Present – subject land contains suitable habitat.	Potential – some local records. However, predicted range falls just short of subject land.	No - no suitable habitat was identified within development footprint that would cause significant impacts
Dasyornis brachypterus	Eastern Bristlebird	E	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone. Age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years; however, habitat in northern NSW requires frequent fires to maintain habitat condition and suitability. The northern fire regimes is between 3-6 years and of variable	0	Absent – lack of heathy understory.	Unlikely – no local records	No - no suitable habitat was identified within subject land

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			intensity depending on the habitat condition.				
Falco hypoleucos	Grey Falcon	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast, and near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring. Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Believed to be extinct in areas with more than 500mm rainfall in NSW.	0	Present – subject land contains suitable foraging habitat nearby. However, no stick nests were observed in tall eucalyptus trees for breeding.	Unlikely – no local records. Additionally, Merimbula's yearly average rainfall is above 500mm and they are rarely seen in coastal regions.	No
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	V, M	Usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitat with saline or brackish water, in modified or artificial wetlands, and in areas located close to humans or human activity. Latham's snipe feed in soft mudflats or shallow water. They shelter during the day in small wetlands including urban water bodies, saltmarshes, as well as	16 (1982 to 2020)	Present – subject land contains suitable foraging habitat in the form of saltmarsh, mudflats and low densely	Likely – consistent local records nearby subject land.	Unlikely – development footprint minimised and mangrove removal avoided, construction

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			creek edges, where there is adequate shallow flooded or inundated substrate. They also use crops and pasture. They mostly are found among dense cover comprising sedges, grasses, lignum, reeds, and rushes. Known to occur in the upland wetlands of the New England Tablelands and Monaro Plateau. Breeds in Japan.		vegetated wetland (PCT 4091 and PCT 4102). Habitat is considered saline/brackish which can be utilised by this species.		short-term, operational does not change current landuse.
Gallinago megala	Swinhoe's Snipe	M	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens (Higgins & Davies 1996). Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes (Higgins & Davies 1996)	0	Present – assessment area contains suitable foraging habitat in the form of saltmarsh, forested wetland and saline wetland. Habitat is considered saline/brackish which can be utilised by this species.	Potential – no local records however, habitat present is suitable.	No - not recorded locally

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Gallinago stenura	Pin-tailed Snipe	M	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands	0	Absent – habitat found within subject mostly contains saline/brackish swamps/waterbodies (PCT 4091, PCT 4102 and PCT 4056).	Unlikely – no local records found and no suitable habitat	No
Grantiella picta	Painted Honeyeater	V	Nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema.* 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	Marginal – some suitable breeding habitat within subject land (PCT 4056). No suitable foraging habitat.	Unlikely – no local records and limited suitable habitat. Additionally, subject land occurs outside predicted habitat range.	No
Haliaeetus leucogaster	White-bellied Sea-Eagle	M	Distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. Habitats are	0	Present – subject land contains habitat	Likely – no local sightings from BioNet	No - no suitable habitat was

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Also occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists 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'.		suitable for foraging only. Proximal to a large area of open water (Merimbula Lake). Saltmarsh, mangroves, tidal flats and open woodland provide foraging resources. Large eucalypts are too close to residential development and therefore not suitable breeding habitat. No stick nests observed survey.	search. However, they are known in the subject area.	identified within development footprint that would cause significant impacts to foraging habitat or large emergent trees (breeding habitat)

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Hirundapus caudacutus	White-throated Needletail	V, M	Arrive in Australia from their breeding grounds in the northern hemisphere in about October each year and leave somewhere between May and August. Are non-breeding migrants in Australia. Breeding takes place in northern Asia. In coastal areas, they have been observed flying over sandy beaches or mudflats and often around coastal cliffs and other areas with prominent updraughts. They occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings.	15 (1983 to 2020)	Present – subject land contains habitat suitable for foraging only. Mudflats and estuary with sandy beaches (PCT 4102). Additionally, contains open forest.	Likely – local records show presence nearby subject land.	No - Vast range of foraging habitat available and does not breed in Australia
Hydroprogne caspia	Caspian Tern	M	This species is gregarious when breeding, though single nesting does occur. Outside of breeding, the Caspian Tern occurs mostly singly or in small groups. Occasional larger groups of 30 or more birds are seen, often at rich fishing areas or at nightly roost sites, where they may roost with other terns. The species may also aggregate into flocks on passage (migration) (Higgins & Davies 1996). Within Australia, the Caspian Tern has a widespread occurrence and can be found in both coastal and inland habitat	22 (1992 to 2019)	Marginal – may be some suitable foraging habitat in the subject land.	Unlikely- no recent records within the subject land	No – no habitat within the development footprint.
Lathamus discolor	Swift Parrot	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW	48 (1999 to 2023)	Present – subject land contains suitable	Likely – consistent sighting records within	Possible – SAII species.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. No breeding in NSW. Broad range of habitats where eucalypts are flowering profusely or where there are abundant lerps. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, Blue Gum *E. tereticornis,* and White Box *E. albens*.		foraging habitat. Suitable flowering trees (*E. tereticornis* and *C. gummifera)* associated with forested PCTs	subject land.	
Limosa lapponica	Bar-tailed Godwit	M	Arrive in Australia each year in August from breeding grounds in the northern hemisphere. More numerous in northern Australia. Inhabit estuarine mudflats, beaches and mangroves. Common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders.	80 (1982 to 2017)	Present – subject land and development footprint contains suitable foraging habitat. Estuarine mudflats, beaches and mangroves present (PCT 4091 and PCT 4102)	Likely - consistent sighting records within subject land.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	E, M	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. Often occurs around beds of seagrass, and in nearby saltmarsh or the outer margins of mangrove areas. 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. 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. Rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips.	2 (2017)	Present – subject land and development footprint contains suitable foraging habitat. Estuarine mudflats, beaches/sandflats and mangroves present (PCT 4091 and PCT 4102)	Likely – some recent sighting records nearby subject land	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.
Limosa limosa	Black-tailed Godwit	E, M	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.	5 (2009 to 2017)	Present – subject land and development footprint contains suitable foraging habitat. Estuarine	Likely – some recent sighting records nearby subject land	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term,

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			Frequently recorded in mixed flocks with Bar-tailed Godwits.		mudflats, beaches/sandflats and mangroves present (PCT 4091 and PCT 4102)		operational does not change current landuse.
Melanodryas cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	E	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. Perches on low dead stumps and fallen timber or on low-hanging branches. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. Nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1-5 m above the ground. Widespread across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. Considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*.	1 (1985)	Present – subject land contains suitable foraging and breeding habitat. Open eucalypt woodland present with moderate structural diversity and fallen timber.	Unlikely – only one historic sighting recorded nearby subject land. Area may be too fragmented or not near a suitable clearing.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Monarcha melanopsis	Black-faced Monarch	M	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. The species also occurs in selectively logged and 20—30 years old regrowth rainforest. It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. The species especially occurs in 'marginal' habitats during winter or during passage (migration). Other areas in which the Black-faced Monarch may be found include: gullies in mountain areas or coastal foothills, softwood scrub dominated by Brigalow (Acacia harpophylla), coastal scrub dominated by Coast Banksia (Banksia integrifolia) and Southern Mahogany (Eucalyptus botryiodes), occasionally among mangroves and sometimes in suburban parks and gardens.	0	Marginal – some suitable habitat present within assessment area. Species can occur in dry sclerophyll forest present as well as sometimes mangroves.	Unlikely – no local sightings recorded nearby assessment area and habitat present typically is not utilised.	No
Myiagra cyanoleuca	Satin Flycatcher	M	Found along the east coast of Australia in tall forests, preferring wetter habitats such as heavily forested	0	Absent – no suitable	Unlikely – no local sightings	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			gullies, but not rainforests. Nests in loose colonies of two to five pairs nesting at intervals of about 20-50 m apart. It builds a broad-based, cup-shaped nest of shredded bark and grass, coated with spider webs and decorated with lichen. The nest is placed on a bare, horizontal branch, with overhanging foliage, about 3-25 m above the ground.		breeding or foraging habitat present in subject land. No heavily forested gullies.	recorded nearby the subject land and no suitable habitat identified.	
Neophema chrysogaster	Orange-bellied Parrot	CE	Breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia, southern Victoria, and occasional reports from NSW. Winter habitat is saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons. Spits and islands are favoured but they will turn up anywhere within these coastal regions. Forages in weedy areas associated with these coastal habitats or even in totally modified landscapes such as pastures, seed crops and golf courses.	0	Present – subject land contains suitable foraging habitat. Contains saltmarshes and strandline vegetation within an estuary environment (Merimbula Lake) (PCT 4097 and PCT 4091).	Low - no records within close proximity to subject land. Species main population is found in south-eastern South Australia.	No
Neophema chrysostoma	Blue-winged Parrot	V	The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right	0	Marginal – subject land	Potential – no local sightings	No Foraging

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			through to semi-arid zones. Throughout their range, they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. While on the mainland, mobile flocks feed in saltmarsh and rough pasture in coastal Victoria. Blue-winged Parrots can also be seen in altered environments such as airfields, golf courses and paddocks. Breed in Tasmania.		contains some suitable foraging land. Contains saltmarsh (PCT 4091 and PCT 4102). Woodland present is not considered grassy.	recorded nearby the subject land. However, some habitat is suitable.	habitat will not be subjected to impacts
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	CE, M	In NSW, occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. Generally, occupies coastal lakes, inlets, bays and estuarine habitats, and in NSW 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. 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	54 (1982 to 2020)	Present – subject land and development footprint contains suitable foraging habitat. Estuarine intertidal mudflats, beaches/sandflats, mangroves and saltmarsh present (PCT	Known – recorded during survey	Possible – SAII species.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			or other similar structures. Is carnivorous, mainly eating crustaceans.		4091 and PCT 4102). Oyster leases also present nearby subject land.		
Numenius minutus	Little Curlew, Little Whimbrel	M	The Little Curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. When resting during the heat of day, the Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated. Birds may also rest in grassy, open woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, and occasionally on mudflats when nearby grasslands are unburnt, or around swamps.	0	Marginal – some of the assessment area and subject land contains suitable foraging habitat. Coastal estuary, mudflats, beaches/sandflats, mangroves and saltmarsh present.	Potential – no local sightings recorded nearby the assessment area. However, some habitat is suitable.	No – despite suitable habitat, not recorded locally.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Numenius phaeopus	Whimbrel	M	Regular migrant to Australia and New Zealand, with a primarily coastal distribution. Found in all states, but more common in the north. Found on the intertidal mudflats of sheltered coasts, in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. Occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. Infrequently recorded using saline or brackish lakes near coastal areas. Also uses saltflats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and saltfields (Higgins & Davies 1996). Forages on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves, and sometimes forages on sandy beaches or among rocks. It has occasionally been sighted feeding on exposed coral or rocky reefs and rock platforms. It is known to probe holes and crevices among rubble and on reef flats, but not on reef crests. Regularly roosts in mangroves and other structures flooded at high tide.	19 (1982 to 2019)	Present – subject land and development footprint contains suitable foraging habitat. Estuarine intertidal mudflats, beaches/sandflats, mangroves and saltmarsh present (PCT 4091 and PCT 4102).	Likely – consistent local sightings recorded within the development footprint.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.
Pandion haliaetus	Osprey	M	The osprey tolerates a wide variety of habitats, nesting in any location near a body of water providing an adequate food supply. It is found on all continents except Antarctica. In Australia it is mainly	0	Marginal – some suitable habitat found in assessment	Potential –local species sighting in December	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			sedentary and found patchily around the coastline, though it is a non-breeding visitor to eastern Victoria and Tasmania. (Atlas of Living Australia, n.d).		area. Information on habitat is limited. However, subject land is proximal to the coastline with an estuary for adequate food supply.	2024 however targeted surveys undertaken in March 2024 showed no breeding habitat present.	
Pycnoptilus floccosus	Pilotbird	V	Occur above 800 m in the Brindabella Ranges, Australia, in the ACT, and in the Snowy Mountains in New South Wales and north-east Victoria. Pilotbirds live on the ground in dense forests with heavy undergrowth where they forage for insects and occasionally eat seeds and fruits. They appear to be largely sedentary, occupying small territories all year round. They build a domed nest on or near the ground in which they usually lay two eggs. P. f. floccosus occur at 800–1,500 m in alpine regions.	5 (1997 to 2001)	Marginal – subject land contains some suitable habitat. Moderately dense forests present on subject land (PCT 3638). subject land is below 800m above sea level.	Unlikely – some historic local sightings recorded nearby subject land. However, there is limited suitable habitat and the subject land is below 800m above sea level where they are less likely to occur.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Rhipidura rufifrons	Rufous Fantail	M	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (*Eucalyptus microcorys*), Mountain Grey Gum (*E. cypellocarpa*), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (*E. delegatensis*), Blackbutt (*E. pilularis*) or Red Mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (*Acmena smithi*) rainforest, with Grey Myrtle (*Backhousia myrtifolia*), Sassafras (*Doryphora sassafras*) and Sweet Pittosporum (*Pittosporum undulatum*) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (*Eucalyptus maculata*), Yellow Box (*E. melliodora*), ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (*Melaleuca* spp.).	0	Marginal – some suitable habitat present in the assessment area. Occasionally found in dry sclerophyll forest. Paperbarks are also present in the subjectland (Melaleuca armillaris subsp. Armillaris).	Unlikely – no local sightings recorded and also habitat present is only marginal and typically is not utilised.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Rostratula australis	Australian Painted Snipe	E	A small freshwater wader restricted to Australia. Can inhabit fresh and sometimes brackish water both ephemeral and permanent wetlands, lakes, swamps, claypans, inundated or waterlogged grasslands, saltmarsh, dams, rice crops, sewage farms and bore drains, generally with a good cover of grasses, rushes and reeds, low scrub, Lignum, open timber or samphire. 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.	0	Present – subject land and development footprint contains suitable foraging and breeding habitat. Estuarine saltmarsh present containing Glasswort samphire (Sarcocornia quinqueflora) (PCT 4091 and PCT 4102). Rushes present for breeding habitat (4102).	Potential – no local sightings recorded. However, habitat is somewhat suitable.	No – despite suitable habitat, not recorded locally.
Stagonopleura guttata	Diamond Firetail	V	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	5 (1983 to 2020)	Marginal – some suitable foraging and breeding	Potentially – some local sightings recorded	No foraging habitat not likely to be impacted.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			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 5-40 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. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.		habitat present within subject land. Open sclerophyll forest with shrubby understory present in subject land	nearby subject land.	
Sternula albifrons	Little Tern	M	In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide	5 (1996 to 2017)	Potential – habitat possibly occurring within subject land but unlikely within subject area	Unlikely – low records and no records within recent year	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			mark near estuary mouths or adjacent to coastal lakes and islands. Nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. 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.				
Symposiachrus trivirgatus	Spectacled Monarch	M	Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests (Atlas of Living Australia, n.d).	0	Absent – no suitable habitat present within assessment area. Area is not tropical or sub-tropical.	Unlikely – no local sightings recorded and no suitable habitat.	No
Sternula nereis nereis	Australian Fairy Tern	V	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. The bird roosts on beaches at night.	0	Absent - no suitable habitat in the subject area.	Unlikely – no local sightings recorded and no suitable habitat.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Thalasseus bergii	Crested Tern	M	The species inhabits tropical and subtropical coastlines, foraging in the shallow waters of lagoons (Higgins and Davies 1996, del Hoyo et al. 1996), coral reefs (del Hoyo et al. 1996), estuaries (Urban et al. 1986, del Hoyo et al. 1996), bays, harbours and inlets (Higgins and Davies 1996), along sandy, rocky, coral (del Hoyo et al. 1996) or muddy shores, on rocky outcrops in open sea, in mangrove swamps (Langrand 1990) and also far out to sea on open water (del Hoyo et al. 1996). It shows a preference for nesting on offshore islands (Urban et al. 1986, del Hoyo et al. 1996), low-lying coral reefs, sandy or rocky coastal islets, coastal spits, lagoon mudflats (del Hoyo et al. 1996), and artificial islets in saltpans and sewage works (Urban et al. 1986, del Hoyo et al. 1996) within 3 km of the coast (del Hoyo et al. 1996)	133 (1957 to 2022)	Potential foraging area – within the inlet near the subject land.	Unlikely- development is unlikely to impact any foraging or habitat areas.	No
Thinornis cucullatus cucullatus	Eastern Hooded Plover, Eastern Hooded Plover, Eastern Hooded Dotterel	V	The hooded plover (eastern) is a small Australian beach nesting bird. It mainly occurs on wide beaches backed by dunes with large amounts of seaweed and jetsam, creek mouths and inlet entrances. Nests are found above the high water mark on flat beaches, on stony terraces, or on sparsely vegetated dunes. As the hooded plover occurs on beaches, it is easily disturbed by human activities, particularly off-leash domestic dogs.	65 (1980 to 2020)	Absent – subject land does not contain suitable habitat. No open coastal beaches backed by sand dunes present. Subject land	Unlikely – consistent local sightings recorded nearby subject land. However, habitat is not considered suitable.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
					occurs away from the estuary (Merimbula Lake's) entrance.		
Tringa brevipes	Grey-tailed Tattler	M	Usually seen in small flocks on sheltered coasts with reefs and rock platforms or with intertidal mudflats. They are also found in intertidal rocky, coral or stony reefs, platforms and islets that are exposed at high tide, also shores of rock, shingle, gravel and shells and on intertidal mudflats in embayment's, estuaries and coastal lagoons, especially those fringed with mangroves.	6 (1982 to 2014)	Present – development footprint and subject land contains suitable foraging habitat. Contains intertidal mudflats and mangroves within an estuary (PCT 4091 and PCT 4102)	Potential – some local sightings recorded nearby subject land. However, records are not recent. But habitat is considered suitable.	Unlikely – development footprint minimised and mangrove removal avoided, construction short-term, operational does not change current landuse.
Tringa nebularia	Common Greenshank, Greenshank	E, M	Does not breed in Australia, however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. In NSW, the species has been recorded in most coastal regions. It	1 (2019)	Present – development footprint and subject land	Potential – only one recent local sighting recorded.	No - rare visitor, minimal habitat

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			is widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions.		contains suitable foraging habitat. Contains intertidal mudflats, saltmarsh and mangroves within an estuary (PCT 4091 and PCT 4102)	However, subject land is considered suitable.	impact.
Epinephelus daemelii	Black Rockcod, Black Cod, Saddled Rockcod	V	The Black Rockcod is found in warm temperate and subtropical parts of the south-western Pacific.The Black Rockcod is a common New South Wales species but is rarely seen due to its secretive nature usually found hiding in caves and under ledges. Found on coastal reefs, estuaries and deep offshore.	0	Absent – Habitat not within subject land.	Unlikely – no records and no habitat located in subject land.	No
Prototroctes maraena	Australian Grayling	V	Is diadromous, spending part of its lifecycle in freshwater and at least part of the larval and/or juve0e stages in coastal seas. Adults (including pre spawning and spawning adults) inhabit cool, clear, freshwater streams with gravel substrate and areas alternating between pools and riffle zones such as the Tambo River, which is also known to have granite	0	Potential – Fresh water inlet present within subject land.	Unlikely – no local records of species within subject land`	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			outcrops. Also associated with clear, gravel-bottomed habitats in the Mitchell and Wonnangatta Rivers (Victoria) and in a muddy-bottomed, heavily silted habitat in the Tarwin River (Victoria). Has been found over 100 km upstream from the sea. Currently, occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania. Found in fresh and brackish waters of coastal lagoons, from Shoalhaven River in NSW to Ewan Ponds in South Australia. Is absent from the inland Murray-Darling system. In Victoria in the 1980s, this species had been most frequently collected in the Tambo, Barwon, Mitchell and Tarwin River systems. In NSW, there are many sightings from the Deua River that cover all year classes, usually in small shoals containing a number of individuals.				
Heleioporus australiacus	Giant Burrowing Frog	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. Home ranges are approximately 0.04 ha in size. Breeding habitat of this species is	2 (2010 to 2019)	Present – Breeding habitat and non-breeding habitat present within subject land. Contains dry sclerophyll forests (PCT	Unlikely – no individuals were identified during targeted surveys.	No - no suitable habitat was identified within development footprint that would cause significant

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water.		3181) as well as small first and second order streams.		impacts
Litoria aurea	Green and Golden Bell Frog	V	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis* spp.). Optimum habitat includes still, shallow water-bodies that are unshaded, free of predatory fish such as Plague Minnow *(Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Also, with emergent aquatic plants, more frequent in ephemeral ponds rather than permanent ponds. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. Forage in coastal swamps, marshes, dune swales, lagoons, lakes and other estuary, riverine floodplain wetlands and billabongs, artificial water bodies (storm water detention basins, farm dams, bunded areas, drains, ditches and other excavations capable of capturing water such as quarries and brick pits, minor structures such as tanks.	5 (2000 to 2008)	Present – subject land contains breeding and foraging habitat. Contains coastal wetlands and marshes with bullrushes and spikerushes present . Site also contains several ephemeral waterbodies.	Potential – no individuals were identified during targeted surveying	No - no suitable habitat was identified within development footprint that would cause significant impacts
Litoria raniformis	Southern Bell Frog, Growling Grass Frog,	V	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys.	0	Marginal – Subject land contains some breeding	Unlikely – no local records	No - no suitable habitat was identified

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
	Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog		They are also found in irrigated rice crops, particularly where there is no available natural habitat. Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. Known to breed anytime from early spring through to late summer/early autumn (Sept to April) following a rise in water levels. During the breeding season animals are found floating amongst aquatic vegetation (especially cumbungi or Common Reeds) within or at the edge of slow-moving streams, marshes, lagoons, lakes, farm dams and rice crops. Tadpoles require standing water for at least 4 months for development and metamorphosis to occur but can take up to 12 months to develop. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.		habitat but land it is not subject to freshwater flooding events. Some Typha swamp present, but habitat is likely too saline.		within development footprint that would cause significant impacts
Litoria watsoni	Southern Heath Frog, Watson's Tree Frog	E	This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to	0	Marginal – some breeding habitat present. Perched swamps occur in subject land but not within development footprint. No	Unlikely – no local records	No – no suitable habitat was identified within development footprint that would cause significant

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			sunlight, but will also use temporary isolated pools.		permanent streams present and limited heath-based forest.		impacts
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	V	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Feed on insects and smaller frogs. Breed in streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams. As the tadpoles grow they move to deep permanent pools and take approximately 12 months to metamorphose. Occur along the east coast of Australia from southern Queensland to north-eastern Victoria.	0	Marginal – some breeding and foraging habitat present in subject land. Some areas of deep leaf litter and thick understory present (PCT 4056). Streams may be suitable for breeding after rainfall, however, pools present in subject land likely aren't deep or permanent.	Unlikely – no local records and no individuals were identified after targeted surveying.	No - no suitable habitat was identified within development footprint that would cause significant impacts

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	E	The Spot-tailed Quoll (SE mainland population) occurs from south-east Queensland, eastern NSW, Victoria, south-east Australia and Tasmania. It occurs in a variety of habitats, including temperate and subtropical rainforests, wet sclerophyll forest, open and closed eucalypt woodlands, inland riparian and River Red Gum forests, and occasional sightings in mangrove swamps, open country and grazed land. The species has a preference for mature wet forest habitat especially in areas with rainfall 600 mm/year. For breeding they use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.	11 (1974 to 2006)	Marginal – some foraging habitat present in subject land. Some association with mangrove swamps and sclerophyll forests (PCT 3638) however, they prefer wet sclerophyll forest.	Unlikely – limited suitable habitat in the Subject Land, and Subject Land is fragmented.	No - no suitable habitat was identified within development footprint that would cause significant impacts
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	E	Found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the northern tip of Queensland. Southern Brown Bandicoots are largely crepuscular. Found in heath or open forest with a heathy understorey on sandy or friable soils. Feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Searches for food often create distinctive conical holes in the soil. Nest during the day in a shallow depression in the ground covered by leaf litter, grass	3 (2011 to 2014)	Marginal – some foraging and breeding habitat present within subject land. Contains open dry sclerophyll forests with limited heathy understory. Areas of the subject land	Potential – some previous local records	No Habitat unlikely impacted by boardwalk or construction activities

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			or other plant material. Nests may be located under Grass trees *Xanthorrhoea* spp., blackberry bushes and other shrubs, or in rabbit burrows.		also had sandy/ friable soils (PCT 3639 and 3108). Some suitable breeding habitat was also present.		
Petauroides volans	Greater Glider (southern and central)	E	Arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. 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. Typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Species favoured include *E. viminalis, E. tereticornis*.	0	Marginal – some foraging and breeding habitat present in subject land. Some favoured foraging species associated forest onsite. Some tree hollows present within site footprint.	Low – no local records, suitable habitat present is limited within the subject land.	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Petaurus australis	Yellow-bellied Glider (south-eastern)	V	Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	94 (consistent records from 1988 to 2023)	Present – breeding and foraging habitat found within subject land. Area contains moist coastal gullies with areas of eucalypt forest . Some suitable tree hollows also found within subject land.	Likely – consistent local records in surrounding area.	No – only potential minor impacts from noise. Development footprint will not impact hollow bearing trees or fragment habitat

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	E	Distributed in Eastern Aust forests and woodlands. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. In regards to breeding they have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Koalas have a forest type preferences that vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. They eat foliage of more than 70 eucalypt species and 30 non-eucalypt species, Home Range, <2 to several hundred Ha. Males are highly mobile, especially juveniles trying to find their territory, moving many kilometres, especially where trees are sparse.	16 (consistent record from 1900's to 2023)	Present – foraging and breeding habitat present within subject land but setback from boardwalk.	Potential – some recent local records in the area.	No impacts likely on forested habitat.
Potorous tridactylus	Long-nosed Potoroo (southern mainland)	V	In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an	17 (1986 to 2023)	Present – foraging and breeding habitat present within subject	Potential - some recent local records in the area.	No impacts likely on forested habitat.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. The species has often been recorded in gullies and near creeks. Often digs small holes in the ground in a similar way to bandicoots. During the day it shelters in a crude nest under dense understorey vegetation. Fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet. Also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Breeding peaks typically occur in late winter to early summer and a single young is born per litter.		land. Contains open dry sclerophyll forests with some heathy understory. Areas of the subject land also had sandy/ friable soils. Some suitable breeding habitat was also present. Small ephemeral creeks and gullies also present in subject land.		
Pseudomys fumeus	Smoky Mouse, Konoom	E	Prefers heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies. Seeds and fruits from leguminous shrubs form the main summer and autumn diet, with some invertebrates, eg., Bogong Moths in the high country.	0	No – not associated with identified PCTs	Unlikely – no local records	No

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			Hypogeal (truffle-like) fungi predominate in winter and spring, with some flowers, seeds and soil invertebrates. May occur singly, as pairs or small communal groups based around patches of heath, sometimes comprising a male and up to five females sharing a burrow system. Breeding is in spring. Nesting burrows have been found in rocky localities among tree roots and under the skirts of Grass Trees *Xanthorrhoea* spp.				
Pseudomys novaehollandiae	New Holland Mouse, Pookila	V	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 – not associated with identified PCTs	Unlikely – no local records	No
Pteropus poliocephalus	Grey-headed Flying-fox	V	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 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, giving birth and rearing young. Annual mating commences in January and a single young is born in October or	81 (1986 to 2021)	Present – suitable foraging habitat present within subject land within forest.	Likely – consistent local records in area	No impacts likely on forested habitat.

Species Name	Common name	EPBC Status	Habitat description	Number of records within 10km (BioNet) and range between earliest and latest date of record	Presence of habitat	Likelihood of occurrence	Possible impact
			November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50km 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.				

C.8 Protected matters search report

The report from the protected matters search report follows overleaf

EPBC Act Protected Matters Report

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

Report created: 04-Apr-2024

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	97
Listed Migratory Species:	57

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	87
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	1
Nationally Important Wetlands:	4
EPBC Act Referrals:	3
Key Ecological Features (Marine):	1
Biologically Important Areas:	19
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text	Buffer Status
Brogo Vine Forest of the South East Corner Bioregion	Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In feature area
Lowland Grassy Woodland in the South East Corner Bioregion	Critically Endangered	Community likely to occur within area	In feature area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Litoria aurea			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria raniformis			
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area	In feature area
Litoria watsoni			
Southern Heath Frog, Watson's Tree Frog [91509]	Endangered	Species or species habitat likely to occur within area	In feature area
Mixophyes balbus			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Potorous tridactylus trisulcatus			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudomys fumeus			
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat likely to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
Acacia georgensis			
Bega Wattle [9848]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Amphibromus fluitans			
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Astrotricha crassifolia			
Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia tessellata			
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calochilus pulchellus			
Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Correa baeuerlenii Chef's Cap [17007]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Corunastylis rhyolitica listed as Genoplesium rhyoliticum Pambula Midge-orchid, Rhyolite Midge Orchid [78697]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leionema ralstonii [64926]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	Endangered	Species or species habitat may occur within area	In feature area
Pomaderris parrisiae Parris' Pomaderris [22119]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Westringia davidii [19079]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Zieria formosa Shapely Zieria [56733]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Zieria parrisiae Parris's Zieria [56735]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In feature area
SHARK			
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Migration route known to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons Little Tern [82849]		Breeding likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Migration route known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In buffer area only
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Symposiachrus trivirgatus as Monarcha trivirgatus			
Spectacled Monarch [83946]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago megala			
Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago stenura			
Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Limosa lapponica			
Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus			
Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat known to occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [16089]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [15535]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12265]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
[Neophema chrysogaster](#) Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Symposiachrus trivirgatus as Monarcha trivirgatus			
Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thalassarche bulleri			
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov.			
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita			
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thinornis cucullatus as Thinornis rubricollis](#) Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
[Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis](#) Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area	In feature area
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Ben Boyd	National Park	NSW	In buffer area only
Bournda	National Park	NSW	In buffer area only
Bournda	Nature Reserve	NSW	In buffer area only
South East Forest	National Park	NSW	In buffer area only
Yurammie	State Conservation Area	NSW	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
Eden RFA	New South Wales	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Bondi Lake	NSW	In buffer area only
Merimbula Lake	NSW	In feature area
Pambula Estuarine Wetlands	NSW	In buffer area only
Wallagoot Lagoon (Wallagoot Lake)	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Upwelling East of Eden	South-east	In buffer area only

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In feature area
Seabirds			

Scientific Name	Behaviour	Presence	Buffer Status
Ardenna grisea Sooty Shearwater [82651]	Foraging	Likely to occur	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In buffer area only
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely to occur	In buffer area only
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In buffer area only
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In buffer area only
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur	In buffer area only
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur	In buffer area only
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In buffer area only
Sharks			
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In buffer area only
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In buffer area only
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

C.9 Assessment of Significance

The following AoS follow overleaf:

Communities

- *Brogo Vine Forest of the South East Corner bioregion* TEC
- *Subtropical and Temperate Coastal Saltmarsh* TEC.

Threatened species

- Curlew Sandpiper (*Calidris ferruginea)*
- Swift Parrot *(Lathamus discolor)*
- Eastern Curlew *(Numerius madagascariensis)*

Migratory species

In addition to the species listed above:

- Curlew Sandpiper (*Calidris ferruginea).*
- Eastern Curlew *(Numerius madagascariensis)*

C9.1 Brogo Vine Forest in the South East Corner Bioregion

Brogo Vine Forest in the South East Corner Bioregion
Reduce the extent of an ecological community
Brogo Vine Forest TEC is associated with PCT 3108; 1.84ha occurs in the subject land. Approximately 0.06ha of this TEC would be cleared, a reduction in extent within the subject land of 3.2%. Geographically, the proposal would not reduce the extent.
Fragment or increase fragmentation of an ecological community
For the purposes of deriving clearing estimates, the gap created by the existing pathway has been subtracted from PCT mapping defining this TEC. An increase in the path gap of 2m to 4m (representing path widening for this project) would not fragment this TEC. According to Conservation Advice, patch size for this TEC includes breaks up to 30m for paths, roads, fences, etc (DAWE, 2022). For this project, there are two patches of Brogo Vine Forest TEC inside the subject land. They are 150m apart and comprise PCT 3108. The local extent of these patches will essentially not change due to clearing associated with the proposal and will not fragment any Brogo Vine Forest TEC.
Adversely affect habitat critical to the survival of an ecological community
Habitat critical to the survival of this TEC includes patches that are in high condition, which represent those parts of the community that retain the highest diversity and most intact structure and ecological function and have the highest chance of persisting in the long term (DAWE, 2022). PCT 3108 is in good condition according to the criteria in the Conservation Advice (DAWE, 2022). Thus, the proposal would not affect habitat critical to the survival of Brogo Vine Forest TEC.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

Fauna such as Sugar Glider, Grey-headed Flying-fox play a role in nutrient cycling, pollination and seed dispersal in this TEC (DAWE, 2022). These species were detected in the subject site; the proposal would not affect their population size or role in the community. Eucalypt canopy trees provide a function role in structure, shade and microhabitat factors; the function these trees provide would not be modified by the proposal as clearing would be taken within one metre of the path edge, avoiding most trees. Mitigation measures include best practice erosion and sedimentation practices to minimise impact upon hydrology and soils. The proposal includes boardwalk in hydrological sensitive areas to minimal alteration of water drainage patterns. Overall, the proposal is unlikely to modify or destroy abiotic factors necessary for the Brogo Vine Forest TEC survival.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
This TEC is located adjacent to the boardwalk development footprint and exists in a disturbed state due to edge effects (the boardwalk marks the natural southern edge of the TEC patch). There are ongoing anthropogenic disturbances from both pedestrians using the path and the residential area which abuts the TEC. Weed species are prevalent in understory in wetter areas. Mitigation measures include stockpiles for native vegetation and cleared exotic areas with high weed cover to minimise spread of weeds within the subject site. Existing fauna seen to be important to the ecological function of the TEC (DAWE, 2022); are unlikely to be impacted by boardwalk-pathway widening.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: *assisting invasive species, that are harmful to the listed ecological community, to become established, or* *causing regular mobilization of fertilizers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or*
As already discussed, invasive flora species are well established in the subject land and the anthropogenic disturbance from adjacent residential areas is ongoing. Weeds already present that are known to impact Brogo Vine Forest TEC include Blackberry *(Rubus spp.)* and Fireweed *(Senecio madagascariensis)*. Widening the existing boardwalk-pathway is not likely to introduce additional weeds. Mitigation measures include separating stockpiles (native clearing versus exotic clearing areas) to minimise translocation of weeds during construction. The proposal does not involve the introduction of any fertilizers, herbicides or other chemicals or pollutants. With the recommended stockpile hygiene measures implemented, the likelihood of the proposal causing introduction of new invasive species to the TEC is minimal.
Interfere with the recovery of an ecological community
There is no recovery plan for this ecological community. Relevant key threats to Brogo Wet Vine Forest include: • Clearing • Altered disturbance regimes. • Invasion of exotic flora.

The proposal would result in the linear loss of 0.06ha of Brogo Vine Forest TEC in the configuration of 1 metre either side of an existing boardwalk and pathway for a 300m length. The clearing is minor due to configuration and quantity. The proposal area is already subject to disturbances (existing boardwalk, abutting residential areas) and ongoing anthropogenic disturbances (pedestrian and pet traffic). The proposal will not further alter existing disturbances. Invasive flora already exist and cannot be controlled of adjacent residential areas (edge effects). However, mitigation to minimise translocation of weeds within the subject site and hygiene procedures for any machinery used will be implemented. Therefore, the proposal is unlikely to introduce new invasions of exotic flora species. On this basis, the proposal is unlikely to interfere with the recovery of Brogo Vine Forest TEC in the subject.
Conclusion
A small (3.2%) reduction in TEC extent would occur in the subject land but the TEC would not be reduced geographically in the locality. The proposal would not create gaps between patches (defined as greater than 30m) leading to fragmentation. The TEC in the subject land is good quality (as defined in Conservation Advice), not high quality, thus is not considered critical to the survival of the TEC. The proposal would not modify or destroy abiotic factors such as habitat structure or faunal assemblage. The proposal would not lead to substantial change in species composition (including functionally important species), introduce new weeds or chemicals. The proposal would not interfere with Brogo Vine Forest TEC recovery. Mitigation measures are in place to support these outcomes. Overall, the proposal is unlikely to result in a significant impact to the TEC.

C9.2 Subtropical and Temperate Coastal Saltmarsh

Subtropical and Temperate Coastal Saltmarsh
Reduce the extent of an ecological community
Saltmarsh vegetation, likely in better (less disturbed) condition, is prevalent around the Merimbula Lake outside of the subject land. Approximately 0.77ha of *Subtropical and Temperate Coastal Saltmarsh* occurs in the subject land; 0.08ha of this TEC would be cleared as a result of the proposal (10.4%). This TEC is located adjacent to (and in some cases beneath) the existing boardwalk. It is currently subject to disturbance by pedestrians and their pets, and therefore the edges of this patch exist in a modified state. There will be a negligible reduction in the extent of this community locally (0.08ha).
Fragment or increase fragmentation of an ecological community
Clearing can lead to fragmentation, with the breaking down of continuous saltmarsh into unconnected patches. The proposed clearing of 0.08ha would occur along a linear area in the form of one metre either side of the existing boardwalk footprint along a total of 200m of saltmarsh vegetation. Fragmentation could occur if the tidal regime, upon which the community is dependent, were altered or if pollination and seed dispersal from plants in the community were isolated from other patches. Given the small increase in the gaps within the saltmarsh (from existing 2m gap to proposed 4m gap), fragmentation is unlikely to occur. During field assessment, it was observed in some areas that saltmarsh had recolonized underneath the existing boardwalk, suggesting that a) fragmentation has not occurred and b) long term losses in patches of saltmarsh may be less than expected. Increasing the width of boardwalk from 1.7-2.5m wide is a minor increase and connectivity would still be maintained along the boardwalk with the remaining patch outside of the development footprint, and the proposal would not isolate any patches of the community.
Adversely affect habitat critical to the survival of an ecological community
Habitat critical to the survival of this ecological community is listed in the conservation advice as: *"Of critical importance to the survival of the Coastal Saltmarsh ecological community is an ongoing connection with the adjacent tidal regime (whether regular or irregular)".* The saltmarsh in the subject land (and development footprint) has a direct tidal regime connection to the south (Merimbula Lake); and widening the boardwalk will not change and tidal influences to Merimbula Lake, therefore not affecting processes that are critical to the survival of this ecological community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
Soils and nutrient balance in parts of the Subject Land are already highly disturbed through past construction and maintenance of Merimbula Boardwalk. The proposal would have a short-term impact upon soil and possibly water within the vicinity of the development area (when replacing boardwalk piles). These impacts are manageable with the implementation of erosion and sediment controls and

would be unlikely to further degrade the community in the long-term. The actions associated with the proposal are not considered likely to substantially alter hydrological patterns necessary for the community's survival.
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
The proposal would be unlikely to cause a change in the species composition of the remaining patch. No characteristic or functionally important species would be lost through the impact to the 0.06ha of *Subtropical and Temperate Coastal Saltmarsh* and there would be no fragmentation of seed dispersal. No further impacts are anticipated to the remaining *Subtropical and Temperate Coastal Saltmarsh*. No introduced fire or flooding regimes would occur and no increase of natural occurrences of these events is anticipated from the development. No harvesting of plants would occur in the remaining *Subtropical and Temperate Coastal Saltmarsh*. Mitigation measures, including delineating no go zones, would ensure that the broader patch of this TEC would remain undisturbed during the proposed works.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • *assisting invasive species, that are harmful to the listed ecological community, to become established, or* • *causing regular mobilization of fertilizers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or*
The saltmarsh community (PCT 4097) is relatively intact and unaffected by weeds. In widening the boardwalk, a weed 'hygiene' procedure may help to prevent new weed infestations (such as *Juncus krausii* or other saline tolerant plants) from being introduced into the saltmarsh during the construction phase, if contaminated machinery or materials are brought into the area. The proposal will not introduce any fertilizers, herbicides or other chemicals or pollutants. With the recommended hygiene measures implemented, the likelihood of the proposal resulting in invasive species or introduction of pollutants into saltmarsh is considered minimal.
Interfere with the recovery of an ecological community
There is no adopted recovery plan for this ecological community. Key threats to *Subtropical and Temperate Coastal Saltmarsh* include: • Clearing and fragmentation • Infilling • Altered hydrological / tidal restriction. • Invasive species • Climate change • Mangrove encroachment • Recreation

- Pollution / litter
- Eutrophication
- Acid Sulfate soils
- Grazing
- Insect control
- Evaporative salt production and other mining
- Inappropriate fire regimes

The proposal would not constitute or introduce any key threats to the TEC. The removal of lineal 0.08ha along an approximately 1 x 200m of saltmarsh, to widen a boardwalk, is unlikely to interfere with the recovery of the *Subtropical and Temperate Coastal Saltmarsh TEC* locally.

Conclusion

The proposal would result in the removal of up to 0.06ha of *Subtropical and Temperate Coastal Saltmarsh* from 0.77ha in the subject land. Saltmarsh is locally abundant outside of the subject land around Merimbula Lake. The development footprint is highly disturbed by an existing boardwalk and frequent pedestrian access.

The proposal involves widening an exiting boardwalk to 2.5m, with construction disturbance to 4m total width. It would not lead to fragmentation and would not modify or destroy abiotic factors. The proposal would not cause a substantial change in the species composition or substantial reduction in the quality of the ecological community. For these reasons, a significant impact is considered unlikely to occur to the TEC and an EPBC referral is not considered necessary.

C9.3 Swift Parrot (Lathamus disolor)

Lathamus discolor (Swift Parrot) – Critically Endangered
Lead to a long-term decrease in the size of a population
Breeding for this species occurs in Tasmania, however the species is known to occupy hollow bearing eucalypts near foraging habitat when not in breeding season (Threatened Species Scientific Committee, 2016). Because there are winter-flowering eucalypts in the locality, the subject site is considered 'NSW important habitat area' for the Swift Parrot. Habitat in the subject land consists of 6.4ha of forest, scrub, mangrove and saltmarsh from PCTs 3108, 3639, 4054, 4056, 4091 and 4097. The 'important habitat area' occupies 41.8ha within the assessment area and comprises extensive forests in the locality. Of this, 0.16ha (6% of subject land; 0.9% of assessment area) of important habitat would be removed in a linear fashion along a 700m long edge of the boardwalk and pathway (approximately one metre on either side). Extensive areas of similar habitat occur in the locality. The clearing proposed would not interfere with foraging, migration or roosting and therefore would not lead to a long-term decrease in the size of the Swift Parrot population.
Reduce the area of occupancy of the species
Estimating the area of occupancy is difficult to quantify because the range varies widely depending on the method used (Threatened Species Scientific Committee, 2016). A combined estimate gives a range of 18.5km^2 to 355km^2 (Threatened Species Scientific Committee, 2016). Clearing whole patches of vegetation would reduce the area of occupancy; and widening a boardwalk and path by 1m would not cause this. The proposal involves clearing one metre either side of an existing boardwalk and pathway for around 700m of suitable habitat, leading to a total clearing area of 0.16ha. The 4m gap created within the habitat would not affect connectivity or habitat use. Therefore, the proposal would not reduce the area of occupancy for Swift Parrot.
Fragment an existing population into two or more populations
As already discussed, the proposal involves clearing one metre either side of an existing boardwalk and pathway to 2.5 (allowing construction disturbance to 4m). A 4m gap between trees would not pose a barrier to habitat use or movement within the habitat area as this gap size occurs naturally within forest and woodland structures, and the Swift Parrot occupies these habitat types. Therefore, the proposal would not fragment the existing population into two or more populations.
Adversely affect habitat critical to the survival of a species
Within the National Recovery plan (DCCEEW, 2024) habitat critical to the survival of the Swift Parrot includes "those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot or are otherwise identified by the recovery team." The habitat within the subject land is mapped as important habitat in NSW and therefore is likely to meet the criteria for habitat critical to the survival of Swift Parrot. In quantifying losses, there would be 0.16ha of critical habitat removed, which includes three hollow-bearing trees.
Disrupt the breeding cycle of a population

Breeding takes place in Tasmania, and during the non-breeding period (winter), Swift Parrots migrate to the mainland, dispersing according to availability of foraging resources (DCCEEW, 2024). In relation to the breeding cycle (relevant to the subject land) there are key foraging resources. While habitat in the subject site is theoretically critical to the survival of Swift Parrot, in practice important foraging tree species were not recorded in the subject land. A few mature winter-flowering eucalypts would be removed to widen the boardwalk and pathway by one metre either side. Bangalay flowers in autumn, Coastal Grey Box and Woollybutt may flower anytime between autumn and winter (CANBR, 2020). Only one of the hollow-bearing trees to be removed has potential to be utilised for roosting: HBT 12 a stag with medium spout.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
As discussed, 6% of the habitat in the subject land (habitat continues beyond the subject land) would be removed in a linear fashion approximately one metre either side of an existing boardwalk and pathway for about 700m of habitat. The habitat to be cleared is already disturbed, being an existing edge subject to high pedestrian and pet traffic. This habitat patch is also adjacent to residential areas with high disturbance in the form of weeds, noise and pets. The widening of gap in the habitat from to 4m would not substantially alter the microclimate of the forest due to small magnitude. The proposal would not substantially change the land use or disturbance regime. Thus, the proposal is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that Swift Parrot is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
The subject land is adjacent to residential areas on the fringe of an urban area. Invasive plants and animals are already established on site and in the locality. Mitigation measures would be in place to minimise the risk of translocating weeds throughout the subject site. The proposal would not introduce or exacerbate the presence of invasive species.
I*ntroduce disease that may cause the species to decline*
Psittacine Beak and Feather Disease (PBFD) is known to occur in Swift Parrots (Department of Environment and Heritage, 2005) and is included in the recovery objectives for the species (DCCEEW, 2024). However, with known methods of infection for this disease being from excrement and feather and skin particles, most transmission of this disease would occur within breeding habitat. The proposal would not affect breeding habitat and is unlikely to introduce disease that may cause Swift Parrot to decline.
Interfere with the recovery of the species
Within the National Recovery Plan for the species (DCCEEW, 2024) is listed the objectives for recovery action, these objectives are: Objective 1: To identify and prioritize habitats and sites used by the species across its range, on all land tenures. Objective 2: To implement management strategies to protect and improve habitats and sites on all land tenures

Objective 3: To monitor and manage the incidence of collisions, competition and Beak and Feather Disease (BFD). Objective 4: To monitor population trends and distribution throughout the range. The proposal to remove 0.16ha of Swift Parrot important habitat is inconsistent with objectives 1 and 2. However, given the relative extent of habitat within the assessment area (41.8ha) and beyond, along with the configuration of the proposal clearing (linear along existing disturbed edge), it is unlikely that the proposal will interfere with recovery of Swift Parrot.
Conclusion
The subject land intersects with NSW important habitat mapping for Swift Parrot, would therefore qualify as critical habitat and the species is assumed to occur during non-breeding season. The lineal clearing of 0.16ha proposed would not interfere with foraging, migration or roosting and therefore would not lead to a long-term decrease in the size of the Swift Parrot population. The 4m gap created within the habitat would not affect connectivity or habitat use; the proposal would not reduce the area of occupancy or fragment the population for Swift Parrot. Key winter foraging tree species would not be affected and habitat connectivity would be maintained thus the proposal would not affect the breeding cycle. The proposal would not lead to invasive species or disease. Due to the configuration (linear) and scale (0.16ha) of clearing relative to the large areas of habitat outside of the subject land, the proposal would not interfere with species recovery. Thus, the proposal is unlikely to lead to significant impact for Swift Parrot.

C9.4 Eastern Curlew (Numerius madagascariensis)

Numenius madagascariensis (Eastern Curlew) – Critically Endangered
Lead to a long-term decrease in the size of a population
Eastern Curlew breeds in Siberia. During the non-breeding season, the species forage in intertidal sandflats or mudflats, often foraging around mangroves, saltmarshes and near rock pools (DCCEEW, 2023). The species roosts in sheltered estuaries, mangrove swamps, saltmarshes and intertidal flats. Eastern Curlews was observed incidentally foraging on oyster leases in Merimbula Lake near the subject land. The proposed development would remove 0.24ha of 5.6ha (5.9%) habitat in the subject land potentially used by the species. This habitat is prevalent locally around the shoreline of Merimbula Lake. Habitat is associated with the following PCTs present within the subject land or within the Migratory Shorebirds important habitat mapping in the development footprint: • PCT 3108 South Coast Scarp Wet Vine Forest • PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest • PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub • PCT 4091 Grey Mangrove-River Mangrove Forest • PCT 4097 Samphire Saltmarsh. The minor clearing impacts would be unlikely to cause a decrease in the population size of *Numenius madagascariensis* (Eastern Curlew) because there is no breeding habitat in Australia and the small magnitude of foraging and roosting habitat impacted would not impact the extent of local habitat available.
Reduce the area of occupancy of the species
The area of occupancy in Australia is estimated to be 8,500km^2 and is decreasing. The removal or modification (e.g. trimming) of habitat in the development footprint would occur approximately one metre either side of an existing boardwalk and pathway along 900m of forest, scrub, mangrove and saltmarsh. It would not fragment habitat into two or more patches and the subject land would continue to host habitat and Eastern Curlew individuals. Widening the boardwalk would not reduce the area of occupancy for the species.
Fragment an existing population into two or more populations
As described above, the clearing involves removing or modifying vegetation for approximately one metre either side of an existing boardwalk and pathway along 900m of forest, scrub, mangrove and saltmarsh. This would create a gap of 4m between trees and shrubs (where these occur on both side of the path), which is consistent with a natural structure for open forest and mangroves. The increased width of the proposal would not inhibit the movement of Eastern Curlew between habitat components and therefore, not cause fragmentation. Noise and disturbance during construction may temporarily deter Eastern Curlews from foraging or roosting in the subject land, however during this period there is sufficient surrounding habitat around Merimbula Lake to host the population. Thus, it is unlikely that the proposed development would fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species
The approved conservation advice (DCCEEW, 2023) describes habitat critical to the survival of this species as the following: • Areas used for activities such as foraging, breeding, roosting, or dispersal; • Areas used for the long-term maintenance of the species (such as macrobenthos); • Areas used to maintain genetic diversity and long-term evolutionary development; or • Areas used for the re-introduction of populations or recovery of the species. The proposed development will remove 0.24ha of critical habitat (areas potentially used for foraging and roosting). Mitigation measures such as clear physical demarcation of the works area would ensure that the remaining habitat in the subject land (and more extensive around Merimbula Lake beyond the subject land) would not be adversely affected.
Disrupt the breeding cycle of a population
As this species does not breed within Australia, the proposal will not directly disrupt or impact the species' breeding cycle. Indirect effects may be in disruptions to migration (including rest and preparation). Although included in NSW important habitat mapping for migratory shorebirds, Merimbula Lake is not listed as nationally significant for the Eastern Curlew population (Weller, et al., 2020). Therefore, the proposal is unlikely to disrupt the breeding cycle of the population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
As discussed, the removal or modification of 0.24ha of potential habitat would occur in approximately one metre either side of an existing boardwalk and path along 900m of forest, scrub, mangrove and saltmarsh habitat. The quality of the habitat to be removed is low to moderate given its proximity to the high pedestrian (and pet) traffic path and past disturbance from construction of the existing boardwalk. On this basis, the proposed development would be unlikely to modify, destroy, remove, isolate or decrease availability of habitat to the extent that the species would be likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
The conservation advice (DCCEEW, 2023) lists invasion of cordgrass and mangroves into mudflat areas as threats, as the changes in foraging habitat availability may drive species away from feeding sites. There are mangroves within the area of the development footprint, however it is unlikely the proposed development will contribute to the spread mangroves into mudflats. It is noted in the conservation advice that the factors that contribute to the spread of mangroves and cordgrass are: • Changing patterns in precipitation. • Altered tidal regime or sea level. • Catchment modifications leading to altered sedimentation and nutrient levels • Land subsidence With the extent of habitat removal being minor (0.33ha) and not impacting on any of these factors, the likelihood of mangroves spreading into foraging habitat is low.

Though not specific to Eastern Curlew, domestic animals (e.g. cats) are known to impact shorebirds (Dowding & Murphy, 2001). Domestic animals already access the site due to adjacent residential areas and the 'dog friendly' walking path. The proposal would not exacerbate this. With these factors being considered, it is unlikely that the proposed development will introduce any new invasive species that are harmful to the species or increase the populations of already present invasive species within the subject land.
Introduce disease that may cause the species to decline
The approved conservation advice does not mention any diseases that are of particular risk to this species. As the development involves the upgrade of an already existing man-made structure with minimal vegetation removal, it is unlikely that the development will introduce any diseases that may cause the decline of this species.
Interfere with the recovery of the species.
There is no recovery plan for this species and conservation advice mostly concerns mitigation of key threats. These threats being ongoing human disturbance and habitat loss. Key concerns for migratory shorebirds are cumulative disturbance and retention of safe refuge and nocturnal roost sites (DEE, 2017). Upgrades to the boardwalk and pathway are motivated primarily by safety concerns; the existing boardwalk is too narrow for current usage numbers, as well as wobbly and aging. The purpose is not to increase visitor numbers but to make it safe to sustain current numbers. Thus, human disturbance is not expected to increase cumulatively as a result of the proposal. The impact of clearing on the availability of roost sites would be minimal given the spread of the impact along 900m of habitat. Thus the proposal would be unlikely to interfere with the recovery of the species.
Conclusion
Eastern Curlew was recorded adjacent to the subject land in connected habitat during surveys. The habitat in the subject site is critical to survival and mapped as important habitat in NSW. As breeding occurs in northern hemisphere, habitat in the subject land is important for foraging and resting. The configuration (linear) and scale (0.24ha) of clearing is unlikely to lead to population decline, reduce the area of occupancy, fragment the population or disrupt the breeding cycle of Eastern Curlew. The proposal would not reduce availability or habitat quality, result in invasive species or disease that would lead to Eastern Curlew decline. The proposal would not interfere with species recovery. Thus, the proposal is unlikely to lead to significant impact for Eastern Curlew.

C9.5 Curlew Sandpiper (*Calidris ferruginea*)

Calidris ferruginea (Curlew Sandpiper) – Critically Endangered
Lead to a long-term decrease in the size of a population
Habitat in the subject for Curlew Sandpiper consists of intertidal mudflats and saltmarsh (foraging) along with mangroves and small areas of dry sand (roosting) (DCCEEW, 2024) of the Merimbula Lake, an ICOLL. This includes 5.6ha of PCTs 3108, 3639, 5054, 4056, 40941 and 4097. There is no breeding habitat in the region; the species breeds in Arctic Siberia (DCCEEW, 2023). The subject land occupies approximately 2.14km of the approximate 16.5 km lakeside perimeter: 7.71%. There are four BioNet records of the species within 10km and presence has been assumed in the subject land. Up to 0.33ha of foraging and/or roosting habitat would be affected; 6% of habitat with the subject land. The proposal would be unlikely to cause a decrease in the population size of Curlew Sandpiper as breeding habitat does not occur locally and the magnitude of foraging and roosting habitat removal would be negligible relative to local extent.
Reduce the area of occupancy of the species
Area of occupancy in Australia is 8,000km^2. The removal or modification of habitat in the development footprint would occur approximately one metre either side of an existing boardwalk and pathway along 900m of forest, scrub, mangrove and saltmarsh. It would not fragment the habitat into two or more patches and the subject land would continue to host habitat and Curlew Sandpiper individuals. in this way, the proposal would not reduce the area of occupancy for the species.
Fragment an existing population into two or more populations
The population potentially uses foraging and roosting habitat within the subject land. The proposal involves removal or modification (e.g. trimming) of native vegetation around the edges of existing habitat patches rather than within. The proposal will not fragment any patches of native vegetation. Therefore, it would be unlikely that the proposal would fragment an existing population.
Adversely affect habitat critical to the survival of a species
According to the Approved Conservation Advice (DCCEEW, 2023), habitat that is critical to the survival of the species is defined as areas: • For activities such as foraging, breeding, roosting or dispersal; • For long-term maintenance of the subspecies (including the maintenance of species essential to the survival of the curlew sandpiper, such as macrobenthos); • To maintain genetic diversity and long-term evolutionary development; or • For the re-introduction of population or recovery of the species. Within Australia this habitat is made up of a mosaic of feeding and roosting habitat. Foraging habitat for the Curlew Sandpiper consists of mostly mudflats on intertidal flats and beaches. Roosting habitat is made up of intertidal sandflats, sits and banks but can also occur in mudflats, estuaries, coastal lagoons and bays (DCCEEW, 2023). The proposed development would remove 0.33ha of habitat that would be considered critical. However, given that this amount of removal is small compared to the remainder of similar habitat in

the subject land, it is unlikely that this removal of habitat will adversely affect the survival of the species. This habitat has also been disturbed in the past with the initial construction of the Merimbula Boardwalk.
Disrupt the breeding cycle of a population
As this species does not breed within Australia, it is unlikely that the development would directly disrupt the breeding cycle of a population. Indirect impacts may be disruptions to migration (including rest and preparation). Merimbula Lake is not listed as nationally significant for the Curlew Sandpiper population (Weller, et al., 2020). Therefore, the proposal is unlikely to disrupt the breeding cycle of the population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
As discussed, the removal or modification of 0.33ha of potential habitat would occur in approximately one metre either side of an existing boardwalk and path along 900m of forest, scrub, mangrove and saltmarsh habitat. The quality of the habitat to be removed is low to moderate given the proximity to the high pedestrian (and pet) traffic and past disturbance from construction of the existing boardwalk. On this basis, the proposed development would be unlikely to modify, destroy, remove, isolate or decrease availability of habitat to the extent that the species would be likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
The conservation advice (DCCEEW, 2023) lists invasion of cordgrass and mangroves into mudflat areas as invasive species, as the changes in feeding habitat availability and may drive species away from feeding sites. There are mangroves within the area of the development footprint, however there is little risk of spreading mangroves into mudflats. Though the species does use mangroves for roosting also. It is noted in the conservation advice that the factors that contribute to the spread of mangroves and cordgrass are: • Changing patterns in precipitation. • Altered tidal regime or sea level. • Catchment modifications leading to altered sedimentation and nutrient levels • Land subsidence With the removal of native vegetation being small and not impacting on any of these factors, the likelihood of mangroves spreading into foraging habitat is small. Although not specific to Curlew Sandpiper, domestic animals (e.g. cats) are known to impact shorebirds (Dowding & Murphy, 2001). The management of domestic animals on public land is a separate issue and is not in line with the scope of this project. As the boardwalk, foreshore and residential areas access is pre-existing, domestic access to Curlew Sandpiper habitat is not expected to change as a result of this proposal. As this is an upgrade to a man-made construction, and is within a close distance to residential areas, the subject area already contains a number of non-native flora and fauna species. With these factors being considered, it is unlikely that the proposed development will introduce any new invasive species

that are harmful to the species or increase the populations of already present invasive species within the subject land.
Introduce disease that may cause the species to decline
There are no diseases listed as threatening for this species according to the Conservation Advice (DCCEEW, 2023). As the proposed development involves the upgrade of an already existing man-made structure with minimal vegetation removal, it is unlikely that the development will introduce any diseases that may cause the decline of this species.
Interfere with the recovery of the species
There is no recovery plan for this species, however the conservation advice for the species indicates that mitigation of key threats is a priority to the conservation of this species. The key threats in Australia are noted as loss of foraging and roosting habitat. The proposal would result in the loss of 0.33ha foraging and roosting habitat. This is very small compared to the available habitat in the subject area and locally (including Panboola Wetlands and other estuaries). Thus the proposal would be unlikely to substantially interfere with the recovery of the species.
Conclusion
The subject land intersects with NSW important habitat mapping for migratory shorebirds and meets the definition of critical habitat for Curlew Sandpiper, and the species is assumed to occur in the subject land. Due to the configuration (linear) and scale (0.33ha) of clearing the proposal is unlikely to reduce the area of occupancy, fragment the population or disrupt the breeding cycle of Curlew Sandpiper. The proposal is unlikely to substantially affect habitat quality or availability, result in invasive species or disease or interfere with recovery. Thus, the proposal is unlikely to lead to significant impact upon the Curlew Sandpiper population.

C9.6 Migratory Species

Curlew Sandpiper (*Calidris ferruginea*) and Eastern Curlew *(Numerius madagascariensis)*
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.
The MNES Significant impact guidelines 1.1 states that an area of 'important habitat' for a migratory species is: • *habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or* • *habitat that is of critical importance to the species at particular life-cycle stages, and/or* • *habitat utilised by a migratory species which is at the limit of the species range, and/or* • *habitat within an area where the species is declining.* Mapped important habitat for Eastern Curlew occurs within the Subject Land, comprising 0.24ha. Habitat in the subject for Curlew Sandpiper consists of intertidal mudflats and saltmarsh (foraging) along with mangroves and small areas of dry sand (roosting) (DCCEEW, 2024). Up to 0.33ha of foraging and/or roosting habitat would be affected; comprising 6% of habitat with the subject land. None of these listed migratory species breed in Australia, and as such the development footprint will not be substantially modifying breeding habitat for any of these species. Whilst there is a minimal amount of native vegetation removal that could potentially be used as roosting or foraging habitat for the species, the removal of native vegetation from these areas is minimal in the context of the habitat in the locality. The vegetation in these areas has been highly disturbed from the initial development of the Merimbula boardwalk in the past. The removal of this native vegetation will not result in the fragmentation of existing native vegetation patches, nor will it isolate any areas of important habitat for any of the species listed. Fire and nutrient cycles will not be altered within the development footprint. Considering that this species is highly mobile and has a wide distribution range, the removal of up to 0.24ha of potential habitat for Eastern Curlew and 0.33ha of Curlew Sandpiper is minor in the context of the locality and unlikely to substantially modify, destroy or isolate an area of important habitat.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
The conservation advice for both these species (DCCEEW, 2023 and DCCEEW 2023a) lists invasion of cordgrass and mangroves into mudflat areas as threats, as the changes in foraging habitat availability may drive species away from feeding sites. There are mangroves within the area of the development footprint, however it is unlikely the proposed development will contribute to the spread mangroves into mudflats. It is noted in the conservation advice that the factors that contribute to the spread of mangroves and cordgrass are: • Changing patterns in precipitation. • Altered tidal regime or sea level. • Catchment modifications leading to altered sedimentation and nutrient levels

- Land subsidence

With the extent of habitat removal being minor and not impacting on any of these factors, the likelihood of mangroves spreading into foraging habitat is low.

Though not specific to Eastern Curlew and Curlew , domestic animals (e.g. cats) are known to impact shorebirds (Dowding & Murphy, 2001). Domestic animals already access the site due to adjacent residential areas and the 'dog friendly' walking path. The proposal would not exacerbate this.
With these factors being considered, it is unlikely that the proposed development will introduce any new invasive species that are harmful to the species or increase the populations of already present invasive species within the subject land.

Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Within the Significant impact guidelines (Department of the Environment, 2013) it states that an ecologically significant proportion changes based on the species but should consider the following factors:

- Species population status
- Genetic distinctiveness
- Species specific behavioural patterns

As the development will remove a small amount of native vegetation, this may reduce availability of roosting or foraging habitat. However, the amount of vegetation to be removed is minimal and is unlikely to impact an ecologically significant proportion of any population within the area.

Appendix D Field Data

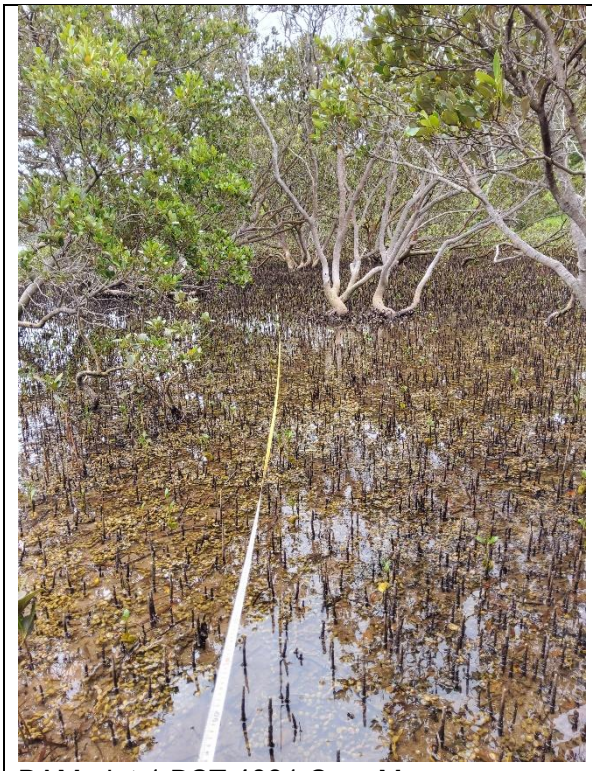
D.1 BAM plot data

Table 13-4 Vegetation survey data and locations

plot	pct	area	patchsize	condition class	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic	Plot-based vegetation survey?	Vegetation integrity survey?
1	4091	0.13ha	30	high	56	757714	5912980	324	1.0	1.0	0.0	0.0	0.0	0.0	50.0	0.1	0.0	0.0	0.0	0.0	0	0	70.0	0.0	1	1	0	0	0	1	0.0	Yes	Yes
2	4091	0.13ha	30	high	56	757755	5913306	92	1.0	3.0	2.0	1.0	0.0	0.0	60.0	10.4	1.1	1.0	0.0	0.0	0	0	47.6	0.0	1	1	0	0	0	1	0.0	Yes	Yes
3	4102	0ha	30	moderate	56	758285	5912750	87	1.0	2.0	1.0	1.0	0.0	0.0	2.0	7.1	70.0	0.5	0.0	0.0	0	0	3.0	16.0	1	1	0	0	0	1	0.0	Yes	Yes
4	3108	0.06ha	30	moderate	56	758376	5912659	46	2.0	15.0	4.0	6.0	0.0	4.0	10.2	49.4	0.5	0.8	0.0	0.5	1	1	66.6	100.0	1	1	1	1	0	1	31.6	Yes	Yes
5	4056	0.02ha	30	moderate	56	758761	5912831	234	2.0	4.0	5.0	2.0	0.0	1.0	2.2	52.3	21.5	0.2	0.0	2.0	0	0	13.8	64.0	0	1	1	1	0	0	0.2	Yes	Yes
6	4097	0.08ha	30	high	56	757754	5913302	260	1.0	2.0	1.0	1.0	0.0	0.0	5.0	15.1	30.0	2.0	0.0	0.0	0	0	8.8	8.0	1	0	0	0	0	1	0.0	Yes	Yes
7	4054	0.04ha	30	moderate	56	757820	5912904	88	1.0	5.0	9.0	8.0	0.0	1.0	0.2	25.3	6.2	0.9	0.0	0.2	0	0	43.0	93.0	0	0	1	0	0	0	0.8	Yes	Yes
8	3639	0.06ha	30	moderate	55	757716	5913117	45	5.0	9.0	9.0	1.0	0.0	4.0	16.7	70.1	7.1	0.1	0.0	0.4	0	0	80.4	153.0	0	1	1	1	1	1	0.2	Yes	Yes

D.2 BAM plot photos

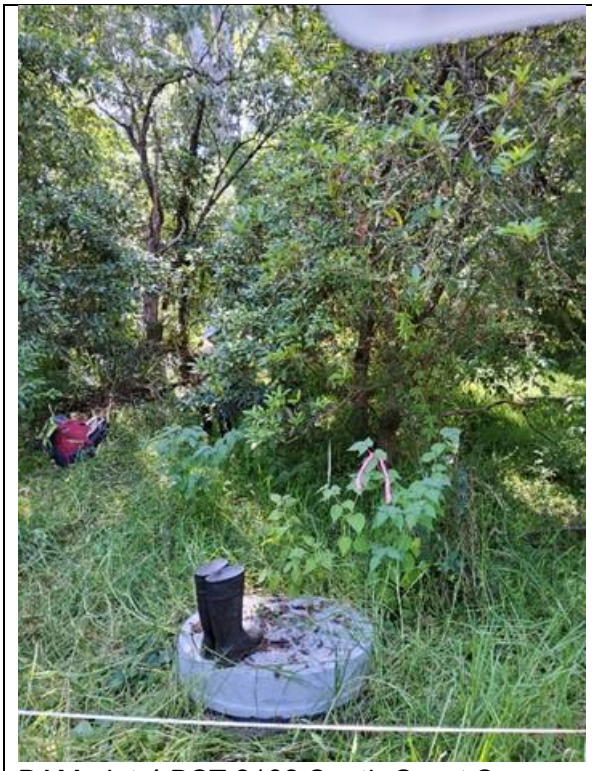
Photos follow overleaf.



BAM plot 1 PCT 4091 Grey Mangrove – River Mangrove Forest

BAM plot 2 PCT 4091 Grey Mangrove – River Mangrove Forest

BAM plot 3 PCT 4102 South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh

 BAM plot 4 PCT 3108 South Coast Scarp Wet Vine Forest	
 BAM plot 5 PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub	No litter plot from BAM plot 5 available

BAM plot 6 PC 4097 Samphire Saltmarsh

BAM plot 7 PCT 4054 South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

BAM plot 8 PCT 3639 South Coast Sands Bangalay Littoral Forest

D.3 PCT justification

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
1 Not TEC. Classified as Marine Veg under FM Act.	Saline Wetland *Tidal shoreline with silt + Sand*	1 *Avicennia marina subsp. marina* (50% Cover)	*Aegiceras corniculatum* (0.1% Cover)	None	4091 4140 4097(weak) 4090(weak)	Not needed due to strong correlation using step 1(A)	4091 4096 4097 4103	Step 1A resulted in 2 strong matches using the centroid match function being PCT 4091 & 4140. Weaker PCTs 4097 and 4090 were ruled out. Step 1B was not undertaken. PCT 4091 was chosen because *A.marina* was most dominant with occasional *A. coniculatum* and there were some reference sites near by. In applying step 2, PCT 4096 must contain *Zoysia macrantha* of which there was none. PCT

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								4097 must contain samphire and there was none inside this plot (step 2). 4103 must contain *Sporobolus virginicus* of which there was none inside the plot (step 2).
2 Not TEC. Classified as Marine Veg under FM Act.	Saline Wetland *Tidal shoreline with silt + Sand*	1 *Avicennia marina* subsp. *marina* (60% cover)	1 *Sarcocornia quinqueflora* (10% Cover) 2 *Aegiceras corniculatum* (0.2% cover) 3 *Suaeda australis* (0.2% cover)	1 *Zoysia macrantha* (1% cover) 2 *Carpobrotus glaucescens* (1% cover) 3 *Austrostipa stipoides* (0.1% cover)	4091 4097 4140 4141	Not needed due to strong correlation using step 1(A)	4097 4096 4103 4091	Step 1A resulted in 4 strong matches using the centroid match function. Step 1B was not undertaken. PCT 4091 was chosen because of the dominance of *Avicennia marina* over the plot and strong correlation in Plot to PCT Tool PCT 4097 was not chosen

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								because of the sparse abundance of samphire (which should be dominant) inside the plot as well as other sparsely spaced saltmarsh related species (step 2). This plot had to be adjusted to fit inside the Mangrove community, which was a narrow fringe of trees fronting Lake Merimbula shoreline. The other species were found on the margin of the ecotone between Mangrove and saltmarsh further inland.
3 NSW & Cmlth Saltmarsh TEC. Marine	Saline Wetland *Edge of tidal shoreline with*	1 *Avicennia marina* subsp. *marina* (2% cover)	1 *Sarcocornia quinqueflora* (7% Cover) 2 *Melaleuca armillaris* subsp.	1*Juncus kraussii* supsp. *australiensis* (70% cover) 2 *Samolus*	4097 4026 4102	Not needed due to strong correlation using step 1(A)	4096 4102 4103	Step 1A resulted in 4 strong matches using the centroid match function. Step 1B was not undertaken.

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
Veg under FM Act.	*silt + Sand*		*armillaris* (0.1% cover)	*repens* (0.5% cover)	4141		4091 4097 4101	In applying step 2 PCT 4102 was chosen because of the dominance of *Juncus kraussii* across the site and presence of all other species that were recorded inside the BAM plot having a lesser presence with this PCT. It was closely compared to PCT 4097 (identified in the plot to PCT tool 1A) It was concluded that PCT 4102 is the best match due to the dominance of *Juncus kraussii* (and not *Sarcocornia quinqueflora*) across the site. PCT 4102 also cross matches spatial distribution, landscape characters described for this

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								PCT.
4 Not a BC or EPBC listed TEC.	Dry Sclerophyll Forest (Shrubby & Shrub-Grass) Peaty soils over metisediment bedrock	1 *E bosistoana* (10% Cover) 2 *Notelaea longifolia* (0.2% Cover)	1 *Pittosporum undulatum* (45% Cover) 2 *Exocarpos cupressiformis* (2% Cover) 3 *Melictyus dentatus* (0.5% Cover)	1 *Oplismenus imbecillus* (0.2% Cover_ 2 *Dichrondra repens* (0.2% Cover) 3 *Geranium solanderi*	3108 3639(weak) 3639(weak) 3188(weak) 4113(weak)	Not needed due to strong correlation using step 1(A)	3638 3639 3453 3181	The Plot to PCT Tool derived one PCT with a strong floristic/centroid match being PCT 3108 (step 1A). Other PCTs had weak associations and were therefore ruled out. If applying Step 2, PCTs 3639 & 3638 did not match floristically well to what was onsite and did not contain *E bosistoana* as the dominant canopy species so were therefore ruled out. PCT 3453 contained *E bosistoana*, however the soils appeared not be granite or basalt. PCT 3181 was also investigated as it relates to

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								PCT 3453 and is found on more sheltered lower slopes which correlated with Plot 4. *E bosistoana* is present in this PCT as well as a mix of other native shrubs found within this plot. PCT 3181 is also found locally within the SVT mapping (step 3) and was considered the best matching PCT. When considering steps 1A & 3, PCT 3108 was chosen due to centroid match within threshold.
5 Potential to classify as BC Act listed Swamp Oak Floodplain	Forested Wetlands & Saline Wetlands	1 *E.botryoides* (2% cover) 2 *Acmena smithii* (0.2% cover)	1 *Melaleuca armillaris* subsp. *armillaris* (50% cover) 2 *Synoum glandulosum* (2%	1 *Carex appressa* (7% Cover) 2 *Gahnia sieberiana* (6%	4102(weak) 4092(weak) 3792(weak) 4010(weak)	4056 (50%) 4102 P(50%) 3038 (50%) 3039 (50%)	4061 4028 4056 **4102**	The Plot to PCT Tool 1A derived weak correlations using the centroid function. Therefore Characteristic Sp Method (1B) was used.

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
Forest due to landscape and dominance of Melaleuca and semi-saline conditions. I think the BAM plot is an ecotone between this TEC and what would turn into a dry Scl Forest.	Waterlogged deep mud		cover) 3 Goodenia ovata (0.2% cover)	Cover) 3 Machaerina juncea (5% cover)				PCTs 4102 is a "Placeholder PCT' and was therefore ruled out (likely data errors). Step 2 methodology was then applied to attempt some clarity with PCT identification. Entry of the key species found inside the BAM Plot resulted in 4056 also being identified as a potential. Because of a 'plausable' floristic correlation in Plot to PCT, PCT 4056 was chosen. PCT 4056 also contains some other species found in the BAM

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								plot being *Gahnia sieberiana* & *Machaerina juncea*.
6 NSW & Cmlth Saltmarsh TEC. Marine Veg under FM Act.	Saline Wetland Edge of tidal shoreline with silt + Sand	1 *Avicennia marina* subsp. *marina* (5% cover)	1 *Sarcocornia quinqueflora* (15% Cover) 2Suada australis (0.1% cover)	1 *Juncus kraussii* subsp. *australiensis* (30% cover) 2Samolus repens (2% cover)	4097 4026 4141 4103	Not needed due to strong correlation using step 1(A)	4096 4102 4103 4091 **4097** 4101	Plot to PCT tool 1A resulted in 4 strong matches using the centroid match function. Environmental thresholds were also good for 4097. Step 1B was not applied. In applying Step 2, PCT 4103 seemed a good match because of the dominance of *Juncus kraussii* across the site and presence of all other species that were recorded inside the BAM plot having a lesser presence with this PCT. It was closely compared to PCT 4097 (identified in Plot to PCT Tool)

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								and it was decided that PCT 4097 should be used due to strong centroid match.
7 Not Littoral RF TEC due to lack of representative sp which should be found in this TEC. Not Bangalay Sand Forest TEC due to lack of representative sp which should be	Dry Sclerophyll Forest Dry sandy peat soils	1 *E botryoides* (0.2% Cover)	1 *M armillaris* (15% Cover) 2 *Alyxia buxifolia* (10% cover) 3 *Rhagodia candlleana* (0.1% Cover)	1 *Cynodon dactylon* (5% Cover) 2 *Poa labillardierei* (0.3% cover) 3 *Lobelia anceps* (0.2% cover)	4054(weak) 3640(weak) 3792(weak) 4117(weak)	3966 (100%) 3416 (67%) 4117 (62%) 3792 (50%)	3638 3639	Step 1A, Plot to PCT Tool centroid match revealed no strong PCT matches. Step 1B was applied revealing PCT 3966 with a very strong floristic match (100%). PCT 3966 was initially chosen. However, PCT 3966 is not found within the IBRA bioregion and subregion of site. Therefore, has been excluded. PCT 4054 has a weak floristic match but a strong environmental match. VIS description states: “This near-placeholder PCT is

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
found in this TEC.								currently represented by only six plots, and caution is required in the evaluation and assignment of new plots to this PCT" PCT 3792 matches description other then being found on "coastal headlands and sea cliffs" Application of step 2 revealed PCTs 3638 & 3639. PCT 3638 was not a strong floristic match as BAM plot 7 did not contain any *M armillaris* or *Pteridium esculentum*, which should occur in this PCT. PCT 3639 did contain *M armillaris* and *E botryoides* and was a stronger match using this method. The plot was assigned to PCT 3639

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
8 Not Bangalay Sand Forest TEC due to lack of representative sp which should be found in this TEC. Soils not aeolian where plot conducted.	Dry Sclerophyll Forest (Shrubby)	1 *E botryoides* (15% Cover) 2 *E longifolia* (1% Cover) 3 *Notelaea longifolia* (0.5% Cover)	1 *Pittosporum undulatum* (60% Cover) 2 *Rhagodia candolleana* (8% Cover) 3 *Exocarpos cupressiformis* (0.5% Cover)	1 *Gahnia aspera* (5% cover) 2 *Lepidosperma laterale* (0.5% Cover) 3 *Lomandra longifolia* (0.5% Cover)	3639(weak) 3260(weak) 3640(weak) 3445(weak)	3867 (65%) Placeholder PCT 3260 (54%) Distribution Sydney 3038 (50%) Distribution Sydney 3453 (50%) Distribution South Coast	3638 3639	Step 1A - Plot to PCT tool had all weak centroid scores. PCT 3639 was in the list. Step 1B - Characteristic species method results. This method resulted in one valid PCT being PCT 3453 (located on South Coast) with a plausible floristic match. Step 2 - Two PCTs shortlisted. PCT 3639 had moderate floristic match but there was no *E longifolia* inside this PCT. It was not mapped in the SVT mapping near the site (step 3). PCT 3638 is associated with the SVT Mapping in the local area but had weak floristic

BAM PLOT & TEC status	Vegetation Formation	3 Key upper stratum sp.	3 key mid stratum sp	3 key lower stratum sp	Step 1(A) Plot to PCT Tool Centroid + Env thresholds Best match (within accepted threshold)	Step 1 (B) Plot to PCT Tool Characteristic Sp Method P = Place holder PCT Best match (within accepted threshold)	Step 2 VCT analysis & best matching PCT	Discussion & best matching PCT
								match. Therefore PCT 3639 as a best match.

D.4 Amphibian survey

Table 13-5 Amphibian survey results

Transect number	Result (amphibian species recorded)	Count of Result (amphibian species recorded)
1	*Limnodynastes peronii* (Striped Marsh Frog)	9
2	*Crinia signifera* (Common Eastern Froglet)	12
	Limnodynastes peronii (Striped Marsh Frog)	12
3	*Crinia signifera* (Common Eastern Froglet)	5
	Limnodynastes peronii (Striped Marsh Frog)	9
	Litoria ewingii (Ewing's Tree Frog)	2
	Uperoleia laevigata (Smooth Toadlet)	1
4	*Crinia signifera* (Common Eastern Froglet)	4
	Limnodynastes peronii (Striped Marsh Frog)	9
	Pseudophryne bibronii (Bibron's toadlet)	1
5	*Crinia signifera* (Common Eastern Froglet)	4
	Limnodynastes peronii (Striped Marsh Frog)	11
	Litoria ewingii (Ewing's Tree Frog)	6
	Uperoleia laevigata (Smooth Toadlet)	1
Grand Total		**86**

D.5 Bird survey details

Table 13-6 Bush-stone Curlew Call-playback results

Species	Location	Date & Time	Result
Bush-stone Curlew	Survey site 1	17/03/24 07:50pm – 08:05pm	Nil records
Bush-stone Curlew	Survey site 2	18/03/24 07:50pm – 08:05pm	Nil records
Bush-stone Curlew	Survey site 4	19/03/24 07:50pm – 08:05pm	Nil records
Bush-stone Curlew	Survey site 3	20/03/24 07:50pm – 08:05pm	Nil records

D.6 Hollow-bearing tree survey

Table 13-7 Hollow-bearing tree results (bold font indicates tree likely to be removed)

#	Species	Common Name	DBH (cm)	Small Hollow Trunk	Medium Hollow Trunk	Large Hollow Trunk	Small Hollow Limb	Medium Hollow Limb	Large Hollow Limb	Fissuring	Decorticating Bark	Fauna Present	Retained /removed	Stag
HBT 1		Mangrove	-	10-20cm										
HBT 2			-	0-5cm			0-5cm							
HBT 3		Mangrove	40	6-10cm								Chewing signs		
HBT 4		**Melaleuca**	**20**	**6-10cm**									**Removed**	**stag**
HBT 5		**Melaleuca**	**90**	**6-10cm**								**Microbats**	**Removed**	**stag**
HBT 6	*Eucalyptus pilularis*	Blackbutt	-				6-10cm							stag
HBT 7	*Eucalyptus bosistoana*	Coast Grey Box	70		11-20cm									
HBT 8			65					2 X 11-20cm	21-40cm					
HBT 9			80					11-20cm						
HBT 10			60	6-10cm										
HBT 11		Melaleuca	60						21-40cm within 2m of ground.					stag
HBT 12			**50**					**11-20cm**					**Removed**	**stag**
HBT 13			50					11-20cm						stag
HBT 14			50					11-20cm						stag
HBT 15	*Eucalyptus bosistoana*	Coast Grey Box	110	5 X 6-10cm				2 X 11-20cm						
HBT 16			70	8 X 6-10cm										
HBT 17			90	8 X 6-10cm										

D.7 Opportunistic fauna species

Table 13-8 Opportunistic fauna results

Common Name	Scientific name	BC Act Status	EPBC Act Status
Mammals			
Water Rat	*Hydromys chrysogaster*	P	
Long-nosed Bandicoot	*Perameles nasuta*	P	
Sugar Glider	*Petaurus breviceps*	P	
Common Ringtail Possum	*Pseudocheirus peregrinus*	P	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V
Common Brushtail Possum	*Trichosurus vulpecula*	P	
Swamp Wallaby	*Wallabia bicolor*	P	
Microbats (species unknown)			
Reptiles			
Eastern three-lined skink	*Acritoscincus duperreyi*	P	
Common Garden Skink	*Lampropholis guichenoti*	P	
Red-bellied Black Snake	Pseudechis porphyriacus	P	
Birds			
Thornbill sp.	*Acanthiza* sp.	P	
Eastern Spinebill	*Acanthorhynchus tenuirostris*	P	
King Parrot	*Alisterus scapularis*	P	
Pacific Black Duck	*Anas superciliosa*	P	
Red Watlebird	*Anthochaera carunculata*	P	
Little Wattlebird	*Anthochaera chrysoptera*	P	
Sulphur-crested Cockatoo	*Cacatua galerita*	P	
Little Corella	*Cacatua sanguinea*	P	
Silver Gull	*Chroicocephalus*	P	

Common Name	Scientific name	BC Act Status	EPBC Act Status
	novaehollandiae		
Swamp Harrier	*Circus approximans*	P	
Grey Shrike-thrush	*Colluricincla harmonica*	P	
Black Swan	*Cygnus atratus*	P	
Galah	*Eolophus roseicapilla*	P	
Peregrine Falcon	*Falco peregrinus*	P	
Eurasian Coot	*Fulica atra*	P	
Australian Pied Oystercatcher	*Haematopus longirostris*	E	
Welcome Swallow	*Hirundo neoxena*	P	
Superb Fairywren	*Malurus cyaneus*	P	
Bell Miner	*Manorina melanophrys*	P	
Little Pied Cormorant	*Microcarbo melanoleucos*	P	
Red-browed Finch	*Neochmia temporalis*	P	
Southern Boobook	*Ninox novaeseelandiae*	P	
Eastern Curlew	*Numenius madagascariensis*		CE, M
Golden Whistler	*Pachycephala pectoralis*	P	
Australian Pelican	*Pelecanus conspicillatus*	P	
Crimson Rosella	*Platycercus elegans*	P	
Eastern Whipbird	*Psophodes olivaceus*	P	
Grey Fantail	*Rhipidura albiscapa*	P	
Sacred Kingfisher	*Todiramphus sanctus*	P	
Common Blackbird	*Turdus merula*	P	
Yellow-tailed Black Cockatoo	*Zanda funerea*	P	
Silvereye	*Zosterops lateralis*	P	

M = Migratory, P = Protected, V = Vulnerable, E = Endangered, CE = Critically Endangered

D.8 Microbat survey results report

Report follows overleaf.

Merimbula boardwalk - Microbat Ultrasonic Call Identification Report

NGH Consulting Pty Ltd

A report prepared for Jared Graham-Higgs

Prepared by RA Environmental Consultants

ABN – 63 6685 875 27

Merimbula boardwalk - Microbat Ultrasonic Call Identification Report

NGH Consulting Pty Ltd

A report prepared for Jared Graham-Higgs

Project aim

This microbat ultrasonic call detection survey and call identification report was prepared to determine:

- Which non-threatened, and threatened microbat species listed as threatened under the New South Wales (NSW) *Biodiversity Conservation Act (2016)* (BC Act) and the *Commonwealth's Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act) are present or potentially present at or near to the Merimbula Boardwalk (hereafter, the study area).
- Which microbat species listed as species credit species under the Biodiversity Assessment Methodology (BAM) (Department of Planning, Industry and Environment (DPIE) 2020; DPIE 2021) are present or potentially present in the study area.
- The presence of the following target species credit species:
    - *Myotis macropus* (Southern Myotis) (species credit species)

The results of this assessment will inform the biodiversity credit calculations that are to be developed in a Biodiversity Development Assessment Report (BDAR).

Methods

Study area and survey effort.

The study area is located approximately 370 km to the south of Sydney. The data received for analysis was collected between 17 and 24 March 2024 on two passively deployed Anabat Express detectors (Titley Scientific).

Each Anabat Express detector was set to record ultrasonic call data throughout the night (e.g., recording commenced at dusk and concluded at dawn). A total of 16 survey nights were achieved during this survey period (Table 1). Table 1 summarizes the detectors used to conduct the survey, the dates surveyed, the overall survey effort, and the number of zero-crossing files submitted for analysis.

Preparation of a candidate species list

Before analysing the data, a candidate list of microbat species known to or deemed likely to occur in the region (in this instance, region acquaints to a 20 km radius of the approximate centre of the subject site) was prepared by completing a search and a review of the Australian Bat Society 'Bat Maps' (BatMap - Ausbats), NSW Bionet database search tool, Atlas of Living Australia (Atlas of Living Australia – Open access to Australia's biodiversity data (ala.org.au)), Churchill (2008), Pennay *et al.* (2011) and Van Dyck and Strahan (2008). The study area is in the Monaro region, and therefore within the Southern biogeographical region of NSW, as described in Pennay (*et al.* 2004).

This search and review identified 18 microbat species that are known to or are likely to occur in the region (Appendix 1 and Appendix 2). According to this search and review, no microbat species listed under the Commonwealth's *Environment Protection and Conservation Act 1999* (EPBC Act) are likely wihtin the study area (Appendix 1 and Appendix 2). To acknowledge that the

characteristic frequency (Fc) of some microbat species can differ across the biogeographic regions (as identified by Penney (*et al.* 2004)), the regional (e.g., the Southern bioregion) Fc for each candidate species is shown in Appendix 1.

Table 1. Survey sites, Anabat Express detectors used, dates surveyed, survey effort, and the number of files submitted for analysis.

Survey Site	Detector Type	Detector name and reference number	Nights surveyed	Survey nights	Files submitted for analysis
5371	Anabat Express	SN440504	17, 18, 19, 20, 21, 22, 23 and 24 March 2024	8	19,439
5372	Anabat Express	Not provided	17, 18, 19, 20, 21, 22, 23 and 24 March 2024	8	11,780
				16	31,219

Data analysis

There were 31, 219 zero-crossing files submitted for analysis (Table 1). To exclude the non-microbat noise files from the analysis, each file was subject to a generic noise (non-bat call) removal filter provided by the software program Anabat Insight (Version 2.1.1-0-g2f61ed1) (Titley Scientific). During this process, 26, 874 noise-only files were excluded from further analysis. The 4,345 files passed by the noise filter were then subject to a Decision Tree (DT) analysis to:

- Sort the microbat call sequences into groups based upon 5 to 10 kHz increments of the average characteristic frequency (Fc).
- Attach a label to each call profile that best represents a species or a species complex that could be responsible for the call.

Following this process, the sorted and labelled microbat call profiles were then manually reviewed in Anabat Insight by Rod Armistead. Species and species complex identifications were made by

comparing the Fc and pulse characteristics of each call profile to the published call parameters presented in:

- The *Region based guide to the echolocation calls of microbats in New South Wales* (Pennay *et al.* 2004) (Bat Calls of New South Wales (PDF - 1.4MB) (nsw.gov.au) and an accompanying reference library of microbat call profiles that were collected from the Southern NSW bioregion (http://www.forest.nsw.gov.au/research/bats/default.asp).
- The *Key to the bat calls of south-east Queensland and north-east New South Wales* (Reinhold *et al.* 2001) (1) (PDF) Key to the bat calls of south-east Queensland and north-east New South Wales (researchgate.net).

While reviewing the microbat calls, the following protocols (adapted from Lloyd *et al.* 2006) were applied:

- Call sequences containing less than three pulses were excluded from the analysis as they can often be too short to confidently determine the identity of the species responsible for the call (Law *et al.* 1999). These short sequences were removed from the data during the DT analysis or as the data was reviewed.
- For those call sequences that can be used to identify a microbat species (or a species complex), two categories of confidence were used (Mills *et al.* 1996):
    - Present – the Fc, quality, and structure of the call profile features (e.g., pulse characteristics) (as per Pennay *et al.* 2004) are such that the identity of the microbat species making the call can be resolved with a relatively high degree of confidence.
    - Potentially present – the quality and structure of the call profile are such that there is some uncertainty about the identity of the species making the call, or there is some likelihood of confusion with another species that produces a similar or overlapping

call profile. Therefore, making it impossible to resolve or attribute that call profile to a single microbat species.

- Unusual call sequences (e.g., possible social calls, intra and inter-species interaction (e.g., social) calls, excited calls, or feeding buzzes) that cannot be used to identify a microbat species were labeled as being of 'low' quality or dismissed from the analysis.
- Sequences that cannot be attributed to an echolocating microbat (e.g. insect buzzes, wind, train, and vehicle movements), were dismissed from the analysis.

Results and Discussion

Summary

Six microbat species were identified as being present in the study area (Table 2 and Table 3, and Table 4). A further eleven species were determined to be potentially present in the study area (Table 2, Table 3, and Table 4). The recorded activity levels (based on the number of call sequences, or microbat passes) are shown in Table 4. Examples of the recorded microbat species and species complex call sequences are shown in Figure 1 to Figure 12.

Threatened species information.

Six microbat species that are also listed as Vulnerable under the BC Act were determined to be potentially present in the study area (Table 2, Table 3, and Table 4). The threatened species deemed to be potentially present comprised of the following:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Myotis macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat)

- *Scoteanax rueppellii* (Greater Broad-nosed Bat)

No microbat species listed under the EPBC Act were identified as being present or potentially present within the study area.

Species credit species

Six threatened species were recorded as being potentially present during the current survey. Under the Biodiversity Assessment Method (Department of Planning, Industry and Environment (DPIE) 2020) and DPIE (2021)), five of the threatened microbats detected during this survey have been allocated ecosystem credit species status. The five ecosystem credit species consist of the following:

- Eastern False Pipistrelle
- Eastern Coastal Free-tailed Bat
- Large Bent-winged Bat
- Yellow-bellied Sheath-tailed Bat
- Greater Broad-nosed Bat

The remaining threatened microbat species, and the target species, the Southern Myotis has been allocated to species credit species status under the BAM (DPIE 2020) and DPIE (2021).

Table 2. The microbat species recorded as being present or potentially present within the study area.

Species name	Common name	Conservation status		Present / potentially present
		BC Act 2016	EPBC Act 1999	
Austronomus australis	White-striped Free-tailed Bat	-	-	Present
Chalinolobus gouldii	Gould's Wattled Bat	-	-	Present
Chalinolobus morio	Chocolate Wattled Bat	-	-	Present
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	-	Potentially present
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	-	Potentially present
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	-	Potentially present
Myotis macropus	Southern Myotis	Vulnerable	-	Potentially present
Nyctophilus geoffroyi	Lesser Long-eared Bat	-	-	Potentially present
Nyctophilus gouldi	Gould’s Long-eared Bat	-	-	Potentially present
Ozimops ridei	Ride's Free-tailed Bat	-	-	Present
Rhinolophus megaphyllus	Eastern Horseshoe Bat	-	-	Present
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat	Vulnerable	-	Potentially present
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	-	Potentially present
Scotorepens orion	Eastern Broad-nosed Bat	-	-	Potentially present
Vespadelus darlingtoni	Large Forest Bat	-	-	Potentially Present
Vespadelus regulus	Southern Forest Bat	-	-	Potentially present

Species name	Common name	Conservation status		Present / potentially present
		BC Act 2016	EPBC Act 1999	
Vespadelus vulturnus	Little Forest Bat	-	-	Present

Table 3. The microbat species recorded as being present or potentially present on each detector.

Species name	Common name	Present / Potentially present	
		Detector reference number	
		5371	5372
Austronomus australis	White-striped Free-tailed Bat	Potentially present	Present
Chalinolobus gouldii	Gould's Wattled Bat	Potentially present	Present
Chalinolobus morio	Chocolate Wattled Bat	Present	Potentially present
*Falsistrellus tasmaniensis**	Eastern False Pipistrelle	-	Potentially present
*Micronomus norfolkensis**	Eastern Coastal Free-tailed Bat	-	Potentially present
*Miniopterus orianae oceanensis**	Large Bent-winged Bat	Potentially present	Potentially present
*Myotis macropus**	Southern Myotis	Potentially present	Potentially present
Nyctophilus geoffroyi	Lesser Long-eared Bat	Potentially present	Potentially present
Nyctophilus gouldi	Gould’s Long-eared Bat**s**	Potentially present	Potentially present
Ozimops ridei	Ride's Free-tailed Bat	Potentially present	Present
Rhinolophus megaphyllus	Eastern Horseshoe Bat	Present	-
*Saccolaimus flaviventris**	Yellow-bellied Sheath-tailed Bat	Potentially present	-

Species name	Common name	Present / Potentially present Detector reference number 5371	 5372
*Scoteanax rueppellii**	Greater Broad-nosed Bat	-	Potentially present
Scotorepens orion	Eastern Broad-nosed Bat	-	Potentially present
Vespadelus darlingtoni	Large Forest Bat	Potentially present	Potentially present
Vespadelus regulus	Southern Forest Bat	Potentially present	Potentially present
Vespadelus vulturnus	Little Forest Bat	Potentially present	Present

*Represents those species listed as Vulnerable under the BC Act

Table 4. The microbat activity recorded at each survey site. The total number of calls identified to species level with a high degree of certainty are shown in brackets.

Species name	Common name	Detector reference number 5371	 5372
Species only			
Austronomus australis	White-striped Free-tailed Bat	10 (0)	3 (1)
Chalinolobus gouldii	Gould's Wattled Bat	7 (0)	24 (3)
Chalinolobus morio	Chocolate Wattled Bat	21 (2)	2 (0)
*Micronomus norfolkensis**	Eastern Coastal Free-tailed Bat	0 (0)	1 (0)
Ozimops ridei	Ride's Free-tailed Bat	248 (0)	31 (20)
Rhinolophus megaphyllus	Eastern Horseshoe Bat	87 (87)	0 (0)
*Saccolaimus flaviventris**	Yellow-bellied Sheath-tailed Bat	22 (0)	0 (0)
Vespadelus vulturnus	Little Forest Bat	0 (0)	19 (3)
Species complexes			
Chalinolobus gouldii or *Ozimops ridei*	Gould's Wattled Bat or Ride's Free-tailed Bat	1	8

Species name	Common name	Detector reference number	
		5371	5372
Chalinolobus morio or *Vespadelus vulturnus*	Chocolate Wattled Bat or Little Forest Bat	7	32
*Falsistrellus tasmaniensis**, *Scoteanax rueppellii** or *Scotorepens orion*	Eastern False Pipistrelle, Greater Broad-nosed Bat or Eastern Broad-nosed Bat	0	2
*Micronomus norfolkensis** or *Ozimops ridei*	Eastern Coastal Free-tailed Bat or Ride's Free-tailed Bat	0	4
*Miniopterus orianae oceanensis**, *Vespadelus darlingtoni* or *Vespadelus regulus*	Large Bent-winged Bat, Large Foret Bat, or Southern Forest Bat	88	1
*Myotis macropus**, *Nyctophilus geoffroyi* or *Nyctophilus gouldi*	Southern Myotis, Lesser or Gould's Long-eared Bats	5	4
Ozimops ridei or *Saccolaimus flaviventris**	Ride's Free-tailed Bat or Yellow-bellied Sheath-tailed Bat	49	0
Vespadelus darlingtoni or *Vespadelus regulus*	Large Forest Bat or Southern Forest Bat	131	47
Identifiable calls		676	178

*Represents those species listed as Vulnerable under the BC Act

Unresolved call profiles and survey limitations

A microbat species was deemed to be present when the recorded call characteristics matched those described in Pennay *et al.* (2004). In the Southern bioregion of NSW, several species can have overlapping call profiles (Pennay *et al.* 2004). These overlapping call sequences can have a similar Fc range and often identical pulse characteristics, thus making it difficult, or at times impossible to attribute (or resolve) a microbat call profile to a single species. If an overlap has been deemed to occur, that call profile will be considered 'unresolved' and given a multi-species complex label, and in some cases, those species in that complex will be then determined to be 'potentially present' only. The following are examples of those species recorded during this survey that can have overlapping call profiles.

- The call sequences of the non-threatened *Chalinolobus gouldii* (Gould's Wattled Bat) and *Ozimops ridei* (Ride's Free-tailed Bat) can overlap. See Figure 2 and Figure 8 for examples of the resolved call sequences for these two species.
- The call sequences of the *C. morio* (Chocolate Wattled Bat) and *Vespadelus vulturnus* (Little Forest Bat) can overlap. See Figure 3 and Figure 12 for examples of the resolved call sequences for these two species.
- The call sequences of the threatened Eastern False Pipistrelle and Greater Broad-nosed Bat can overlap with the call sequence of the non-threatened *Scotorepens orion* (Eastern Broad-nosed Bat). See Figure 4 for an example of an unresolved call sequence that was attributed to these three species.
- The call sequences of the threatened Eastern Coastal Free-tailed Bat and Ride's Free-tailed Bat can overlap. See Figure 5 and Figure 8 for examples of the unresolved and resolved call sequences for these two species.

- The call sequences of the threatened Large Bent-winged Bat can overlap with the call sequences produced by non-threatened *V. darlingtoni* (Large Forest Bat) and *V. regulus* (Southern Forest Bat). See Figure 6 and Figure 11 for examples of the unresolved call sequences for these two species.
- The call sequences of the threatened Southern Myotis can overlap with the call sequences of the non-threatened *Nyctophilus geoffroyi* (Lesser Long-eared Bat) and *N. gouldi* (Gould's Long-eared Bat). See Figure 7 for an example of an unresolved call sequence for these species.
- There were a number of unusual call sequences recorded during this survey. These unusual call sequences displayed flat pulses and an average Fc ranging between 23 and 25 kHz. These calls may represent a Yellow-bellied Sheth-tailed Bat that is calling at a slightly higher average Fc, or a Ride's Free-tailed Bat calling a lower-than-expected Fc, or a noise that is not related to a microbat. These call sequences were either assigned a low quality (unidentifiable) label, potential Ride's Free-tailed Bat, Yellow-bellied Sheath-tailed Bat label, or mixed species label that consisted of these two species. See Figure 10 for an example of one of these calls that was potentially attributed to Yellow-bellied Sheath-tailed Bat.

Unless otherwise specified, the microbat species listed above were regarded as being potentially present only. To confirm the presence (or absence) of these species (as well as those species deemed to potentially present due to poor-quality calls) within the study area, it would be necessary to undertake further survey effort. Under DPIE (2021), these surveys could involve:

- The use of mist or harp traps to conduct live capture and release surveys.

- The use of a thermal camera and hand-held call detectors to monitor forage and roost emergence activity.
- Searches of potential roost habitats, including natural caves, disused mines, bridge structures, stormwater drains or culverts, under exfoliating bark or hollow-bearing trees:
    - The presence of roosting microbats.
    - Evidence of roosting microbats in the form of urine staining, guano, fur, carcasses (dead microbats), and bat fly (Superfamily: Hippoboscoidea, Family Nycteribiidae and Streblidae) pupae casings.

Reporting and nomenclature

This microbat bat call identification report follows the recommended reporting requirements provided by the Australian Bat Society (Reardon 2003). Microbat species and common names follow Jackson and Groves (2015) and Armstrong *et al.* (2020). In this report, *Miniopterus orianae oceanensis* (Large Bent-winged Bat) is used, which follows a name change from *Miniopterus schreibersii* subsp. *oceanensis* (Eastern Bent-wing Bat) (New South Wales Office of Environment and Heritage (now the Department of Climate Change, Energy, the Environment and Water) (2019)).

Disclaimer

The statements and/or recommendations made in this report are made to inform a BDAR that NGH Consulting Pty Ltd is undertaking in relation to the Merimbula Boardwalk only. Rod Armistead Environmental Consultants will not be liable for any loss or damage that might arise from the use of this report by any third party. RA Environmental Consultants, if required, reserves the right to re-analysis, review, and/or discuss the how these species have been identified.

Examples of the resolved and unresolved microbat call profiles recorded during this survey. The call sequences shown below are displayed in the zero-crossing format. All profiles are time compressed (viewed with one millisecond between pulses), time per tick is set at F7 (25 milliseconds), and the smoothness is set at 5 (Titley Scientific 2023). The x-axis represents time in milliseconds, and the y-axis represents the average characteristic frequency. The call profile metrics, date and time, and the GPS coordinates that were recorded by the detector are also shown.

Figure 1. Call profile for *Austronomus australis* (White-striped Free-tailed Bat)

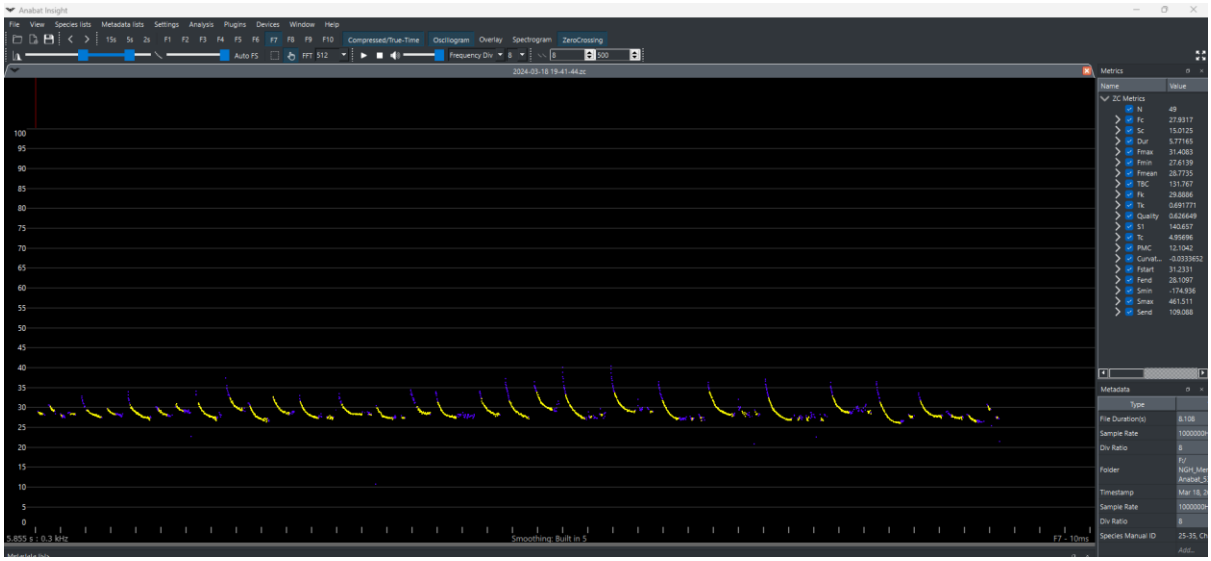


Figure 2. Call profile for *Chalinolobus gouldii* (Gould's Wattled Bat)

Figure 3. Call profile for *Chalinolobus morio* (Chocolate Wattled Bat)

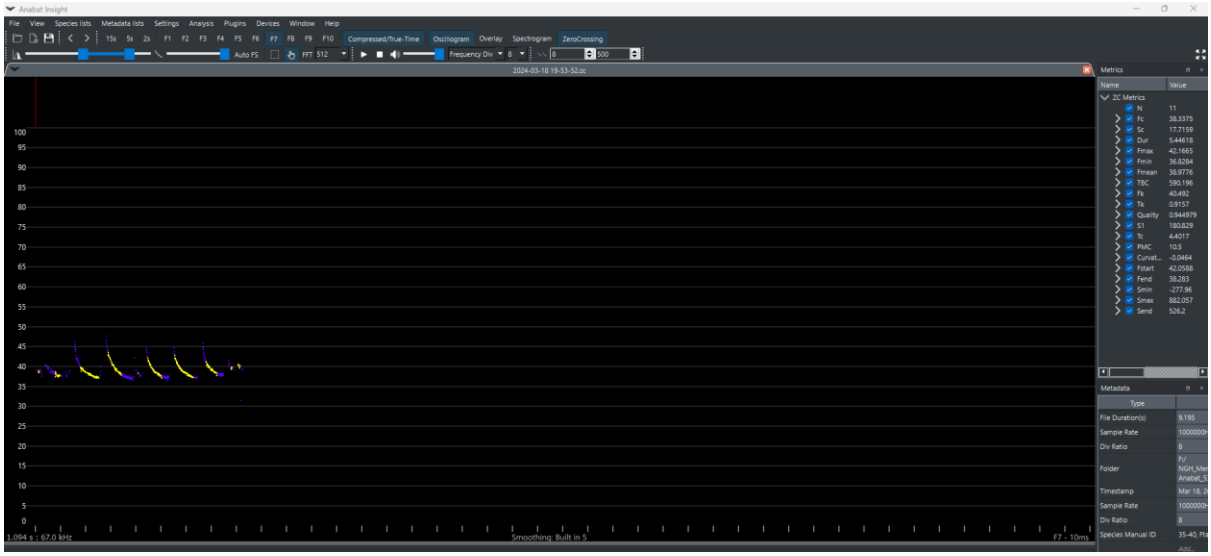


Figure 4. Potential call profile for *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), *Scotorepens orion* (Eastern Broad-nosed Bat), *Myotis macropus* (Southern Myotis), *Nyctophilus geoffroyi* (Lesser Long-eared Bat), or *Nyctophilus gouldi* (Gould's Long-eared Bat).

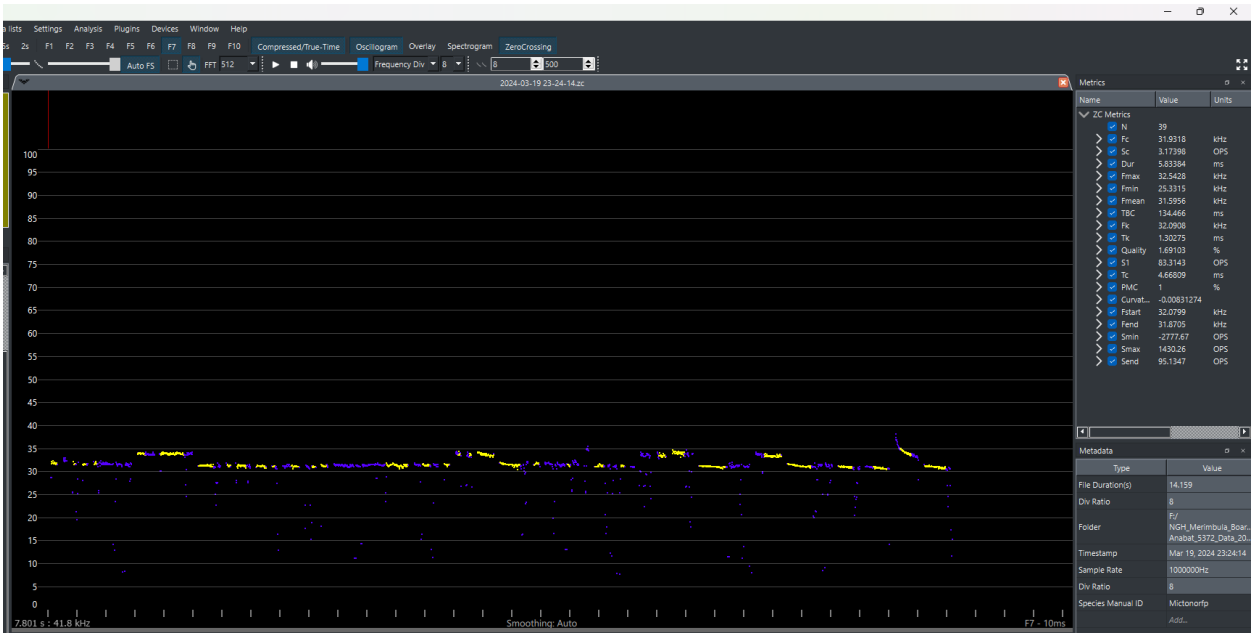


Figure 5. Potential call profile for *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)

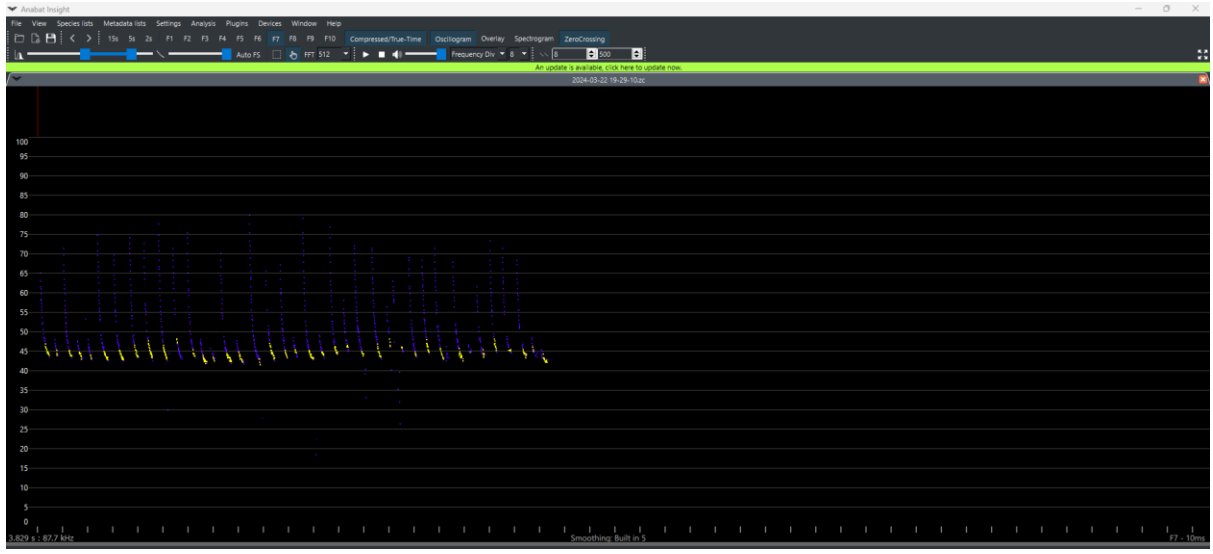


Figure 6. Potential call profile for *Miniopterus orianae oceanensis* (Large Bent-winged Bat), *Vespadelus regulus* (Southern Forest Bat), or *Vespadelus vulturnus* (Little Forest Bat).

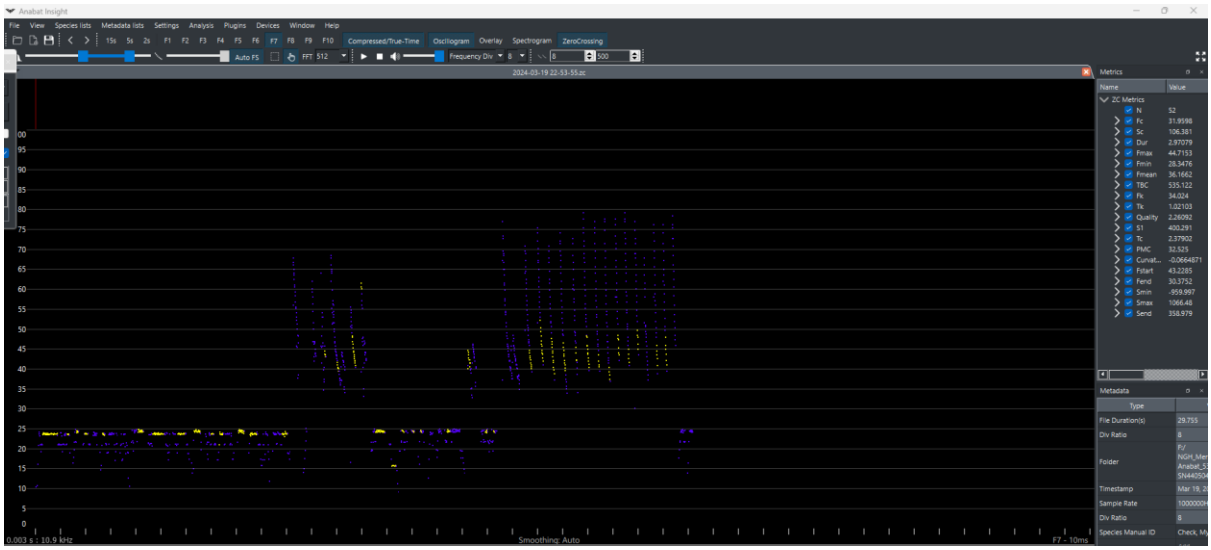


Figure 7. Potential call profile for *Myotis macropus* (Southern Myotis), *Nyctophilus geoffroyi* (Lesser Long-eared Bat), or *Nyctophilus gouldi* (Gould's Long-eared Bat).

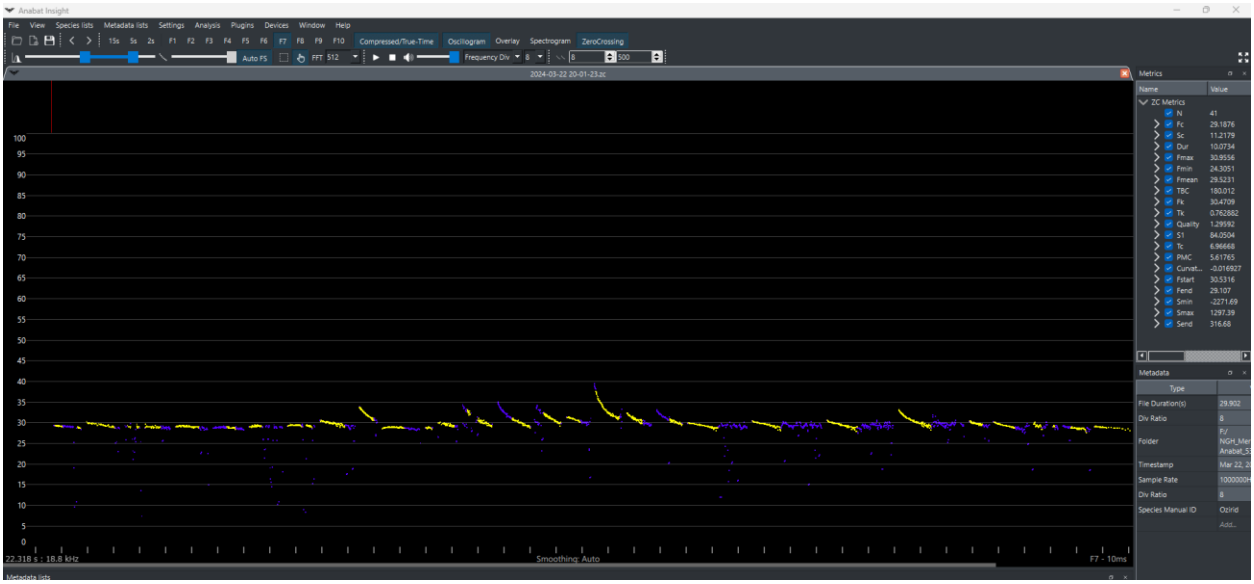


Figure 8. Call profile for *Ozimops ridei* (Ride's Free-tailed Bat).

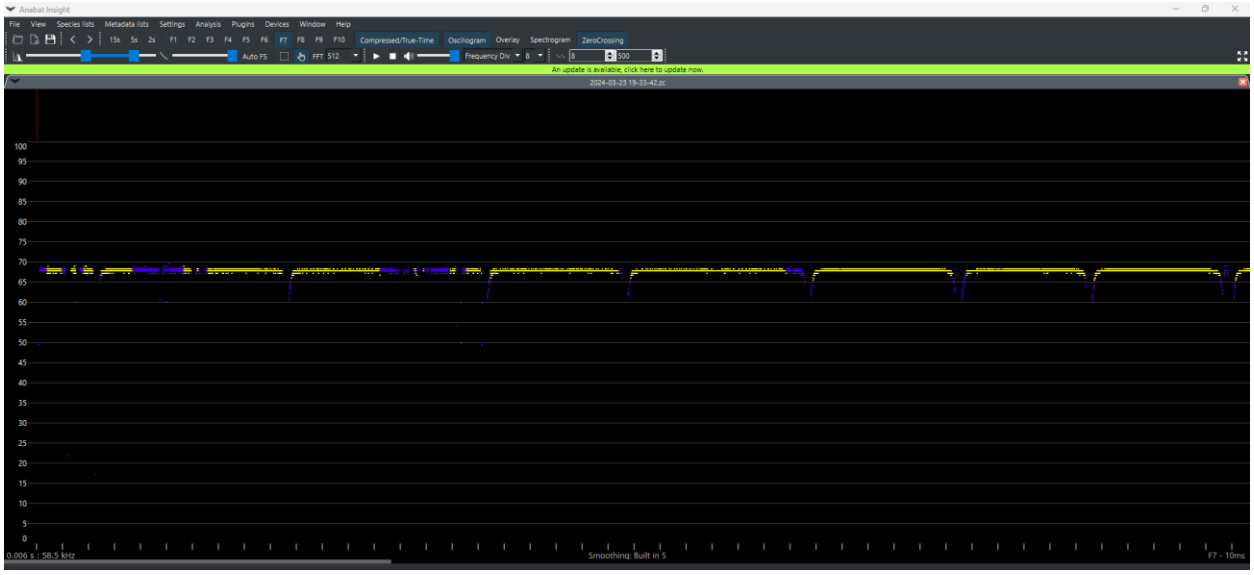


Figure 9. Call profile for *Rhinolophus megaphyllus* (Eastern Horseshoe Bat).

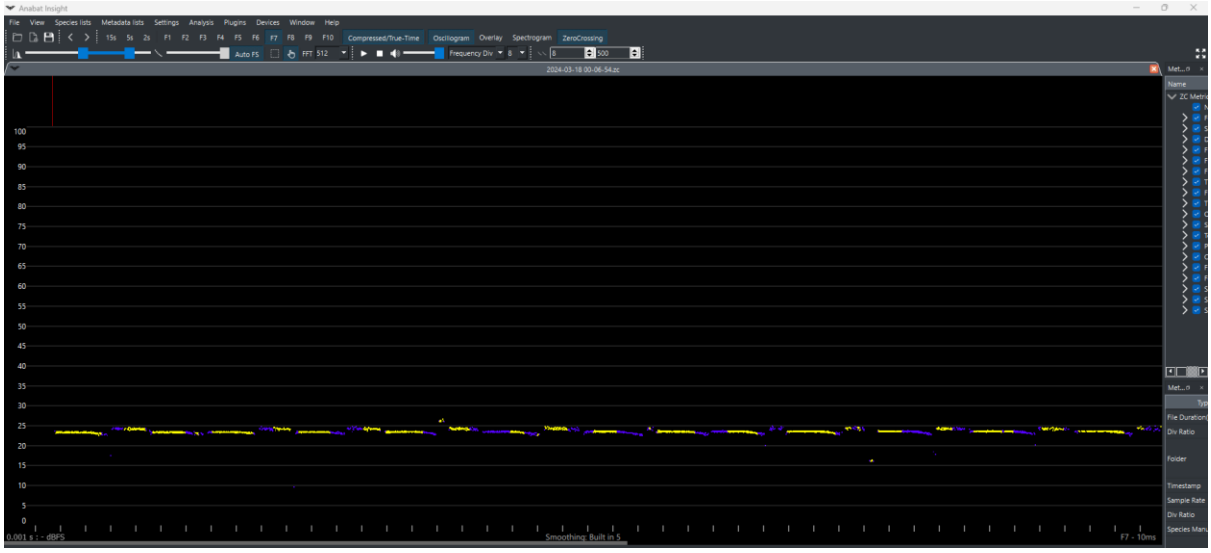


Figure 10. Potential Call profile for *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat).

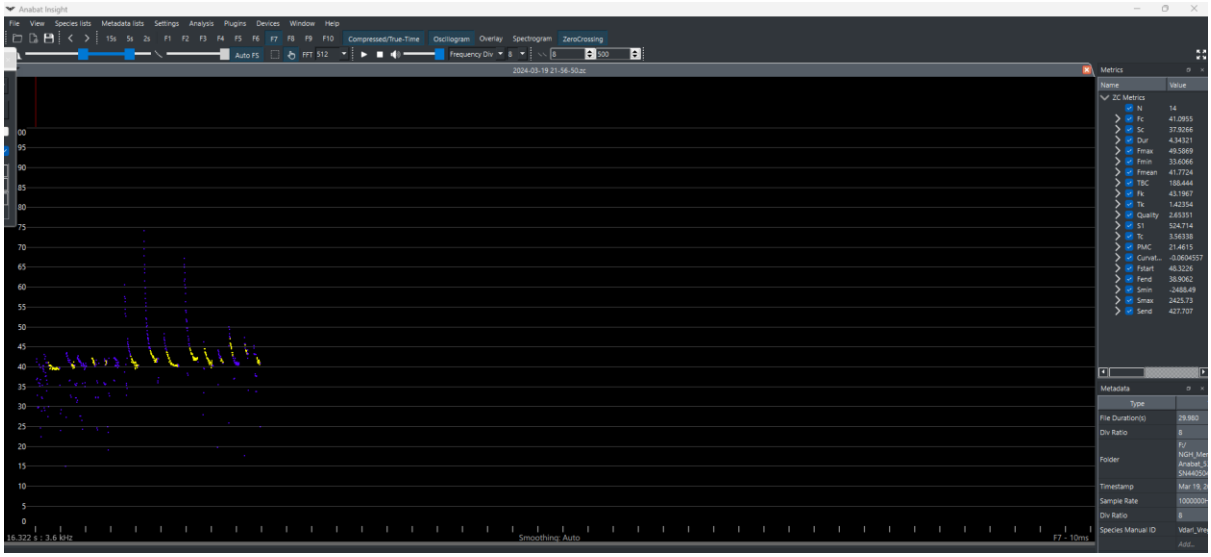


Figure 11. Potential Call profile for *Vespadelus darlingtoni* (Large Forest Bat) and *Vespadelus regulus* (Southern Forest Bat).

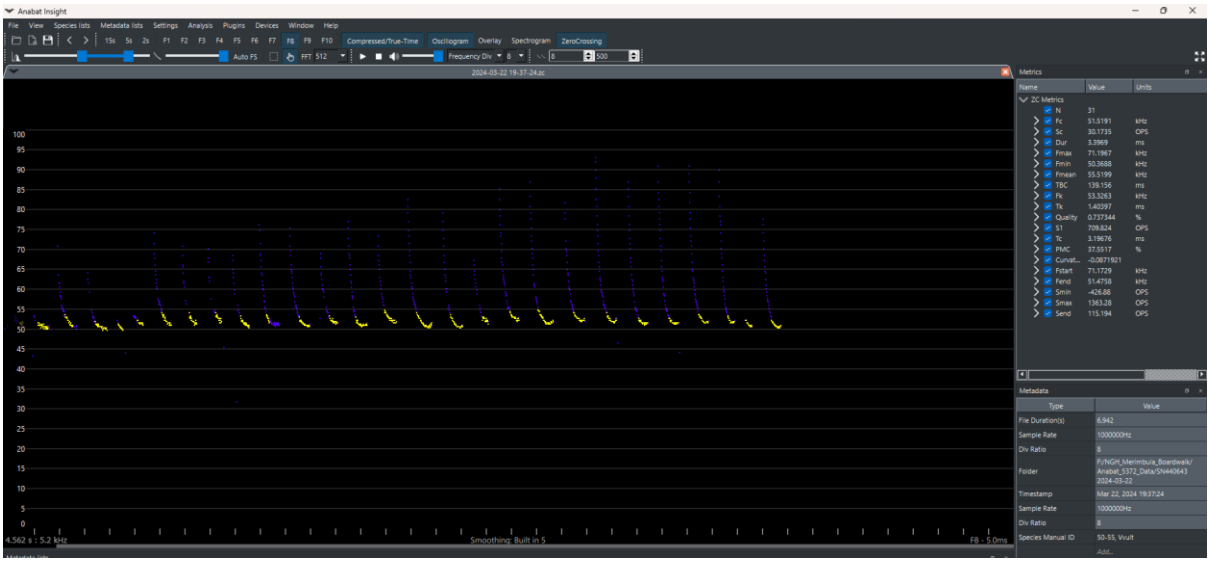


Figure 12. Potential call profile for *Vespadelus vulturnus* (Little Forest Bat)

References and other resources often used to prepare a microbat call identification report

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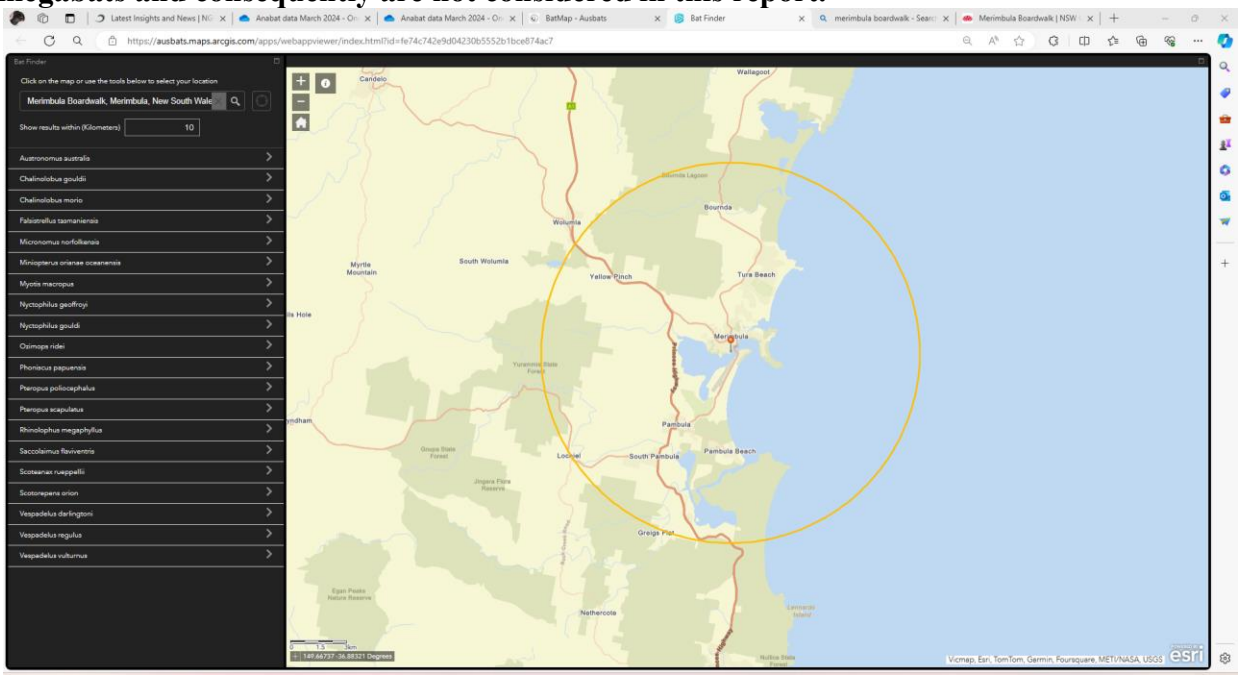
Van Dyck, S., Gynther. I., and Baker. A. (2013). *Field Companion to the Mammals of Australia*. New Reed New Holland. Sydney

Appendix 1. Microbat species that are predicted to occur or have been previously recorded within a 20 km radius of the study area (source Australia Bat Society Bat Maps). *Pteropus poliocephalus* (Grey-headed Flying-fox) and *P. scapulatus* (Little Red Flying-fox) are megabats and consequently are not considered in this report.



Appendix 2. Candidate species list with species-specific characteristic frequency (Fc) range for this site, which is located within the Southern Biogeographic region described in Penny *et al.* (2004). The species list was developed after a review of the Atlas of Living Australia, BatMaps (Australian Bat Society), Penny *et al.* (2011), and the NSW Bionet database.

Family and genus name	Common name	Characteristic Frequency Range (kilohertz (kHz)[1]
Austronomus australis	White-striped Free-tailed Bat	10 – 15 kHz
Chalinolobus gouldii	Gould's Wattled Bat	28.5 – 32.5 kHz
Chalinolobus morio	Chocolate Wattled Bat	48 – 52 kHz
*Falsistrellus tasmaniensis**	Eastern False Pipistrelle	35.5 – 39 kHz
*Micronomus norfolkensis**	Eastern Coastal Free-tailed Bat	31 – 35 kHz
*Miniopterus orianae oceanensis**	Large Bent-winged Bat	44 – 47 kHz
*Myotis macropus**	Southern Myotis	Vertical pulses
Nyctophilus geoffroyi	Lesser Long-eared Bat	Vertical pulses
Nyctophilus gouldi	Gould's Long-eared Bat	Vertical pulses
Ozimops ridei	Ride's Free-tailed Bat	28.5 – 31 kHz

Phoniscus apneusis[*]	Golden-tipped Bat	Vertical pulses
Rhinolophus megaphyllus	Eastern Horseshoe Bat	66.5 – 70 kHz
Saccolaimus flaviventris[*]	Yellow-bellied Sheath-tailed Bat	17.5 – 22.5 kHz
Scoteanax rueppellii[*]	Greater Broad-nosed Bat	33 – 36 kHz
Scotorepens orion	Eastern Broad-nosed Bat	34.5 – 37 kHz
Vespadelus darlingtoni	Large Forest Bat	40 – 44 kHz
Vespadelus regulus	Southern Forest Bat	40 – 44.5 kHz
Vespadelus vulturnus	Little Forest Bat	48.5 – 53 kHz

[1]Pennay *et al.* (2004) and * represents those threatened species that are listed as Vulnerable under the BC Act

Appendix E BAM calculator credit reports

Reports follow overleaf.

Credit reports are valid for 14 days following the report generated date. The BDAR/BCAR must be submitted within this timeframe or new reports generated.

Case 00049718

a) Credits summary report
b) Biodiversity credit report (Like-for-like)
c) Candidate threatened species report
d) Predicted species report

Case 00051513

a) Credits summary report
b) Biodiversity credit report (Like-for-like)
c) Candidate threatened species report
d) Predicted species report

Case 00051563

a) Credits summary report
b) Biodiversity credit report (Like-for-like)
c) Candidate threatened species report
d) Predicted species report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00049718	220669 Merimbula Boardwalk - streamlined BDAR - PCTs3108_4054	28/10/2024
Assessor Name	Report Created	BAM Data version *
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS18074	Finalised	13/06/2025
Assessment Revision	BOS entry trigger	Assessment Type
4	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

South Coast Scarp Wet Vine Forest											
1	3108_Moderate	Brogo Vine Forest of the South East Corner Bioregion	53.6	53.6	0.06	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00	2
										Subtotal	**2**
South Coast Tidal Flats Samolus Paperbark-Grey Box Forest											
2	4054_Moderate	Not a TEC	37.6	37.6	0.04	PCT Cleared - 53%	High Sensitivity to Gain			1.75	1
										Subtotal	**1**
										Total	**3**

Species credits for threatened species

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

Lathamus discolor / Swift Parrot (Fauna)									
3108_Moderate	53.6	53.6	0.04	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	2
4054_Moderate	37.6	37.6	0.03	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1
								Subtotal	**3**
Myotis macropus / Southern Myotis (Fauna)									
3108_Moderate	53.6	53.6	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
4054_Moderate	37.6	37.6	0.04	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**3**

Numenius madagascariensis / Eastern Curlew (Fauna)									
3108_Moderate	53.6	53.6	0.04	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	2
4054_Moderate	37.6	37.6	0.02	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	1
								Subtotal	**3**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00042868/BAAS18074/24/00049718

Proposal Name
220669 Merimbula Boardwalk -streamlined BDAR - PCTs3108_4054

BAM data last updated *
28/10/2024

Assessor Name
Julie Gooding

Assessor Number
BAAS18074

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
13/06/2025

BAM Case Status
Finalised

Assessment Revision
4

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
13/06/2025

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Lathamus discolor / Swift Parrot

Numenius madagascariensis / Eastern Curlew

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Botaurus poiciloptilus / Australasian Bittern

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3108-South Coast Scarp Wet Vine Forest	Brogo Vine Forest of the South East Corner Bioregion	0.1	2	0	2
4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest	Not a TEC	0.0	0	1	1

3108-South Coast Scarp Wet Vine Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Brogo Vine Forest of the South East Corner Bioregion This includes PCT's: 3108	-	3108_Moderate	Yes	2	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Coastal Floodplain Wetlands This includes PCT's: 4015, 4020, 4023, 4024, 4025, 4026, 4027, 4028, 4029, 4033, 4034, 4035, 4036, 4037, 4038, 4041, 4042, 4044, 4046, 4048, 4049, 4050, 4051, 4054, 4055, 4056, 4057, 4059	Coastal Floodplain Wetlands >=50% and <70%	4054_Moderate	No	1	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Lathamus discolor / Swift Parrot	**3108_Moderate, 4054_Moderate**	0.1	3.00
Myotis macropus / Southern Myotis	**3108_Moderate, 4054_Moderate**	0.1	3.00
Numenius madagascariensis / Eastern Curlew	**3108_Moderate, 4054_Moderate**	0.1	3.00

Credit Retirement Options

Like-for-like credit retirement options

Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Numenius madagascariensis / Eastern Curlew	Spp	IBRA subregion
	Numenius madagascariensis / Eastern Curlew	Any in NSW

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00049718	220669 Merimbula Boardwalk - streamlined BDAR - PCTs3108_4054	28/10/2024
Assessor Name	**Report Created**	**BAM Data version ***
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18074	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
4	BOS Threshold: Biodiversity Values Map	13/06/2025

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

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Curlew Sandpiper	Calidris ferruginea	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3108-South Coast Scarp Wet Vine Forest
Eastern Hooded Dotterel	Thinornis cucullatus cucullatus	3108-South Coast Scarp Wet Vine Forest
Eastern Osprey	Pandion cristatus	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Flame Robin	Petroica phoenicea	3108-South Coast Scarp Wet Vine Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3108-South Coast Scarp Wet Vine Forest

Gang-gang Cockatoo	Callocephalon fimbriatum	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Golden-tipped Bat	Phoniscus papuensis	3108-South Coast Scarp Wet Vine Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3108-South Coast Scarp Wet Vine Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3108-South Coast Scarp Wet Vine Forest
Little Eagle	Hieraaetus morphnoides	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Little Lorikeet	Glossopsitta pusilla	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Pilotbird	Pycnoptilus floccosus	3108-South Coast Scarp Wet Vine Forest
Scarlet Robin	Petroica boodang	3108-South Coast Scarp Wet Vine Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Spotted Harrier	Circus assimilis	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Spotted-tailed Quoll	Dasyurus maculatus	3108-South Coast Scarp Wet Vine Forest
Square-tailed Kite	Lophoictinia isura	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Swift Parrot	Lathamus discolor	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Turquoise Parrot	Neophema pulchella	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
Varied Sittella	Daphoenositta chrysoptera	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3108-South Coast Scarp Wet Vine Forest

White-bellied Sea-Eagle	Haliaeetus leucogaster	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest
White-throated Needletail	Hirundapus caudacutus	3108-South Coast Scarp Wet Vine Forest
		4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Australasian Bittern	Botaurus poiciloptilus	4054-South Coast Tidal Flats Samolus Paperbark-Grey Box Forest

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Australasian Bittern	Botaurus poiciloptilus	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00049718	220669 Merimbula Boardwalk - streamlined BDAR - PCTs3108_4054	28/10/2024
Assessor Name	Report Created	BAM Data version *
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS18074	Finalised	13/06/2025
Assessment Revision	BOS entry trigger	Assessment Type
4	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

South Coast Scarp Wet Vine Forest											
1	3108_Moderate	Brogo Vine Forest of the South East Corner Bioregion	53.6	53.6	0.06	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00	2
										Subtotal	**2**
South Coast Tidal Flats Samolus Paperbark-Grey Box Forest											
2	4054_Moderate	Not a TEC	37.6	37.6	0.04	PCT Cleared - 53%	High Sensitivity to Gain			1.75	1
										Subtotal	**1**
										Total	**3**

Species credits for threatened species

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

Lathamus discolor / Swift Parrot (Fauna)									
3108_Moderate	53.6	53.6	0.04	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	2
4054_Moderate	37.6	37.6	0.03	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1
								Subtotal	**3**
Myotis macropus / Southern Myotis (Fauna)									
3108_Moderate	53.6	53.6	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
4054_Moderate	37.6	37.6	0.04	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**3**

Numenius madagascariensis / Eastern Curlew (Fauna)									
3108_Moderate	53.6	53.6	0.04	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	2
4054_Moderate	37.6	37.6	0.02	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	1
								Subtotal	**3**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00051513	220669 Merimbula Boardwalk - streamlined BDAR PCT4091_4097_4102	28/10/2024
Assessor Name	Report Created	BAM Data version *
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS18074	Finalised	13/06/2025
Assessment Revision	BOS entry trigger	Assessment Type
3	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Mangrove-River Mangrove Forest											
2	4091_High	Not a TEC	71.9	71.9	0.13	PCT Cleared - 53%	High Sensitivity to Gain			1.75		4
											Subtotal	**4**
South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh												
1	4102_4097_High	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	72	72.0	0.08	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		3
											Subtotal	**3**
											Total	**7**

Species credits for threatened species

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

Haematopus longirostris / Pied Oystercatcher (Fauna)									
4102_4097_High	72.0	72.0	0.08	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	3
								Subtotal	**3**
Lathamus discolor / Swift Parrot (Fauna)									
4091_High	71.9	71.9	0.07	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	4
								Subtotal	**4**
Myotis macropus / Southern Myotis (Fauna)									
4102_4097_High	72.0	72.0	0.08	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3
4091_High	71.9	71.9	0.13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
								Subtotal	**8**

Numenius madagascariensis / Eastern Curlew (Fauna)									
4102_4097_High	72.0	72.0	0.08	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	4
4091_High	71.9	71.9	0.1	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	5
								Subtotal	**9**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00042868/BAAS18074/24/00051513

Proposal Name
220669 Merimbula Boardwalk -streamlined BDAR PCT4091_4097_4102

BAM data last updated *
28/10/2024

Assessor Name
Julie Gooding

Assessor Number
BAAS18074

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
13/06/2025

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
13/06/2025

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Lathamus discolor / Swift Parrot

Numenius madagascariensis / Eastern Curlew

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.1	0	3	3
4091-Grey Mangrove-River Mangrove Forest	Not a TEC	0.1	0	4	4

BAM Biodiversity Credit Report (Like for like)

4091-Grey Mangrove-River Mangrove Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Mangrove Swamps This includes PCT's: 4091	Mangrove Swamps >=50% and <70%	4091_High	No	4	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 4040, 4094, 4095, 4096, 4097, 4101, 4102, 4103	-	4102_4097_High	No	3	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh	

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Haematopus longirostris / Pied Oystercatcher	**4102_4097_High**	0.1	3.00
Lathamus discolor / Swift Parrot	**4091_High**	0.1	4.00
Myotis macropus / Southern Myotis	**4102_4097_High, 4091_High**	0.2	8.00
Numenius madagascariensis / Eastern Curlew	**4102_4097_High, 4091_High**	0.2	9.00

Credit Retirement Options

Like-for-like credit retirement options

Haematopus longirostris / Pied Oystercatcher	Spp	IBRA subregion
	Haematopus longirostris / Pied Oystercatcher	Any in NSW
Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00051513	220669 Merimbula Boardwalk - streamlined BDAR PCT4091_4097_4102	28/10/2024
Assessor Name	**Report Created**	**BAM Data version ***
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18074	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
3	BOS Threshold: Biodiversity Values Map	13/06/2025

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

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Bar-tailed Godwit (baueri)	Limosa lapponica baueri	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Beach Stone-curlew	Esacus magnirostris	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Black Bittern	Ixobrychus flavicollis	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Black-tailed Godwit	Limosa limosa	4091-Grey Mangrove-River Mangrove Forest
Comb-crested Jacana	Irediparra gallinacea	4091-Grey Mangrove-River Mangrove Forest
Curlew Sandpiper	Calidris ferruginea	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest

Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	4091-Grey Mangrove-River Mangrove Forest
Eastern Curlew	Numenius madagascariensis	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Eastern Hooded Dotterel	Thinornis cucullatus cucullatus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Eastern Osprey	Pandion cristatus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	4091-Grey Mangrove-River Mangrove Forest
Grey-headed Flying-fox	Pteropus poliocephalus	4091-Grey Mangrove-River Mangrove Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	4091-Grey Mangrove-River Mangrove Forest
Little Eagle	Hieraaetus morphnoides	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Little Tern	Sternula albifrons	4091-Grey Mangrove-River Mangrove Forest
Red Knot	Calidris canutus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Sanderling	Calidris alba	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	4091-Grey Mangrove-River Mangrove Forest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
Spotted Harrier	Circus assimilis	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
Spotted-tailed Quoll	Dasyurus maculatus	4091-Grey Mangrove-River Mangrove Forest
Square-tailed Kite	Lophoictinia isura	4091-Grey Mangrove-River Mangrove Forest
Swift Parrot	Lathamus discolor	4091-Grey Mangrove-River Mangrove Forest
Turquoise Parrot	Neophema pulchella	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Varied Sittella	Daphoenositta chrysoptera	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
White-fronted Chat	Epthianura albifrons	4091-Grey Mangrove-River Mangrove Forest

White-throated Needletail	Hirundapus caudacutus	4102-South Coast Bracelet Honey-myrtle Sea Rush Saltmarsh
		4091-Grey Mangrove-River Mangrove Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	4091-Grey Mangrove-River Mangrove Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Numenius madagascariensis / Eastern Curlew	Spp	IBRA subregion
	Numenius madagascariensis / Eastern Curlew	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00051513	220669 Merimbula Boardwalk - streamlined BDAR PCT4091_4097_4102	28/10/2024
Assessor Name	**Report Created**	**BAM Data version ***
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18074	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
3	BOS Threshold: Biodiversity Values Map	13/06/2025

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

List of Species Requiring Survey

Name	Presence	Survey Months
Haematopus longirostris Pied Oystercatcher	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lathamus discolor Swift Parrot	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

Myotis macropus Southern Myotis	Yes (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Numenius madagascariensis Eastern Curlew	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Pied Oystercatcher	Haematopus longirostris
Southern Myotis	Myotis macropus

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Beach Stone-curlew	Esacus magnirostris	Species is vagrant
Curlew Sandpiper	Calidris ferruginea	Habitat constraints
Eastern Hooded Dotterel	Thinornis cucullatus cucullatus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Orange-bellied Parrot	Neophema chrysogaster	Refer to BAR

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00051563	220669 Merimbula Boardwalk - streamlined BDAR 3639_4056	28/10/2024
Assessor Name	Report Created	BAM Data version *
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS18074	Finalised	13/06/2025
Assessment Revision	BOS entry trigger	Assessment Type
3	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

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

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

South Coast Sands Bangalay Littoral Forest											
1	3639_Moderate	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	57.9	57.9	0.06	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	2
										Subtotal	**2**
Southern Estuarine Swamp Paperbark Creekflat Scrub											
2	4056_Moderate	Not a TEC	37.7	37.7	0.02	PCT Cleared - 53%	High Sensitivity to Gain			1.75	1
										Subtotal	**1**
										Total	**3**

Species credits for threatened species

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

Lathamus discolor / Swift Parrot (Fauna)									
3639_Moderate	57.9	57.9	0.01	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1
4056_Moderate	37.7	37.7	0.01	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	1
								Subtotal	**2**
Myotis macropus / Southern Myotis (Fauna)									
3639_Moderate	57.9	57.9	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
4056_Moderate	37.7	37.7	0.02	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**3**

Numenius madagascariensis / Eastern Curlew (Fauna)									
4056_Moderate	37.7	37.7	0.01	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Not Listed	Critically Endangered	True	1
								Subtotal	**1**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00042868/BAAS18074/24/00051563

Proposal Name
220669 Merimbula Boardwalk -streamlined BDAR 3639_4056

BAM data last updated *
28/10/2024

Assessor Name
Julie Gooding

Assessor Number
BAAS18074

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
13/06/2025

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
13/06/2025

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Lathamus discolor / Swift Parrot

Numenius madagascariensis / Eastern Curlew

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Botaurus poiciloptilus / Australasian Bittern
Varanus rosenbergi / Rosenberg's Goanna

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3639-South Coast Sands Bangalay Littoral Forest	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	0.1	0	2	2
4056-Southern Estuarine Swamp Paperbark Creekflat Scrub	Not a TEC	0.0	0	1	1

BAM Biodiversity Credit Report (Like for like)

3639-South Coast Sands Bangalay Littoral Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions This includes PCT's: 3546, 3638, 3639, 3640	-	3639_Moderate	No	2	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4056-Southern Estuarine Swamp Paperbark Creekflat Scrub

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Coastal Floodplain Wetlands This includes PCT's: 4015, 4020, 4023, 4024, 4025, 4026, 4027, 4028, 4029, 4033, 4034, 4035, 4036, 4037, 4038, 4041, 4042, 4044, 4046, 4048, 4049, 4050, 4051, 4054, 4055, 4056, 4057, 4059	Coastal Floodplain Wetlands >=50% and <70%	4056_Moderate	No	1	South East Coastal Ranges, Bateman, Bungonia, East Gippsland Lowlands, Kybeyan-Gourock, Monaro and Snowy Mountains. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Lathamus discolor / Swift Parrot	**3639_Moderate, 4056_Moderate**	0.0	2.00
Myotis macropus / Southern Myotis	**3639_Moderate, 4056_Moderate**	0.1	3.00
Numenius madagascariensis / Eastern Curlew	**4056_Moderate**	0.0	1.00

Credit Retirement Options

Like-for-like credit retirement options

Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Numenius madagascariensis / Eastern Curlew	Spp	IBRA subregion
	Numenius madagascariensis / Eastern Curlew	Any in NSW

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042868/BAAS18074/24/00051563	220669 Merimbula Boardwalk - streamlined BDAR 3639_4056	28/10/2024
Assessor Name	**Report Created**	**BAM Data version ***
Julie Gooding	13/06/2025	Current classification (live - default) (80)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18074	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
3	BOS Threshold: Biodiversity Values Map	13/06/2025

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

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Bar-tailed Godwit (baueri)	Limosa lapponica baueri	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Black Bittern	Ixobrychus flavicollis	3639-South Coast Sands Bangalay Littoral Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Curlew Sandpiper	Calidris ferruginea	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Eastern Curlew	Numenius madagascariensis	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3639-South Coast Sands Bangalay Littoral Forest
Eastern Hooded Dotterel	Thinornis cucullatus cucullatus	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Eastern Osprey	Pandion cristatus	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub

Gang-gang Cockatoo	Callocephalon fimbriatum	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Golden-tipped Bat	Phoniscus papuensis	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Grey-headed Flying-fox	Pteropus poliocephalus	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Large Bent-winged Bat	Miniopterus orianae oceanensis	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Little Eagle	Hieraaetus morphnoides	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Little Lorikeet	Glossopsitta pusilla	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Olive Whistler	Pachycephala olivacea	3639-South Coast Sands Bangalay Littoral Forest
Pilotbird	Pycnoptilus floccosus	3639-South Coast Sands Bangalay Littoral Forest
Red Knot	Calidris canutus	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Sanderling	Calidris alba	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
South-eastern Hooded Robin	Melanodryas cucullata cucullata	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Spotted Harrier	Circus assimilis	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Spotted-tailed Quoll	Dasyurus maculatus	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Square-tailed Kite	Lophoictinia isura	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Swift Parrot	Lathamus discolor	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Turquoise Parrot	Neophema pulchella	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Varied Sittella	Daphoenositta chrysoptera	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
White-bellied Sea-Eagle	Haliaeetus leucogaster	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
White-throated Needletail	Hirundapus caudacutus	3639-South Coast Sands Bangalay Littoral Forest
		4056-Southern Estuarine Swamp Paperbark Creekflat Scrub

BAM Predicted Species Report

Threatened species Manually Added

Common Name	Scientific Name
Eastern False Pipistrelle	Falsistrellus tasmaniensis

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Australasian Bittern	Botaurus poiciloptilus	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Eastern False Pipistrelle	Falsistrellus tasmaniensis	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub
Rosenberg's Goanna	Varanus rosenbergi	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Australasian Bittern	Botaurus poiciloptilus	Habitat constraints
Rosenberg's Goanna	Varanus rosenbergi	Species is vagrant

BAM Candidate Species Report

Proposal Details

Assessment Id 00042868/BAAS18074/24/00051563	Proposal Name 220669 Merimbula Boardwalk - streamlined BDAR 3639_4056	BAM data last updated * 28/10/2024
Assessor Name Julie Gooding	Report Created 13/06/2025	BAM Data version * Current classification (live - default) (80)
Assessor Number BAAS18074	Assessment Type Part 4 Developments (Small Area)	BAM Case Status Finalised
Assessment Revision 3	BOS entry trigger BOS Threshold: Biodiversity Values Map	Date Finalised 13/06/2025

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

List of Species Requiring Survey

Name	Presence	Survey Months
Lathamus discolor Swift Parrot	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

Numenius madagascariensis Eastern Curlew	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Southern Myotis	Myotis macropus

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Curlew Sandpiper	Calidris ferruginea	Habitat constraints
Eastern Hooded Dotterel	Thinornis cucullatus cucullatus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Refer to BAR
Orange-bellied Parrot	Neophema chrysogaster	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00042868/BAAS18074/24/00051563

Assessment name
220669 Merimbula Boardwalk -streamlined BDAR 3639_4056

BAM data last updated *
28/10/2024

Assessor Name
Julie Gooding

Report Created
13/06/2025

BAM Data version *
Current classification (live - default) (80)

Assessor Number
BAAS18074

Assessment Type
Part 4 Developments (Small Area)

BAM Case Status
Finalised

Assessment Revision
3

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Date Finalised
13/06/2025

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

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3639_Moderate	3639-South Coast Sands Bangalay Littoral Forest	Moderate	0.06	1	

2	4056_Moderate	4056-Southern Estuarine Swamp Paperbark Creekflat Scrub	Moderate	0.02	1	

Appendix F Detailed maps

The following map sets follow overleaf:

- PCTs and TECs in subject land
- Species polygon
- Threatened entities at risk of SAII
- Areas requiring offset.

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

PCTs and TECs within Subject Land: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 | PCTs and TECs within the Subject Land Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2022

LEGEND

Development footprint

Subject Land

PCTs within Subject Land

Areas that do not conform to a PCT

3108

4054

4056

4091

4097

4102

3639

EPBC Act listed TECs within Subject Land

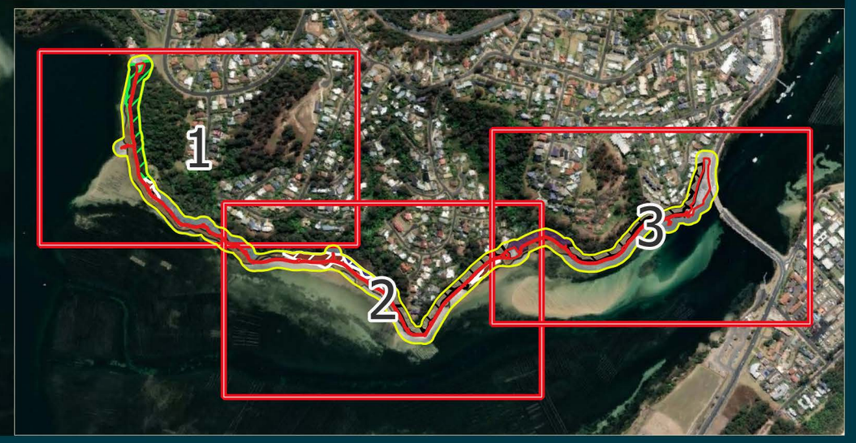
Brogo Wet Vine Forest in the South East Corner Bioregion

Subtropical and Temperate Coastal Saltmarsh

BC Act listed TECs within Subject Land

Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions



0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

PCTs and TECs within Subject Land: Map 2 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 | PCTs and TECs within the Subject Land Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2022

LEGEND

Development footprint

Subject Land

PCTs within Subject Land

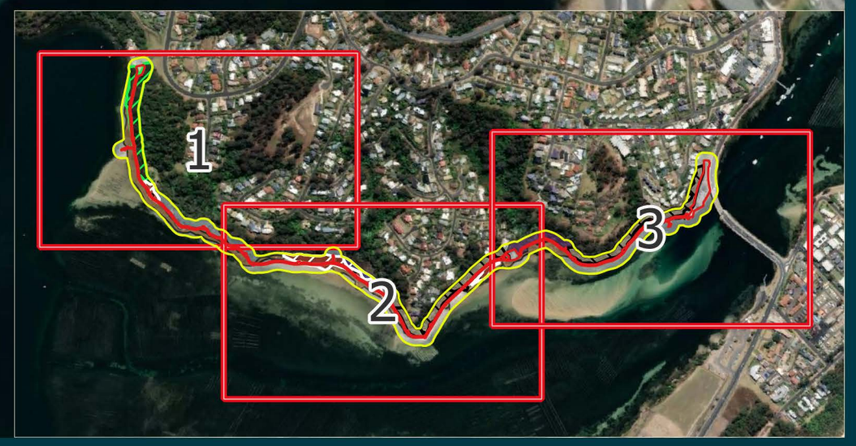
- Areas that do not conform to a PCT
- 3108
- 4054
- 4056
- 4091
- 4097
- 4102
- 3639

EPBC Act listed TECs within Subject Land

- Brogo Wet Vine Forest in the South East Corner Bioregion
- Subtropical and Temperate Coastal Saltmarsh

BC Act listed TECs within Subject Land

- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions



0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

PCTs and TECs within Subject Land: Map 3 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 | PCTs and TECs within the Subject Land Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2022

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Southern Myotis threatened species polygons: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 | Threatened species polygons Southern Myotis Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND
- Development footprint
- Subject Land
- Southern Myotis species polygon

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Southern Myotis threatened species polygons: Map 2 of 3

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Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened species polygons Southern Myotis Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Southern Myotis threatened species polygons: Map 3 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 | Threatened species polygons Southern Myotis Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND
- Development footprint
- Subject Land
- Pied Oystercatcher Habitat

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Pied Oystercatcher threatened species polygons: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \Threatened species polygons Pied Oystercater Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND
- Development footprint
- Subject Land
- Pied Oystercatcher Habitat

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Pied Oystercatcher threatened species polygons: Map 2 of 3

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Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened species polygons Pied Oystercater Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Pied Oystercatcher threatened species polygons: Map 3 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened species polygons Pied Oystercater Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND

- Development footprint
- Subject Land
- Eastern Curlew species polygon

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Migratory shorebirds threatened species polygons: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \Threatened species polygons Eastern Curlew Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2024

0 75 150 m

Datum: GDA2020 / MGA Zone 55

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Merimbula Board Walk BDAR

Migratory shorebirds threatened species polygons: Map 2 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \Threatened species polygons Eastern Curlew Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2024

Datum: GDA2020 / MGA Zone 55

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Merimbula Board Walk BDAR

Migratory shorebirds threatened species polygons: Map 3 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened species polygons Eastern Curlew Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2024

LEGEND
- Development footprint
- Subject Land
- Eastern Curlew species polygon
- Swift Parrot species polygon
- NGH Eastern Curlew incidental sighting

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Threatened Entities at Risk of SAII: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened Entities at Risk of SAII Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND

- Development footprint
- Subject Land
- Eastern Curlew species polygon
- Swift Parrot species polygon
- NGH Eastern Curlew incidental sighting

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Threatened Entities at Risk of SAII: Map 2 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Threatened Entities at Risk of SAII Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

LEGEND

- Development footprint
- Subject Land
- Eastern Curlew species polygon
- Swift Parrot species polygon
- NGH Eastern Curlew incidental sighting

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Threatened Entities at Risk of SAII: Map 3 of 3

Ref. 22-669 Merimbula Board Walk BDAR 20240312 | Threatened Entities at Risk of SAII Atlas Author: Jared Graham-Higgs Date created: 11.06.2025 © NGH 2025 © ESRI 2022

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Areas requiring offset: Map 1 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \Areas that require offset Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2024

LEGEND
- Development footprint
- Subject Land
- Areas requiring offset
- Area excluded from BDAR offset

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Areas requiring offset: Map 2 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Areas that require offset Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2024

LEGEND
- Development footprint
- Subject Land
- Areas requiring offset
- Area excluded from BDAR offset

0 75 150 m

Datum: GDA2020 / MGA Zone 55

NGH

Merimbula Board Walk BDAR

Areas requiring offset: Map 3 of 3

Ref: 22-669 Merimbula Board Walk BDAR 20240312 \ Areas that require offset Atlas Author: Jared Graham-Higgs Date created: 18.11.2024 © NGH 2024 © ESRI 2024

Appendix G Agency/consent authority consultation

Agency consultation follows overleaf.

From:	Jared Graham-Higgs
To:	Bianca Heinze; Gillian Young; Elise Keane; Rebecca Phyland
Cc:	Tamya Wynne; Eliana Hack
Subject:	FW: Merimbula Boardwalk BDAR advice
Date:	Wednesday, 6 March 2024 6:22:41 PM
Attachments:	image005.png image009.png image013.png image014.png image015.png image016.png image017.png image018.png image019.jpg image020.png image021.png

---

Hi Bio team,

Just to keep you in the loop. Please see email chain below for an update on our consultation with the BCD re Merimbula BW.

Cheers,

Jared

Jared Graham-Higgs
Regional Manager Biodiversity - NSW South / Graduate Program Manager

m: 0429 441 297 p: 02 6492 8338
e. jared.gh@nghconsulting.com.au
a. Suite 11, 89-981 Auckland Street, Bega, NSW 2550
w. nghconsulting.com.au | Our commitment to reconciliation

Work days: Monday-Thursday

From: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Sent: Wednesday, March 6, 2024 9:33 AM
To: Elise Keane <elise.keane@nghconsulting.com.au>; Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Allison Treweek <Allison.Treweek@environment.nsw.gov.au>

Subject: RE: Merimbula Boardwalk BDAR advice

Thanks Elise

Can we please add the requirement to provide evidence/ justification in the BDAR to support any exclusion of candidate species based on habitat assessment.

We are also happy to discuss once you have completed your habitat assessment.

Kind regards

Angie

Angela Jenkins
Senior Conservation Planning Officer, South East
Biodiversity and Conservation Division,
Department of Climate Change,
Energy, the Environment and Water

T (02) 6229 7075 **E** rog.southeast@environment.nsw.gov.au

dcceew.nsw.gov.au

11 Farrer Place
Queanbeyan NSW 2620

Working days Monday to Friday, 9:00am - 5:00pm

I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

In order to ensure a high level of customer service and monitor work flow, South East Planning Team has an email address: rog.southeast@environment.nsw.gov.au. Please address all further email correspondence in relation to Planning matters to this address. If appropriate, emails can be marked to the attention of your usual contact in the team.

Please consider the environment before printing this email.

From: Elise Keane <elise.keane@nghconsulting.com.au>
Sent: Tuesday, 5 March 2024 1:07 PM
To: Damon Oliver <Damon.Oliver@environment.nsw.gov.au>; Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>
Subject: RE: Merimbula Boardwalk BDAR advice

Hi Angie and Damon,

Thank you for meeting with us last week to discuss the Merimbula Boardwalk upgrade, and thanks

also Damon for sending through the information regarding the shorebirds and migratory waders.

To confirm what we discussed:

- The client, Bega Valley Shire Council, are wanting to submit the BDAR by August, due to their construction timeline. In doing so, we would not be able to undertake targeted surveys for some candidate species where their survey timing falls in the second half of the year.
- We can potentially rule out some candidate species through doing habitat assessments in March, whilst we are undertaking targeted surveys.
    - In particular, we would undertake surveys for stick nests for threatened raptor species at our earliest convenience (understanding that this survey would be outside of the breeding period for raptor species). If there were no stick nests present, we could remove these species based on their habitat constraint.
    - We would also do a habitat assessment for mammal species, including Brush-tailed Phascogale and White-footed Dunnart, to determine if there is suitable habitat for these species within the development footprint. If not, we could remove these species based on lack of habitat.
- We would also complete targeted survey for the below species as discussed in the meeting.
    - Anabat surveys in March for Southern Myotis including additional assessment to assess suitability of wooden structures for roosting sites.
    - Bush-stone Curlew surveys in March due to a record near the boardwalk
- We will recommend to the client undertaking construction works outside of the breeding period for shorebirds and migratory waders (as provided by Damon, undertaking construction in April-August would minimise impacts).

Please let me know if there is anything else.

Thanks,

Elise

Elise Keane
Senior Ecologist

m: 0488 448 017 p: 03 7031 9123
e. elise.keane@nghconsulting.com.au
a. suite 2, level 14, 10 Queen St, Melbourne, Vic 3000
w. nghconsulting.com.au | Our commitment to reconciliation

From: Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Sent: Thursday, February 29, 2024 12:26 PM
To: Elise Keane <elise.keane@nghconsulting.com.au>; Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>
Subject: RE: Merimbula Boardwalk BDAR advice

Hi All

Just following up on the advice I said I would provide on timing of construction to avoid/minimise disturbance to shorebirds and migratory waders.

I have checked timing of arrival of non-breeding migratory waders, and breeding timing of local threatened shorebirds. Essentially if construction can be restricted to

The April-August period that should minimise impacts. Some species may still be present, but most should be absent and none will be breeding.

Hope this is of some assistance?

Regards

Damon

Damon Oliver
Senior Team Leader – Ecosystems and Threatened Species, South East
Biodiversity, Conservation and Science
Department of Climate Change, Energy, Environment and Water
Ph: 02 6229 7112 Mob: 0407 073 170 Fax: 02 6229 7001
www.dcceew.nsw.gov.au

My office is on Ngunnawal and Ngambri Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land.

We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

From: Elise Keane <elise.keane@nghconsulting.com.au>
Sent: Monday, 26 February 2024 2:19 PM
To: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Subject: RE: Merimbula Boardwalk BDAR advice

Hi Angela,

Yes that works, I'll send through a meeting invitation.

Thanks,

Elise

Elise Keane
Senior Ecologist

m: 0488 448 017 p: 03 7031 9123
e. elise.keane@nghconsulting.com.au
a. suite 2, level 14, 10 Queen St, Melbourne, Vic 3000
w. nghconsulting.com.au | Our commitment to reconciliation

From: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Sent: Monday, February 26, 2024 2:17 PM
To: Elise Keane <elise.keane@nghconsulting.com.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Subject: aRE: Merimbula Boardwalk BDAR advice

Hi Elise

Wednesday would be best for me– Damon and I will both be available 11am if that suits?

Angela Jenkins
Senior Conservation Planning Officer, South East
Biodiversity and Conservation Division,
Department of Climate Change,
Energy, the Environment and Water

T (02) 6229 7075 **E** rog.southeast@environment.nsw.gov.au

dcceew.nsw.gov.au

11 Farrer Place
Queanbeyan NSW 2620

Working days Monday to Friday, 9:00am - 5:00pm

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Please consider the environment before printing this email.

From: Elise Keane <elise.keane@nghconsulting.com.au>
Sent: Monday, 26 February 2024 2:10 PM
To: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Subject: RE: Merimbula Boardwalk BDAR advice

Hi Angela,

Thanks for getting back to us. Would you be available tomorrow afternoon around 2pm to answer any questions you have about the project? Otherwise I'm also available on Wednesday.

Thanks,

Elise

Elise Keane
Senior Ecologist

m: 0488 448 017 p: 03 7031 9123
e. elise.keane@nghconsulting.com.au
a. suite 2, level 14, 10 Queen St, Melbourne, Vic 3000
w. nghconsulting.com.au | Our commitment to reconciliation

From: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Sent: Friday, February 23, 2024 10:18 AM
To: Elise Keane <elise.keane@nghconsulting.com.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Damon Oliver <Damon.Oliver@environment.nsw.gov.au>
Subject: FW: Merimbula Boardwalk BDAR advice

HI Elise

Just left a message on your voice mail. Could we make a time to discuss early next week? It will be much easier to make comment if we can get some more details from you.

Thanks

Angela Jenkins
Senior Conservation Planning Officer, South East
Biodiversity and Conservation Division,
Department of Climate Change,
Energy, the Environment and Water

T (02) 6229 7075 **E** rog.southeast@environment.nsw.gov.au

dcceew.nsw.gov.au

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Please consider the environment before printing this email.

From: Allison Treweek <Allison.Treweek@environment.nsw.gov.au> **On Behalf Of** ROG South East Region Mailbox
Sent: Wednesday, 21 February 2024 3:30 PM
To: Angie Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Subject: FW: Merimbula Boardwalk BDAR advice

Hey can you look at this and send a response to them about it for me – if you have time?

Thanks Al

Allison Treweek
Senior Team Leader Planning, South East
Biodiversity and Conservation Division,
Department of Climate Change,
Energy, the Environment and Water

My office is on Ngunnawal Country
T 02 62297082 | **M** 0400706004 | **E** allison.treweek@environment.nsw.gov.au
Level 3, Farrer Place, Queanbeyan NSW

dcceew.nsw.gov.au

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From: Elise Keane <elise.keane@nghconsulting.com.au>
Sent: Thursday, 8 February 2024 1:16 PM
To: ROG South East Region Mailbox <rog.southeast@environment.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>
Subject: Merimbula Boardwalk BDAR advice

Hi SouthEast BCD team,

We are planning to undertake targeted surveys for a BDAR to support a DA for Bega Valley Shire Council, who are proposing to demolish and upgrade the pre-existing Merimbula Boardwalk, located along Merimbula Lake. Bega Valley Shire Council are wanting to have the assessment completed by end of July 2024. We are writing to seek BCD support for assuming presence for some species.

Based on preliminary surveys, there are a number of candidate species for which targeted surveys can be undertaken during February and March 2024, to meet this timeline. The remaining species have survey timings within the second half of the year, or survey effort would be unable to be undertaken within the timeframe. These species include:

- White-bellied Sea-Eagle- nest trees?
- Little Eagle-
- Square-tailed Kite
- Eastern Osprey
- White-footed Dunnart
- Brush-tailed Phascogale

Due to this, Bega Shire Council are interested in assuming presence for these species, in order to meet their development timeline. The current development footprint is 1.24 ha, of which 0.72 ha is native vegetation, including:

- 0.08 ha of PCT 4097 Samphire Saltmarsh
- 0.27 ha of PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub
- 0.18 ha of PCT 3273 South Coast Lowland Shrub-Grass Forest

- 0.19 ha of PCT 4091 Grey Mangrove-River Mangrove Forest

These figures will be further refined and reduced following fine scale vegetation zone mapping, which will include removal of the current boardwalk footprint from the native vegetation area.

Would BCD support assuming presence for the above species given Bega Valley Shire Council's preference to complete the assessment prior to the survey timeline for these species?

Thanks,

Elise

Elise Keane
Senior Ecologist

m: 0488 448 017 p: 03 7031 9123
e. elise.keane@nghconsulting.com.au
a. suite 2, level 14, 10 Queen St, Melbourne, Vic 3000
w. nghconsulting.com.au | Our commitment to reconciliation

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Any views expressed in this email are those of the individual sender except where the sender expressly and with authority states them to be the views of the NSW Office of Environment, Energy and Science.

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m:
e.
a.
w.

From: Mick Bettanin <mick.bettanin@dpi.nsw.gov.au>
Sent: Thursday, September 7, 2023 9:56 AM
To: Gillian Young <gillian.y@nghconsulting.com.au>
Subject: RE: Draft Aquatic Assessment Methodology for Merimbula Boardwalk - seeking comments

Good morning Gillian, thanks for your email.

If you follow the Policy and Guidelines as you have identified, then your work will align to the FMA. From what I can see you planned survey approach will provide the information required to make an assessment of potential direct and indirect impacts to key fish habitats, oyster aquaculture, commercial fisheries and recreational fisheries opportunities. Please note that the offset fee in the P&G has had CPI applied and is now $113.50/m2 when calculated at 2:1.

Merimbula is not a recreational fishing haven, however, is highly valued by recreational fishers due to there being many restrictions on commercial fishing. There are two active commercial fishers in the lake, who hand gather Cockles – please let me know if you need contact details for them.

When referring to our department please refer to us as NSW DPI Fisheries, or DPI. At the moment there is a separate department called DPE, and one called DPIE, and we shall see where this lands with the state budget and MOG changes. Not withstanding that NSW DPI Fisheries has long been our forward facing name despite numerous departmental changes over the years.

Kind regards,
Mick

Mick Bettanin
Fisheries Manager - 0438 293 747

From: Gillian Young <gillian.y@nghconsulting.com.au>
Sent: Wednesday, 23 August 2023 10:45 AM
To: Mick Bettanin <mick.bettanin@dpi.nsw.gov.au>
Cc: Jared Graham-Higgs <jared.gh@nghconsulting.com.au>; Tamya Wynne <t.wynne@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>
Subject: Draft Aquatic Assessment Methodology for Merimbula Boardwalk - seeking comments

Hi Mick,

You may remember that I called to touch base with you to see if we could conduct early consultation with NSW Fisheries about NGH's proposed aquatic assessment survey approach for Merimbula Boardwalk and jetty upgrades. We now have a draft methodology and are now ready to consult with Fisheries.

Could Fisheries please:

1. Review the document attached, with detailed context of the Fisheries Management Act requirements,
2. Provide any feedback regarding the approach. Have we missed anything?
3. Provide a response by COB Wed 6th Sept if possible?

Don't hesitate to reach out and call if you need to discuss anything. We hope to consult early to be able to collect all necessary field data, to avoid later complications in the assessment.

Regards

Gill.

Gillian Young
Senior Ecologist - NSW BAM Assessor [BAAS17086]

m: 0409 832 608
e. gillian.y@nghconsulting.com.au
a. 22 Bondi St, Tuross Head, NSW 2537
w. nghconsulting.com.au | Our commitment to reconciliation
Availability: Tuesday - Thursday

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ABN 31 124 444 622 ACN 124 444 622

E: ngh@nghconsulting.com.au

GOLD COAST

2B 34 Tallebudgera Creek Road
Burleigh Heads QLD 4220

T. (07) 3129 7633

SYDNEY REGION

Unit 17, 21 Mary Street
Surry Hills NSW 2010

T. (02) 8202 8333

BEGA

Suite 11, 89-91 Auckland Street
(PO Box 470)
Bega NSW 2550

T. (02) 6492 8333

MELBOURNE

Level 14, 10-16 Queen Street
Melbourne VIC 3000

T: (03) 7031 9123

TOWNSVILLE

Level 4, 67-75 Denham Street
Townsville QLD 4810

T. (07) 4410 9000

BRISBANE

T3, Level 7, 348 Edward Street
Brisbane QLD 4000

T. (07) 3129 7633

NEWCASTLE - HUNTER & NORTH COAST

Level 1, 31-33 Beaumont Street
Hamilton NSW 2303

T. (02) 4929 2301

WAGGA WAGGA - RIVERINA & WESTERN NSW

35 Kincaid Street (PO Box 5464)
Wagga Wagga NSW 2650

T. (02) 6971 9696

CANBERRA

Unit 8, 27 Yallourn Street
(PO Box 62)
Fyshwick ACT 2609

T. (02) 6280 5053

SUNSHINE COAST

Building 1, 30 Chancellor Village Boulevard
Sippy Downs QLD 4556

T: 13 54 93

WODONGA

Unit 2, 83 Hume Street
(PO Box 506)
Wodonga VIC 3690

T. (02) 6067 2533