



BROU WASTE MANAGEMENT FACILITY EXPANSION

Biodiversity Assessment Report

FINAL

May 2024

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Biodiversity Assessment Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited

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Date: May 2024



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Acronyms

Acronym	
AOO	Area of Occupancy
AOBV	Areas of Outstanding Biodiversity Value
AoS	Assessment of Significance
AP&A Act	NSW Environmental Planning and Assessment Act 1997
ASL	Above Sea level
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BAR	Biodiversity Assessment Report
BCAR	Biodiversity Certification Assessment Report
BC Act	NSW <i>Biodiversity and Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOM	Bureau of Meteorology
BOS	NSW Biodiversity Offset Scheme
Brou WMF	Brou Waste Management Facility
BV Map	Biodiversity Values Map
BVMTT	Biodiversity Values Map Threshold Tool
CEA	Coastal Environmental Area
CM Act	NSW <i>Coastal Management Act 2016</i>
DAWE	Department of Agriculture, Water and the Environment
DBH	Diameter at Breast Height
DCCEEW	Department Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment, Water, Heritage and the Arts
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EAH	Environmental Agency Head
EC	Ecological Community
EIA	Environmental Impact Assessment
EOO	Extent of Occurrence
EPA	Environment Protection Authority
EP&A Act	NSW <i>Environment Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ESC	Eurobodalla Shire council
FM Act	NSW <i>Fisheries Management Act 1994</i>
GDEs	Groundwater Dependent Ecosystems
ha	Hectares

Acronym	
HEVAE	High Ecological Value Aquatic Ecosystem
IBRA	Interim Biogeographic Regionalisation for Australia
KSAT	Koala Spot Assessment Technique
LGA	Local Government Area
LLS Act	NSW <i>Local Land Service Act 2013</i>
LLS	Local Land Services
LLS Regulation	Local Land Services Regulation 2014
MNES	Matters of National Environmental Significance
NPW Act	National <i>Parks and Wildlife Act 1974</i>
NSWPW	NSW Public Works
NVR	Native Vegetation Regulatory
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool
RBGS	Royal Botanic Gardens Sydney
RPMs	Rapid Mapping Points
SAII	Serious and Irreversible Impact
SCIVI	South Coast – Illawarra Vegetation Integration
SEPP	State Environmental Planning Policy (Biodiversity and Conservation) 2021
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Communities
TSC	NSW <i>Threatened Species Conservation Act 1995</i>
VI	Vegetation Integrity
VZ	Vegetation Zone

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1.0 Introduction

1.1 Purpose of this report

NSW Public Works (NSWPW), a division of the Department of Regional NSW has been engaged by Eurobodalla Shire Council (ESC) (the Proponent) to assist in the delivery of the proposed Brou Waste Management Facility (Brou WMF) expansion project. Brou WMF is located at the intersection of Brou Lake Road and Brou Tip Road, Bodalla NSW (the Project) within the Eurobodalla Shire Local Government Area (LGA).

ESC has received funding for upgrades of their two existing waste facilities (Brou and Surf Beach) following a significant increase in waste generated from the 2019/20 bushfires. Brou WMF was impacted by the volume of asbestos waste resulting from the bushfire clean up, significantly reducing the facility's available capacity. Consequently, ESC requires an alternative waste management solution at least 3 years earlier than anticipated. ESC's solution to this increase in waste is to upgrade (expand) the existing waste management facility at Brou.

As such, a new landfill cell is proposed for the Brou WMF, immediately adjacent to the existing cells on land owned by Council. The Project requires approximately 5 hectares (ha) of land to be rezoned which will allow for the relocation of the waste recovery and administration facilities at the landfill. The relocation of the waste recovery and administration facilities will make available additional land within the existing facility for future landfill purposes. The design will enable the landfill to provision for increased loadings caused by natural disasters while ensuring the facility remains available to the public.

This Biodiversity Assessment Report (BAR) supports the Planning Proposal required for the rezoning. The proposed expansion will require approval under Part 4 of NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and will trigger the NSW Biodiversity Offset Scheme (BOS) due to impacts to land mapped on the NSW Biodiversity Values Map. Given that the proposed expansion works will require an assessment of impacts to biodiversity values in accordance with the Biodiversity Assessment Method (BAM), this BAR includes Stage 1 of the Biodiversity Assessment Method (BAM) and an assessment of Serious and Irreversible Impacts (SAII) on the Swift Parrot (*Lathamus discolor*). However, given this report supports a Planning Proposal, Stage 2 of the BAM has not been carried out; instead, a more generalised impact assessment has been prepared.

1.2 Location of the Project

Brou WMF is located at Lot 1/DP 1205476 the Princes Highway between Bodalla and Narooma. The site is bound to the north, south, east by remnant vegetation, and by the Princes Highway to the west. Eurobodalla National Park is located approximately one kilometre east of the site.

1.3 Project Description

1.3.1 Description of the proposed works

Following ESC's assessment of the impacts of the 2019-20 bushfires on the Brou WMF, Council developed high level options for the expansion of, and improvements to the facility. The options assessment formed the basis of the grant funding submission to the EPA's Bushfire Recovery for Council Landfills Program. The options (and indicative staging) for the development of the site are summarised as below:

- Phase 1: Construction of a new cell and associated ponds to west of current landfill footprint. Review alternative cell locations and prioritise cell sequence accordingly into different stages of expansion.
- Phase 2: Construction of a recycling and resource recovery hub, weighbridge, and commercial operational area, together with amenities and office facilities.
- Phase 3: Construction of a new cell on the footprint of the current operational area
- Phase 4: Construction of a leachate treatment plant adjacent to the existing leachate storage area to contain and treat leachate within the active licensed area (dependent upon operational and volumetric requirements). Onsite treatment alleviates discharge concerns and future proofs leachate management. Treated leachate may be stored and used in onsite operations or reintroduced into the cells in line with EPA approvals to be determined.

Additionally, ESC intends to install a waste to energy system (tied in with landfill gas) once volumes allow, and suitable technology and systems become available.

1.3.2 Site rezoning

To facilitate the proposed expansion of the waste management facility, the land surrounding the existing facility, which is currently zoned as RU3 Forestry, is to be rezoned. A small area of land within the north-eastern corner of the existing facility will also be rezoned. The Planning Proposal is intending the land be rezoned as:

- SP2 Infrastructure.
- C2 Environmental Conservation.

The proposed changes to land zones as detailed within the Planning Proposal are shown in **Figure 1.1**.

FIGURE 1.1
Proposed Land Use Zoning



Legend

- Road
- Subject Land
- Development Site
- State Forest
- NPWS Reserve

Strahler Stream Order

- - - Stream order 1

Proposed Zoning

- C2
- SP2



0 50 100
Metres

Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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1.4 Statutory Considerations

Commonwealth and State legislation relevant to this BAR is described in **Table 1.1**.

Table 1.1 Statutory considerations

Relevant legislation	Governing Agency	Summary
Commonwealth legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Department Climate Change, Energy, the Environment and Water (Commonwealth DCCEW)	The <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) is the Commonwealth Government's primary piece of environmental legislation and is administered by the Australian Government – Department of Climate Change, Energy, the Environment and Water (Commonwealth DCCEW). It is designed to protect national environmental assets, known as matters of national environmental significance (MNES), which include threatened species of flora and fauna, threatened ecological communities (TECs), and migratory species, as well as other protected matters. It defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna, and ecological communities. Actions that may adversely affect MNES may be deemed to be a controlled action under the EPBC Act. The significance of the proposed action on MNES can be determined through self-assessment using <i>Significant Impact Guidelines 1.1 - Matters of National Environmental Significance</i> (DEWHA, 2013). A referral is required for proposed actions that may affect nationally listed threatened species, TECs, and migratory species. The BAM has been endorsed as the assessment method for Matters of National Environmental Significance (MNES) under an EPBC Act Condition-setting Policy. This means any NSW proponent who needs an EPBC Act approval can use the NSW BOS to assess and meet their biodiversity offset requirements. The Australian Government is the decision-maker for whether the Project will be approved under the EPBC Act.
NSW legislation		
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	Department of Planning, Housing and Infrastructure (DPHI)	The <i>Environmental Planning & Assessment Act 1979</i> (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native animals and plants. This includes threatened species, populations and ecological communities, and their habitats of biodiversity values as listed in the <i>Biodiversity Conservation Act 2016</i> (BC Act) and <i>NSW Fisheries Management Act 1994</i> (FM Act). The Environmental Impact Assessment (EIA) that will be prepared for the Project will meet the necessary environmental assessment requirements under the relevant provisions of the EP&A Act.

Relevant legislation	Governing Agency	Summary
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	Department of Climate Change, Energy, the Environment, and Water (NSW DCCEEW)	The <i>Biodiversity Conservation Act 2016</i> (BC Act) and its supporting regulations commenced on 25 August 2017. The BC Act repealed the <i>Threatened Species Conservation Act 1995</i> (TSC Act) along with other natural resource management legislation, while retaining the TSC Act species list. The BC Act sets out the environmental impact assessment framework for threatened species, TECs and Areas of Outstanding Biodiversity Value (AOBV) (formerly critical habitat) for Major Projects, Part 5 activities, and local development. For Part4 activities, the BOS must be applied when a development: • Exceeds the BOS thresholds, those being the Biodiversity Values Map (BV Map) threshold, and the area clearing threshold. • Is likely to have a significant impact according to the test of significance (in section 7.3 of the BC Act). • Is proposed in an Area of Outstanding Biodiversity Value. The entirety of the Subject Land is mapped on the BV Map. The BOS automatically applies to proposals on land mapped on the Biodiversity Values Map.
<i>Coastal Management Act 2016 (CM Act)</i>	NSW DCCEEW	The objective of the CM Act is to manage the coastal environment in a manner consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of NSW. The Study Area contains areas mapped as ‘coastal wetland area’ and ‘proximity to coastal wetlands’. This legislation establishes clear outcome-orientated management objectives for each area to ensure councils apply appropriate management tools and development controls. The management objectives for the coastal wetlands area are as follows: • To protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity. • To promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests • To improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration. • To support the social and cultural values of coastal wetlands and littoral rainforests. • To promote the objectives of State policies and programs for wetlands or littoral rainforest management. The Study Area falls within an area mapped as Coastal Environment Area (CEA) under the CM Act.

Relevant legislation	Governing Agency	Summary
National Parks and Wildlife Act 1974 (NPW Act)	NSW DCCEEW	The <i>National Parks and Wildlife Act 1974</i> (NPW Act) provides for the protection of Aboriginal sites and designated conservation areas as well as the flora and fauna within conservation areas. There are no conservation areas declared under the NPW Act that are within the Study Area, however the Eurobodalla National Park is immediately west of the Study Area, on the western side of the Princes Highway. The objective of the NPW Act is to consolidate and amend the law relating to the establishment, preservation and management of national parks, historic sites, certain other areas, and the protection of certain fauna, native plants and Aboriginal objects.
Fisheries Management Act 1994 (FM Act)	Department of Primary Industries (DPI)	The objectives of the <i>Fisheries Management Act 1994</i> (FM Act) are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. More detailed objectives relevant to the Project include: • To conserve fish stocks and key fish habitats. • To conserve threatened species, populations and ecological communities of fish and marine vegetation. • To promote ecologically sustainable development, including the conservation of biological diversity. No waterways were found to occur within the Subject Land, therefore the FM Act does not apply.
Local Land Services Act 2013 (LLS Act)	Local Land Services (LLS)	The <i>Local Land Services Act 2013</i> (LLS Act), supported by the Local Land Services Regulation 2014 (LLS Regulation), established 11 regional Local Land Services organisations to provide biosecurity, natural resources management and agricultural advisory services. Under Part 5A of the LLS Act and the supporting regulation, a Native Vegetation Regulatory (NVR) map showing the extent of categorised land in NSW is to be published by the Environment Agency Head (EAH). The NVR map underpins the legislative framework for native vegetation clearing in rural areas by categorising land in NSW. However, the map applies only to the following zones (if they are not in an excluded Local Government Area (LGA)): Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU5 Primary Production Small Lots and Zone RU6 Transition. As the site is currently zoned RU3, with future zoning proposed to be SP2 and C2, the LLS Act and provisions relating to the NVR Map do not apply.
State Environmental Planning Policy (Biodiversity and Conservation) 2021	NSW DCCEEW	SEPP (Biodiversity and Conservation) 2021 commenced in March 2022 and includes several previous planning policies including Koala Habitat Protection 2019 and Koala Habitat Protection 2021, Chapter 3 and 4, respectively. Schedule 2 identifies that the provisions of chapters 3 and 4 apply in the Eurobodalla LGA. For all RU1 (Primary Production), RU2 (Rural Landscape) or RU3 (Forestry) zoned land outside of the Sydney Metropolitan Area and Central Coast, Chapter 3 Koala Habitat Protection 2020 applies. Chapter 3 aims to encourage the proper conservation and management of areas of natural vegetation that may provide

Relevant legislation	Governing Agency	Summary
		habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline. This is to be achieved through identifying areas of core Koala habitat, including these areas in environment protection zones and where required managing development consent in relation to areas of core Koala habitat. An assessment of the Project against the requirements of the SEPP is provided in Section 4.6 of this report.

1.5 Personnel

This BAR was prepared by Umwelt in accordance with the requirements of the BC Act and Stage 1 of the BAM (NSW DPIE 2020a). **Table 1.2** provides details of the Umwelt ecologists involved in the survey, calculations and reporting for the Project.

Table 1.2 Key Personnel

Name	Role	Responsibilities	Qualifications
Rachel Musgrave (15+ years)	Project Director	- Technical oversight and management. - Report review. - Field surveys (vegetation mapping, BAM plots, threatened species surveys).	- Bachelor of Science (Hons) Ecology. - Accredited BAM assessor (BAAS18032).
Clare Vincent (5 years)	Project Manager (from March 2024)	Report preparation.	Graduate Diploma in Environmental Management and Ecology.
Joel Callaghan (7 years)	Project Manager (until September 2023)	- Field surveys (vegetation mapping, BAM plots, threatened species surveys). - Data review. - Report preparation.	Bachelor of Science Hons 1 (Plant ecology).
Kyle Stimson (5 years)	Ecologist	- Field surveys (vegetation mapping, BAM plots, threatened species surveys). - Data review.	Bachelor of Environmental Science (Ecological Conservation).
Matthew Mullaney (4 years)	Ecologist	- Field surveys (vegetation mapping, BAM plots, threatened species surveys). - Data review.	Bachelor of Environmental Science (Applied Ecology).
Chloe D'Monte (1 year)	Report Writer	- Data review. - Report preparation.	Bachelor of Environmental Science (Applied Ecology, Water Science, Integrated Environmental Management and Sustainable Landscapes).

Name	Role	Responsibilities	Qualifications
Kealyn Madden (1 year)	Report Writer	- Data review. - Report preparation.	Bachelor of Science (Animal Behaviour), Flinders University.
Bryce Miller (2+ years)	Ecologist	Field surveys (mapping suitable habitat features such as hollow bearing trees, feed trees, burrows, stick nests, and termite mounds).	Bachelor of Biodiversity and Conservation, Macquarie University.
James Taylor (14+ years)	Spatial analyst	GIS and data management.	Bachelor of Environmental Science (Resource Management).
Travis Williamson (6 years)	Spatial and Visualisation Consultant	GIS and data management.	Bachelor of Applied Geographic Information Systems.

1.6 Database Resources Reviewed

A list of the database that were reviewed as part of this BAR are provided in **Table 1.3**.

Table 1.3 Database Resources Reviewed

Database	Source	Search area
NSW Datasets		
BioNet Atlas	NSW DCCEEW (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet - date accessed – 08/04/2024)	10 km radius around Subject Land
BioNet Threatened Biodiversity Data Collection (TBDC)	NSW DCCEEW (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet - date accessed – 08/04/2024)	Threatened entities
BioNet Vegetation Classification	NSW DCCEEW (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet - date accessed – 04/04/2024)	Plant Community Type (PCT) descriptions
Important Area Maps	NSW DCCEEW (https://customer.lmbc.nsw.gov.au/assessment/s/userlogin?startURL=%2Fassessment%2Fs%2F – date accessed 30/11/2023)	Subject Land
Biodiversity Assessment Method Calculator (BAMC)	NSW DCCEEW (https://customer.lmbc.nsw.gov.au/assessment/s/userlogin?startURL=%2Fassessment%2Fs%2F – date accessed 10/04/2024)	Subject Land
Biodiversity Values Map Threshold Tool (BVMTT)	NSW DCCEEW (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/about-the-biodiversity-offsets-scheme/when-does-bos-apply/biodiversity-values-map - date accessed - 05/05/2022)	Subject Land
SEED - The Central Resource for Sharing and Enabling Environmental Data in NSW	NSW DCCEEW (https://www.environment.nsw.gov.au/eSpade2WebApp - date accessed 04/04/2024)	Subject Land

Database	Source	Search area
eSPADE v2.0	NSW DCCEEW (https://www.environment.nsw.gov.au/eSpade2WebApp - date accessed 05/05/2022)	Subject Land
NSW WeedWise	DPI (https://weeds.dpi.nsw.gov.au/ - date accessed 04/04/2024)	South East Local Land Services region
PlantNet - NSW Flora Online	The Royal Botanic Gardens (https://plantnet.rbgsyd.nsw.gov.au/ - date accessed 16/03/2023)	Species descriptions
Register of Declared Areas of Outstanding Biodiversity Value (AOBV)	NSW DCCEEW (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/areas-of-outstanding-biodiversity-value/area-of-outstanding-biodiversity-value-register - date accessed 04/04/2024)	Subject Land
Commonwealth datasets		
Protected Matters Search Tool (PMST)	Commonwealth DCCEEW (https://www.awe.gov.au/environment/epbc/protected-matters-search-tool - date accessed 05/04/2024)	10 km radius around Subject Land
Register of Critical Habitat	Commonwealth DCCEEW (https://www.environment.gov.au/cgi-bin/sprat/public/publicregisterofcriticalhabitat.pl - date accessed 04/04/2024)	Subject Land
Atlas of Groundwater Dependent Ecosystems (GDEs)	Bureau of Meteorology (BoM) (http://www.bom.gov.au/water/groundwater/gde/ - date accessed 13/04/2022)	Subject Land
Directory of Important Wetlands	Commonwealth DCCEEW (https://www.awe.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands - date accessed 04/05/2023)	Subject Land
A search of the National Flying-fox monitoring viewer accessed by the DAWE Interactive Flying-fox Web Viewer	Commonwealth DCCEEW (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf - date accessed 10/04/2024)	10 km radius around Subject Land

2.0 Site Context

2.1 Assessment Areas

The following key assessment areas and boundaries used in this BAR are detailed in **Table 2.1**.

Table 2.1 Key assessment areas and boundaries

Name	Details	Area (ha)	Figure reference
Subject Land	The land subject to the proposed development. For the purposes of this BDAR, the subject land is predominantly composed of the area directly west of the existing landfill, bounded by the Princes Highway and restricted in the south by the existing public road Brou Tip Road within Lot 1 DP1205476.	8.55	Figure 2.1
Development Site	The area of land that is expected to be directly impacted by the proposed expansion of Brou WMF.	2.80	Figure 2.1
Landscape assessment area	The subject land and the area of land within the 1500-metre buffer zone surrounding the subject land that is determined as per Subsection 3.1.2 of the BAM.	868.14	Figure 3.1

2.2 Landscape Features

The subject land falls within the Southeast Corner Bioregion Interim Biogeographic Regionalisation for Australia (IBRA) bioregion and within the Batemans IBRA subregion. The topography of the subject land is relatively flat, varying between 30 metres above sea level (ASL) in the south and 10 metres ASL in the north. No published soil mapping exists for the area within which the study area occurs, however, NSW Seamless Geology Zone 56 suggests that the soils would be derived from soils from the Lachlan Orogen comprised of sandstone, interbedded with laminated siltstone and mudstone. Soils derived from fluvially-deposited quartz-lithic sand, silt, gravel, and clay may be present within the north of the subject land.

The subject land is comprised of wet sclerophyll forest dominated by *Corymbia maculata*. The subject land falls within a locality which is heavily vegetated, comprised of a variety of different vegetation types including rainforest, wet sclerophyll forest, dry sclerophyll forest, riparian forest and forested wetlands, and coastal vegetation such as coastal scrub, spinifex grasslands, saltmarsh, and littoral forest. Much of the vegetation surrounding the subject land falls within Eurobodalla National Park or Bodalla State Forest.

One unnamed first order stream is mapped as occurring within the north-eastern portion of the subject land; however, this creek line could not be located during field assessment.

Table 2.2 Landscape Features

Landscape feature	Landscape assessment area
IBRA bioregions and subregions	Southeast Corner Bioregion, Batemans subregion
NSW (Mitchell) landscapes	Bega Coastal Foothills
Native vegetation cover	>70% native vegetation cover within the assessment area

Landscape feature	Landscape assessment area
Cleared areas	The subject land is predominantly heavily vegetated, intersected by two unsealed tracks running north/south and east/west. The subject land is located immediately west of the area utilised for the existing waste management facility, which is devoid of native vegetation and heavily disturbed. Cleared agricultural land is located approximately 120 metres north of the subject land.
Rivers, streams and estuaries	The subject land has an unnamed mapped watercourse running into the area from the north-eastern corner, however this could not be ground-truthed through numerous rounds of survey. A small seepage area was identified within the subject land however this appeared to be associated with the detention ponds within the waste management facility to the east of the subject land and did not appear to correspond with the mapped watercourse. One first order ephemeral tributary off Whittakers Creek is located south of the subject land.
Wetlands	The Tuross River Estuary is a listed Nationally Important Wetland located approximately 8 kilometres from the Subject Land. The unnamed watercourse does not flow into the Tuross River Estuary. The Protected Matters Search identified a Commonwealth Marine Area – EEZ and Territorial Sea – as occurring within 10 kilometres of the subject land.
Connectivity features	The native vegetation in the subject land is semi-contiguous (separated by the Princes Highway) with Eurobodalla National Park and Bodalla State Forest. Bodalla State Forest is part of a larger area of native vegetation that includes Kooraban National Park, Wadbilliga National Park, Gulaga National Park and Deua National Park.
Areas of geological significance and soil hazard features	No karst, caves, crevices, cliffs, rocks or other geological features of significance were observed within the Subject Land. No area(s) of acid sulphate soil risk occur in the Subject Land.
Areas of outstanding biodiversity value (AOBV)	The subject land and the development footprint do not contain any areas of outstanding biodiversity value as identified under the BC Act.
Important Habitat Mapping	The subject land falls within the Swift Parrot Important Habitat area.
Biodiversity Values Mapping	The subject land falls within threatened species or communities with potential for serious and irreversible impacts

2.2.1 Native Vegetation cover

The native vegetation cover within the landscape assessment area was determined through site surveys of the subject land and aerial photograph interpretation using ArcMap of aerial imagery (year 2014). Field reconnaissance of areas of private land were not undertaken due to access constraints and is considered unnecessary due to the high quality of aerial imagery available.

Table 2.3 Native Vegetation Cover in the Assessment Area

Details	Area (ha)
1500 m landscape assessment area (ha)	868.13
Total area of native vegetation cover (ha)	719.92
Percentage of native vegetation cover (%)	83
Class (0-10, >10-30, >30-70, >70%)	>70

FIGURE 2.1
Site Map

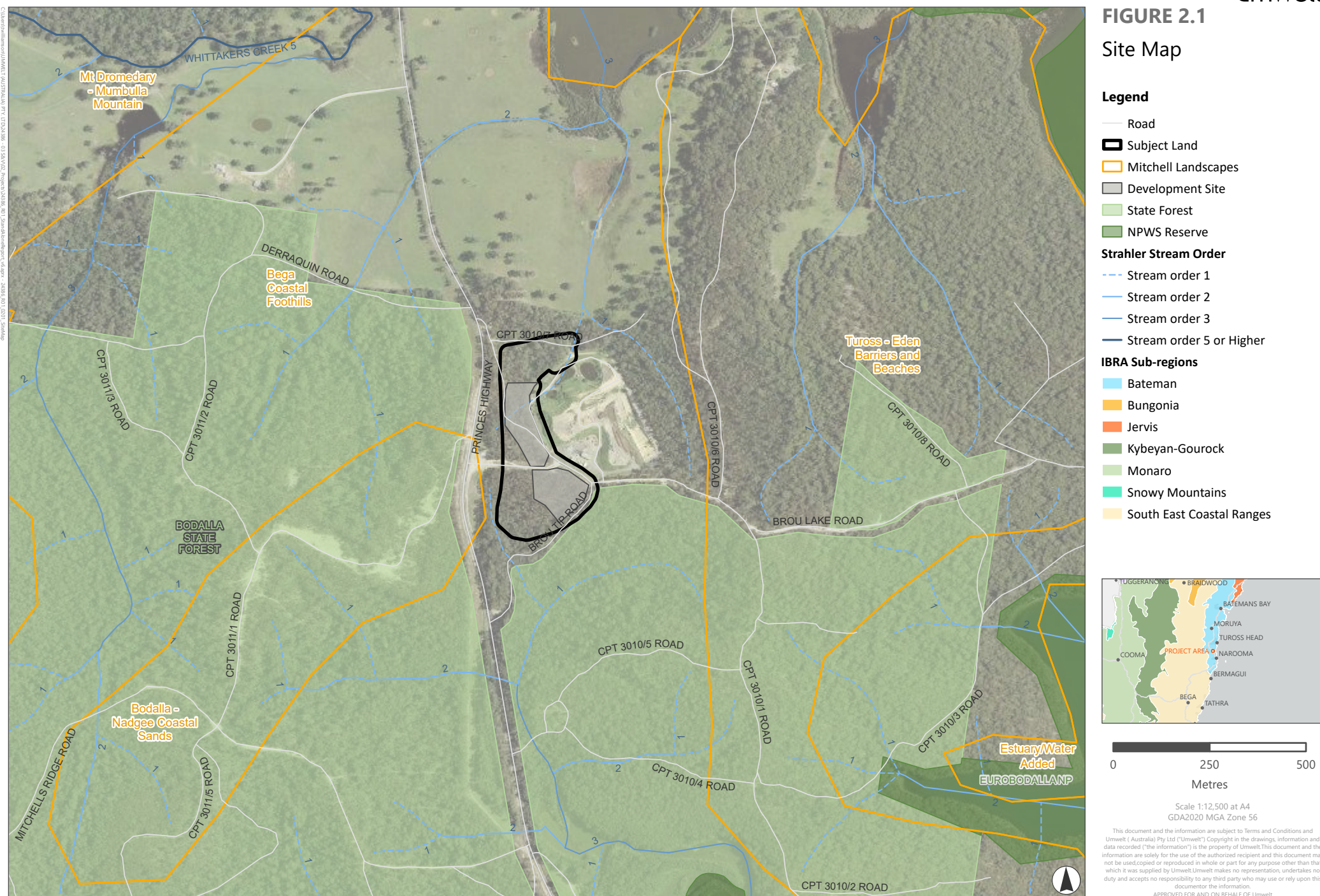
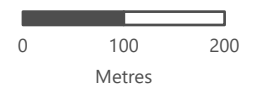
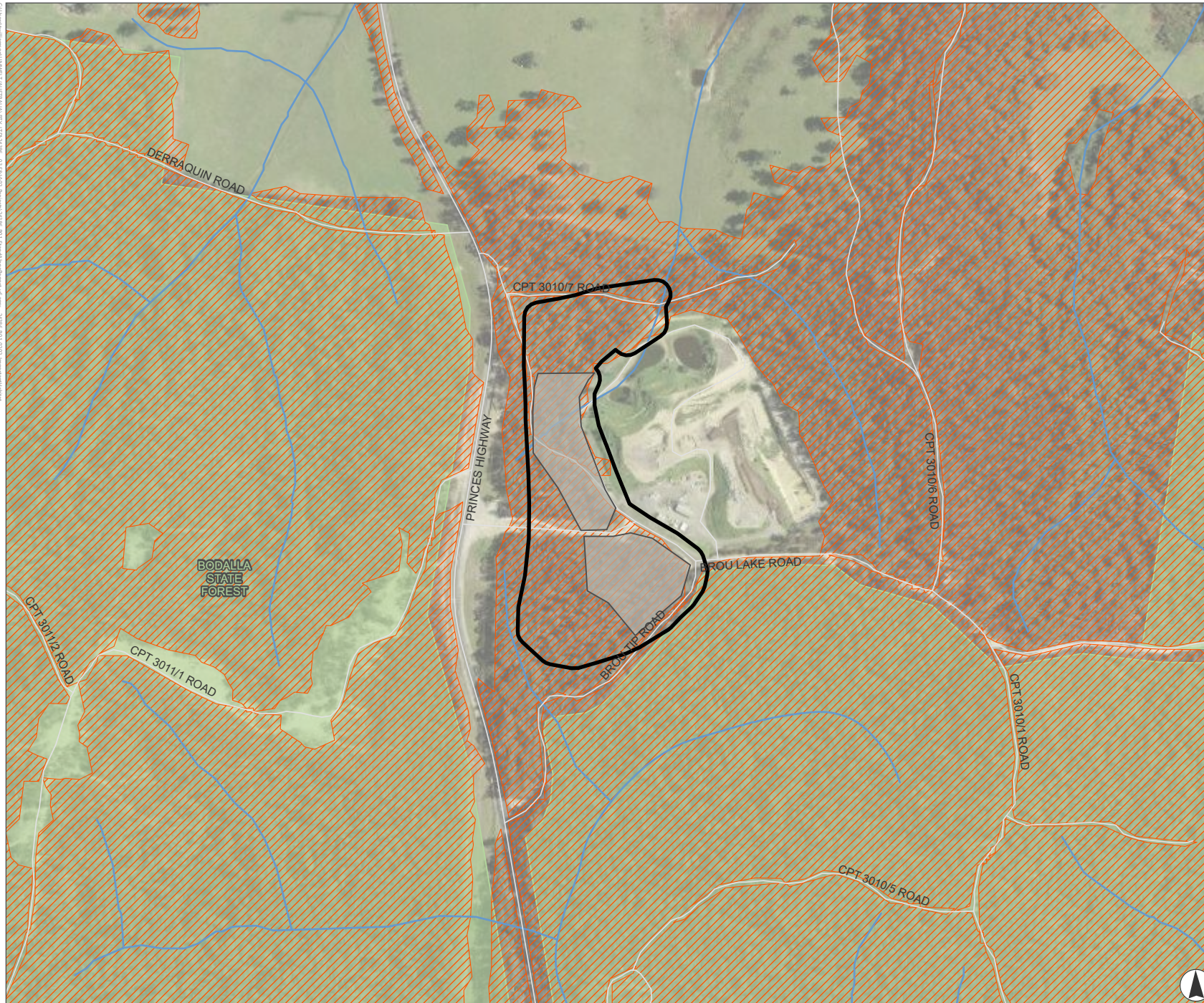


FIGURE 2.2
Important Habitat Map

Legend

-  Road
-  Watercourse
-  Subject Land
-  Development Site
-  State Forest
-  NPWS Reserve
-  Important Habitat Mapping for the Swift Parrot (*Lathamus discolor*)

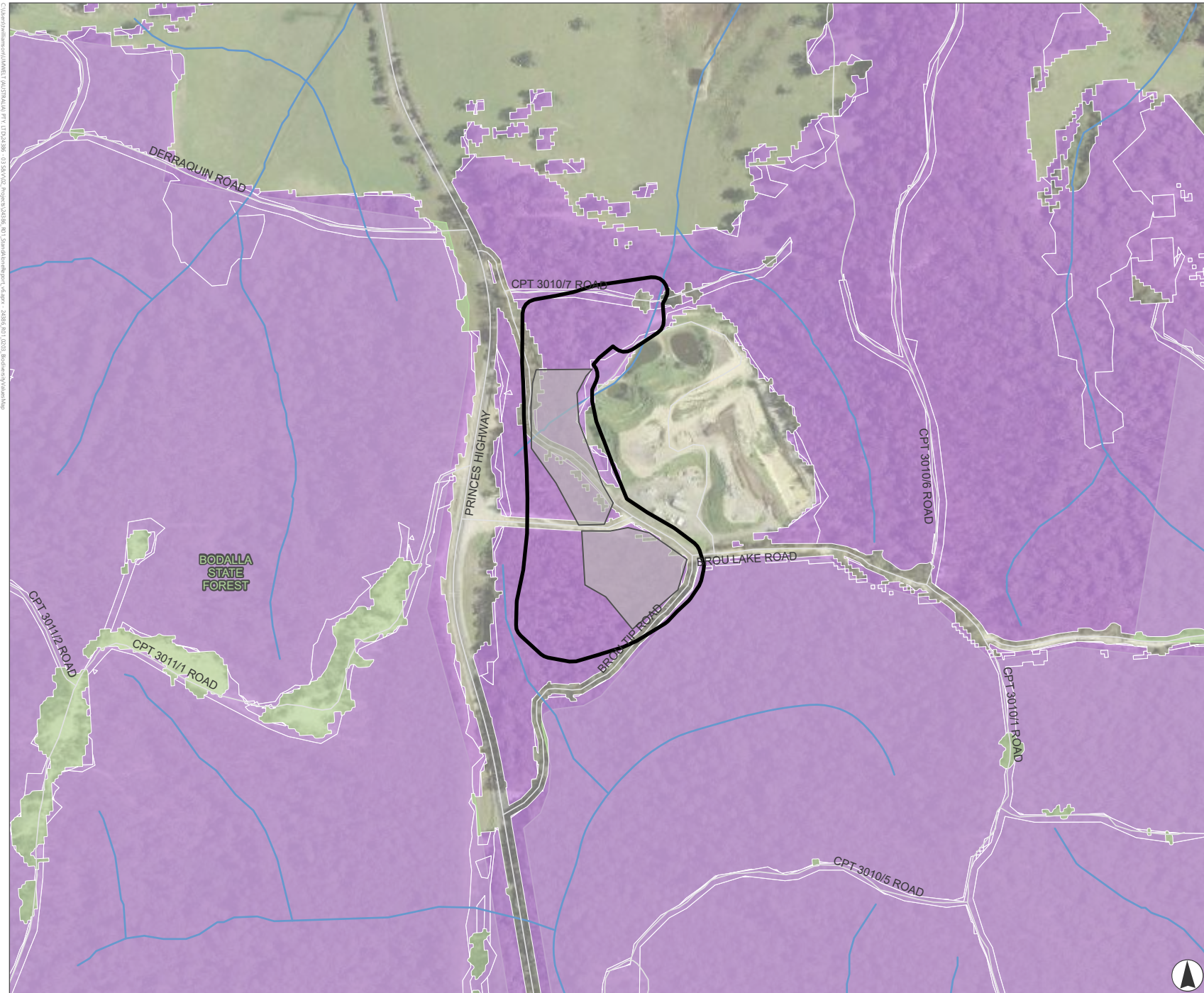


Scale 1:7,500 at A4
GDA2020 MGA Zone 56

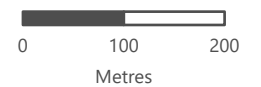
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FIGURE 2.3
Biodiversity Values Map



- Legend**
- Road
 - Watercourse
 - ▭ Subject Land
 - ▭ Development Site
 - ▭ State Forest
 - ▭ NPWS Reserve
 - ▭ Biodiversity Values Map



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3.0 Native vegetation

3.1 Method

3.1.1 Background Research

The following existing information was reviewed to inform the identification of Plant Community Types (PCTs) and Threatened Ecological Communities (TECs) within the subject land:

- BioNet Vegetation Classification Database (DPIE 2021c), last accessed April 2024.
- DCCEE Protected Matters Search Tool for known/predicted EPBC Act-listed TECs, last accessed April 2024.

The following four sets of regional vegetation mapping were considered to inform the preliminary assessment of the vegetation communities present within the project site and preliminary survey corridor:

- Vegetation Map – Southeast NSW Native Vegetation (SCIVI), VIS_ID 2230 (DPE 2021).
- Vegetation Map – Southern Forests, VIS_ID 3858 (DPE 2011).
- Compilation map: Biometric vegetation types of the Shoalhaven, Eurobodalla and Bega Valley local government areas. Version 2.1. VIS_ID 3900 (DPE 2013).
- NSW State Vegetation Type Map. Current Release C1.1.M1.1 (December 2022).

3.1.2 Mapping Native Vegetation Extent

Digital imagery (aerial photographs) of the subject land was viewed prior to and after vegetation survey to identify spatial patterns in vegetation, land use and landscape features.

The regional vegetation mapping was ‘ground-truthed’ in areas within the subject land and the mapping was updated where required. Vegetation mapping was carried out over four working days between May 2022 and June 2022. Vegetation within the subject land was mapped via the following method:

- Transects and traverses using a hand-held tablet containing ArcCollector to record boundaries of, and variation within stratification units not apparent from aerial imagery.
- Collection of data (rapid mapping points (RMPs)) to obtain information on vegetation community structure and distribution, to accurately assign stratification units to vegetation communities.
- Collection of plot and transect data in line with the BAM 2020.

RMP surveys were limited to collecting data on dominant species, including cover and abundance, within a 20 metre by 20 metre quadrat where feasible. Incidental notes recording details on the presence of weeds, evidence of pests, pathogens, and disturbance regimes were also taken to provide justification for condition classes.

The extent of native vegetation within the subject land was confirmed during the field survey.

Mapping was undertaken using QGIS 3.16 and ESRI ArcMap 10.6.

3.1.2.1 Areas that are Not Native Vegetation

Cleared land and exotic vegetation was found to occur within the eastern portions of the subject land, being areas of the existing Brou WMF that are actively being used for waste disposal. These areas were either devoid of vegetation in its entirety or comprised of exotic vegetation. It should be noted that commonly occurring native species with high tolerance for ongoing disturbance regimes may occur in very low density across both the cleared land and exotic vegetation.

3.1.3 Plot-Based Floristic and Vegetation Integrity Survey

Plot-based floristic vegetation surveys and vegetation integrity (VI) plots (BAM VI plot surveys) were conducted in accordance with Section 5.2 and 5.3 of the BAM. BAM plot surveys were carried out for vegetation zones occurring within the Subject Land. The number of plots required for each vegetation zone was calculated in accordance with Table 4 of the BAM, as detailed within **Table 3.1**.

A total of four BAM VI plots were carried out across the Subject Land. PCT 3275: South Coast Spotted Gum Cycad Dry Forest -Thinned/Disturbed was originally mapped as cleared vegetation before being classified as a native vegetation community. As such, no BAM VI plots were carried out within this area. This data would need to be collected to inform a BAM assessment and BDAR as part of an EIA approval for the Project.

The locations of the BAM plot and transect surveys were determined by pacing a distance into the targeted vegetation zone on a random compass bearing, and then walking to that marked location. The randomly marked location became the plot midline for which composition and structure data was collected from a 400 m squared plot and function data collected from a 1,000 metre squared plot.

Floristic composition and structure data were collected from within a 400 metre squared plot (standard 20 metre x 20 metre) and included:

- Species name: Scientific and common name.
- Status: Species status: native, exotic or high threat exotic.
- Growth form: Growth form classes: tree, shrub, grass, and grass like, forb, fern and other.
- Stratum (and layer) in which each species occurs.
- Cover: Percent foliage cover across the plot for each species rooted in or overhanging the plot (Section 5.3.4.13 of the BAM).
- Abundance: For species with less than or equal to five per cent cover an estimate of the number of individuals or shoots of each species was recorded (Table 2 of the BAM).

Species naming, and classification was undertaken in accordance with the naming conventions and botanical keys provided by PlantNET (Royal Botanic Gardens and Domain Trust). Those plant species which could not be identified were sent to the NSW Herbarium at the Royal Botanic Gardens Sydney (RBGS) for verification.

Following field data collection, native plant species recorded within each plot were assigned to a growth form group (i.e., shrub, grass and grass like, forb, fern and other) according to the DPI lookup table or the definitions set out in Table 15 of the BAM. Similarly, the species status (i.e., native, exotic or high threat exotic) was determined for each species based on the DPI lookup table.

Floristic function data was collected from within a 1,000 metre squared plot (standard 20 metre x 50 metre) and included:

- Number of large trees: With reference to the appropriate large tree benchmark for each PCT.
- Tree regeneration: Presence or absence of living trees with < 5 centimetre diameter at breast height (DBH) over bark.
- Tree stem size class: 5-9, 10-19, 20-29, 30-49, 50-79 and > 80 centimetre DBH.
- Length of fallen logs: Total length in metres of all woody material >10 centimetre in diameter and > 50 centimetre in length.
- Trees with hollows: Count of the number of trees with hollows that are visible from the ground.

Litter coverage (as a percentage) was also measured from within five, one square metre sub-plots located evenly along and either side of the 50-metre plot midline. Litter was considered as plant material detached from a plant including leaves, seeds, twigs, branchlets and branches with a diameter of < 10 centimetres and in contact with the ground. The percentage litter cover from the five sub-plots was used to generate the average percentage litter cover for the entire plot.

Native vegetation was also assessed for its potential to align with a TEC listed under the EPBC Act and/or BC Act as defined within their respective Final Determinations.

Table 3.1 Minimum Number of Plots Required and Completed Per Vegetation Zone

Zone ID	PCT	Condition	BC Act	EPBC Act	Area within Subject Land (ha)	Area within Development Footprint (ha)	No. plots required	No. plots completed (plot IDs)
Zone 1	PCT 3275: South Coast Spotted Gum Cycad Dry Forest	Moderate-good	Not listed	Not listed	6.3	2.7	2	3
Zone 2	PCT 3275: South Coast Spotted Gum Cycad Dry Forest	Thinned/disturbed	Not listed	Not listed	0.3	0.1	1	0
Zone 3	PCT 3272: South Coast Lowland Creekflat Forest	Moderate-good	River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	0.7	0.0	1	1
Zone 4	Non-native	-	-	-	0.5	0.0	-	-
Zone 5	Cleared	-	-	-	0.8	0.1	-	-

Legend

-  Road
 Watercourse
 Subject Land
 Development Site
 Native Vegetation



Scale 1:20,000 at A4
GDA2020 MGA Zone 56

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3.2 Plant Community Types

3.2.1 Overview of Plant Community Types

The native vegetation within the subject land was identified to a PCT as described in the BioNet Vegetation Classification System. The data collected during field surveys was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification system. Consideration was given to the following:

- Occurrence within the Sydney Basin bioregion and Jervis subregion.
- Vegetation formation.
- Landscape position.
- Dominant upper, mid and ground strata species.

The vegetation assessment initially identified two PCTs within the Subject Land based on the PCTs available prior to the release of the revised PCTs for eastern NSW and associated update to the BAM-C which occurred in February 2023, as follows:

- PCT 1220: Spotted Gum - White Stringybark - Burrawang shrubby open forest on hinterland foothills, northern Southeast Corner Bioregion.
- PCT 1108: River Peppermint - Rough-barked Apple - River Oak herb/grass riparian forest of coastal lowlands, southern Sydney Basin Bioregion and Southeast Corner Bioregion.

Subsequent to being mapped onsite, these PCTs were decommissioned following the release of the revised PCTs for eastern NSW. Due to decommissioning, neither PCT 1220 nor PCT 1109 were available for use within the BAMC. As a result, two new PCTs, released as part of the revised PCTs for eastern NSW, were selected with reference to BAM VI plot data and the PCT lineage spreadsheet (released by NSW DCCEEW as part of the revised PCT classifications).

Areas of mapped PCTs were stratified into vegetation zones based on their broad condition classifications. Vegetation zones have also been delineated for non-native vegetation and cleared land (**Table 3.2**).

All vascular plants recorded or collected within plots and on meandering transects were identified using keys and nomenclature in Harden (1992, 1993, 2000 and 2002). Where known, changes to nomenclature and classification have been incorporated into the results. Updated taxonomy has been derived from PlantNET (Botanic Gardens Trust 2023).

Common names follow Harden (1992, 1993, 2000 and 2002) where available, and draw on other sources such as local names where these references do not provide a common name.

Table 3.2 PCTs Identified Within the Subject Land

PCT Id	PCT Name	Vegetation Class	Vegetation Formation	BioNet Percentage Cleared estimate	Vegetation Zones	Plots Completed	Total Area of PCT in Subject Land (ha)	Total Area of PCT in Development Footprint (ha)
3272	South Coast Lowland Creekflat Forest	Southern Lowland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	9%	Moderate-good	1	0.7	0.0
3275	South Coast Spotted Gum Cycad Dry Forest	Southern Lowland Wet Sclerophyll Forests	Wet Sclerophyll Forests (Grassy sub-formation)	14%	Moderate-good	3	6.3	2.7
					Thinned / disturbed	0	0.3	0.1
Cleared	Cleared	n/a	n/a	n/a	3	n/a	0.8	n/a
Non-native vegetation	Non-native vegetation	n/a	n/a	n/a	4	n/a	0.5	n/a

FIGURE 3.2
Plant Community Types



Legend

- Road
- Watercourse
-  Subject Land
-  Development Site
-  State Forest

Plant Community Types

-  3272 - South Coast Lowland Creekflat Forest
-  3275 - South Coast Spotted Gum Cycad Dry Forest
-  Exotic Vegetation
-  Water
-  Cleared



0 50 100
Metres

Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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3.2.2 PCT 3272 South Coast Lowland Creekflat Forest

3.2.2.1 PCT Description

PCT 3272 according to the BioNet Classification System is a tall to very tall shrubby sclerophyll open forest that is restricted to small damp clayey flats on minor, intermittent creeks in low hills of the coast and hinterland of the upper South East Corner bioregion.

Tree canopy (variable, sparse to mid-dense) may include the following:

- *Eucalyptus longifolia*, *Corymbia maculata* and *Angophora floribunda*.

Mid-stratum (sparse to mid-dense) may include:

- Common species: *Hibbertia aspera*, *Notelaea venosa* and *Elaeocarpus reticulatus*.
- Occasional species: *Myrsine howittiana*, *Acacia longifolia*, *Breynia oblongifolia*, *Leptospermum polygalifolium*, *Ozothamnus diosmifolius*, *Acacia irrorata*, *Backhousia myrtifolia* or *Sannantha pluriflora*.

Ground layer is influenced by intermittent water events, and may include:

- Usually present: *Lomandra longifolia*, *Dichondra repens*, *Adiantum aethiopicum*.
- Common species: *Oplismenus imbecillis*, *Lobelia purpurascens*, *Pseuderanthemum variabile*, *Carex longebrachiata*, *Dianella caerulea*, *Eustrephus latifolius*, *Entolasia stricta*, *Glycine clandestina* and *Parsonsia straminea*, *Gynochthodes jasminoides*, *Cissus hypoglauca*, *Tylophora barbata* and *Geitonoplesium cymosum*, *Entolasia marginata*, *Microlaena stipoides* and *Imperata cylindrica*, *Pteridium esculentum*, *Lepidosperma laterale*.
- Occasional species: *Gahnia melanocarpa*, *Hydrocotyle sibthorpioides*, *Doodia aspera* and *Hypolepis muelleri*.

Table 3.3 Overview of PCT 3272 South Coast Lowland Creekflat Forest

PCT 3272: South Coast Lowland Creekflat Forest	
Vegetation Class	Southern Lowland Wet Sclerophyll Forests
Vegetation Formation	Wet Sclerophyll Forests (Grassy sub-formation)
Estimate of Percentage Cleared	9
Area in Subject Land	0.7 ha
Conservation status	• River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered – BC Act). • River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (Critically Endangered – EPBC Act).
Vegetation zones (condition) and plots	One plot

3.2.2.2 Justification of PCT Selection

The PCT (3272) was chosen due to the location, landscape position, and flora identified at the site (see Table 3.4 below).

Table 3.4 Floristic and structural summary of PCT 3272 within the study area

Growth form	Details of PCT within Subject Land
IBRA Subregion	Bateman
Landscape position	Located on a coastal floodplain on the eastern side of the Great Dividing Range.
Soils and geology	The Murrah soil landscape is comprised of Ordovician sediments and metasediments which includes siltstones, greywackes, shales and fine sandstones.
Floristic Description – Canopy stratum	<i>Angophora floribunda</i> , <i>Corymbia maculata</i> , <i>Eucalyptus globoidea</i> , <i>Allocasuarina torulosa</i> .
Floristic Description – Mid stratum	<i>Hibbertia aspera</i> , <i>Elaeocarpus reticulatus</i> , <i>Notelaea venosa</i> , <i>Acacia mearnsii</i> , <i>Pittosporum undulatum</i> .
Floristic Description – Ground stratum	<i>Pteridium esculentum</i> , <i>Asplenium flabellifolium</i> , <i>Lomandra longifolia</i> , <i>Entolasia stricta</i> , <i>Lepidosperma laterale</i> , <i>Microlaena stipoides</i> , <i>Imperata cylindrica</i> , <i>Oplismenus aemulus</i> , <i>Echinopogon caespitosus</i> , <i>Dichondra repens</i> , <i>Lobelia purpurascens</i> , <i>Hydrocotyle laxiflora</i> , <i>Gonocarpus teucroides</i> , <i>Gonocarpus teucroides</i> , <i>Glycine clandestine</i> , <i>Parsonsia straminea</i> , <i>Marsdenia rostrata</i> , <i>Macrozamia communis</i> .

3.2.3 PCT 3275 - South Coast Spotted Gum Cycad Dry Forest

3.2.3.1 PCT Description

PCT 3275 according to the BioNet Classification System is a tall to very tall sclerophyll open forest with a dry shrub layer that is common on crests, exposed and semi sheltered upper slopes of the coastal lowland and hinterland ranges between Moruya and Batemans Bay area. It is very frequently associated with granodiorites or sandstones of the Abercrombie Formation.

Tree canopy may include the following:

- *Corymbia maculata*, commonly with *Eucalyptus paniculata* and *Eucalyptus globoidea*.

Mid-stratum (variable, sparse to high cover) may include:

- *Allocasuarina littoralis* or tall *Acacia* species.
- *Persoonia linearis*, commonly with *Leucopogon lanceolatus* and *Macrozamia communis*.

Ground layer (mid-dense) may include:

- *Dianella caerulea*, *Entolasia stricta*, *Imperata cylindrica*, *Lomandra longifolia*, *Lepidosperma laterale*, *Microlaena stipoides*, *Hardenbergia violacea* and *Glycine clandestina*.

Table 3.5 Overview of PCT 3275 - South Coast Spotted Gum Cycad Dry Forest

PCT 3275: South Coast Spotted Gum Cycad Dry Forest	
Vegetation Class	Southern Lowland Wet Sclerophyll Forests
Vegetation Formation	Wet Sclerophyll Forests (Grassy sub-formation)
Estimate of Percentage Cleared	14
Area in Subject Land	6.6 ha
Conservation status	Not a TEC
Vegetation zones (condition) and plots	Three plots

3.2.3.2 Justification of PCT Selection

The PCT (3275) was chosen due to the location, landscape position, and flora identified at the site (see Table 3.6 below).

Table 3.6 Floristic and structural summary of PCT 3275 within the study area

Growth form	Details of PCT within Subject Land
IBRA Subregion	Bateman
Landscape position	Located on a coastal floodplain on the eastern side of the Great Dividing Range.
Soils and geology	The Subject Land occurs across two soil landscapes: the Murrah soil landscape and the Quondolo soil landscape. The Quondolo soil landscape consists of stony, hard-setting soils with high erodibility, low moisture availability and low fertility. The Murrah soil landscape is characterised by steeper terrain, seasonal waterlogging, high erodibility, infertility, acidity and stoniness (Tulau 2002).
Floristic Description – Canopy stratum	<i>Corymbia maculata</i> , <i>Eucalyptus globoidea</i> .
Floristic Description – Mid stratum	<i>Acacia mearnsii</i> , <i>Acacia</i> , <i>Persoonia linearis</i> , <i>Leucopogon lanceolatus</i> , <i>Macrozamia communis</i> .
Floristic Description – Ground stratum	<i>Entolasia stricta</i> , <i>Imperata cylindrica</i> , <i>Lomandra longifolia</i> , <i>Lepidosperma laterale</i> , <i>Microlaena stipoides</i> , <i>Glycine clandestine</i> .

3.3 Vegetation Zones and Vegetation Integrity Score

A map of the PCT vegetation condition zones is provided in **Figure 3.3** and the details of each PCT condition zone, including area, patch size class and the BAM survey plots required and completed are provided in **Table 3.7** below.

Table 3.7 Vegetation Zones (VZ)

VZ ID	PCT	Condition State	Patch Size Class	Area within Subject Land (ha)	Area within Development Footprint (ha)	TEC (Y/N)?	Compostion condition score	Structure condition score	Function condition score	VI Score	Hollow Bearing Trees present (Y/N)?
1	3275	Good-moderate	≥100 ha	6.3	2.7	N	88.7	78.6	70.4	78.9	N
3	3272	Good-moderate	≥100 ha	0.7	0.0	Y	69.2	72.5	81.6	74.3	Y
4	Non-native	-	-	0.5	0.0	-	-	-	-	-	-
5	Cleared	-	-	0.8	0.1	-	-	-	-	-	-

BAM VI Plot not completed in Zone 2. This is PCT 3275 thinned/disturbed. A BAM VI would need to be carried out in this vegetation zone for the Project EIA.

FIGURE 3.3
Vegetation Zones



Legend

■ BAM Vegetation Integrity Plot

— Road

— Watercourse

▭ Subject Land

▭ Development Site

▭ State Forest

Vegetation Zones

▭ Zone 1 - PCT3275 Good - moderate

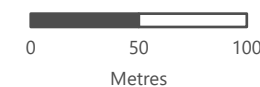
▭ Zone 2 - PCT3275 thinned/disturbed

▭ Zone 3 - PCT3272 Good - moderate

▭ Zone 4 - Non-native Vegetation

▭ Zone 5 - Cleared

▭ Water



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3.4 Threatened Ecological Communities

3.4.1 Overview

During the site visit, the following two TECs were found to occur within the Study Area:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act - endangered).
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (EPBC Act - critically endangered).

A brief description of each TEC and its occurrence within the Study Area is provided in **Table 3.8**.

Table 3.8 Threatened Ecological Communities present within the Subject Land

TEC	PCT	Condition State	BC Act	EPBC Act	SAII	Area within Subject Land (ha)	Area within Development Footprint (ha)
River-flat eucalypt forest on coastal floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	3272	Moderate-good	E	Not listed	N	0.7	0.0
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria			Not listed	CE			

3.4.2 River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act)

3.4.2.1 Assessment against Final Determination – Biodiversity Conservation Act 2016

Within the Subject Land, PCT 3272 has been assessed as conforming to BC Act TEC - River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. The following justification outlines how PCT 3272 conforms to this TEC.

- Location: The Subject Land occurs in the South Eastern Corner IBRA region and in the Batemans IBRA subregion.
- Species assemblage: The mapped occurrences of PCT 3272 within the Subject Land support species characteristic of this TEC such as *Angophora floribunda*, *Dichondra repens*, *Echinopogon caespitosus*, *Entolasia stricta*, *Eustrephus latifolius*, *Glycine clandestine*, *Lomandra longifolia*, *Oplismenus aemulus*, *Pteridium esculentum*, and *Microlaena stipoides*.
- Vegetation structure: The mapped extents of PCT 3272 occurs as a floodplain forest.
- Landform: The mapped occurrence of PCT 3272 occurs on a drainage line associated with a coastal floodplain.

3.4.3 River-flat Eucalypt Forest on Coastal Floodplains of southern New South Wales and eastern Victoria – Critically Endangered Ecological Listing (EPBC Act)

3.4.3.1 Assessment against Final Determination – Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act listed River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria requires vegetation to meet specific condition and size requirements for definition of the TEC under the EPBC Act (DAWE 2020).

Umwelt has assessed EPBC Act listed River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria as occurring within the Study Area. Justification for this decision is in Table 3.9 below.

Table 3.9 Justification of the presence of the River-flat eucalypt forest on Coastal Floodplains of southern New South Wales and Victoria in the Subject Land

Key Diagnostic Characteristics as per the Conservation Advice (DAWE 2020)	PCT 3272 in the Subject Land
Occurs in the South East Corner and Sydney Basin IBRA Bioregions, in eastern Victoria and south eastern New South Wales.	Subject Land occurs in the South East Corner IBRA Bioregion.
Occurs within catchments of the eastern and southern watershed of the Great Dividing Range.	Subject Land is located on a coastal floodplain on the eastern side of the Great Dividing Range.
Occurs at elevations up to 250 m above sea-level (ASL), but most typically below 50 m ASL.	PCT 3272 within the Subject Land occurs below 250 metres ASL.
Occurs on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates, including floodplains, river-banks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans.	PCT 3272 within the Subject Land occurs along an ephemeral creek line associated with a coastal floodplain.
Occurs on alluvial soils of various textures including silts, clay loams, sandy loams, gravel and cobbles. Does not occur on soils that are primarily marine sands, or aeolian sands.	The Subject Land occurs on the Murrah soil landscape. The Murrah soil landscape is comprised of Ordovician sediments and metasediments which includes siltstones, greywackes, shales and fine sandstones. The Subject Land is unlikely to occur or support areas of vegetation on marine or aeolian sands.
Occurs as a tall closed-forest, tall open-forest, closed forest, open forest, tall woodland, or woodland. The canopy has a crown cover of at least 20 percent.	The occurrence of PCT 3272 in the Subject Land occurred as an open forest. The occurrence of PCT 3272 in the Subject Land appeared to support a canopy cover of over 20 percent.
Has a canopy dominated by one or a combination of the following species: <i>Angophora floribunda</i> , <i>A. subvelutina</i> , <i>Eucalyptus amplifolia</i> , <i>E. baueriana</i> , <i>E. benthamii</i> , <i>E. bosistoana</i> , <i>E. botryoides</i> , <i>E. botryoides</i> x <i>E. saligna</i> , <i>E. elata</i> , <i>E. grandis</i> , <i>E. longifolia</i> , <i>E. moluccana</i> , <i>E. ovata</i> , <i>E. saligna</i> , <i>E. tereticornis</i> , <i>E. viminalis</i> .	The occurrence of PCT 3272 in the Subject Land supported a dominant canopy of <i>Angophora floribunda</i> .

Key Diagnostic Characteristics as per the Conservation Advice (DAWE 2020)	PCT 3272 in the Subject Land
A patch is a discrete and mostly continuous area of the ecological community, as defined by the key diagnostic characteristics, but can include small-scale (<30 m) variations, gaps and disturbances within this area. The smallest patch size that can be identified is 0.5 ha.	The patch of PCT 3272 occurring within and extending outside of the Subject Land is larger than 0.5 ha.
≥ 30% of its total perennial understorey vegetation cover is comprised of native species.	The understorey cover of PCT 3272 is comprised of at least 30 percent native vegetative cover.
and	
Ground cover richness ≥ four native species per sample plot.	The understorey cover of PCT 3272 contains greater than four native species per sample plot.

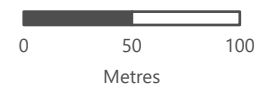
FIGURE 3.4
Threatened Ecological Communities

Legend

- Road
- Watercourse
- ▬ Subject Land
- ▬ Development Site
- State Forest

BC Act Threatened Ecological Communities

- River-Flat Eucalypt Forest on Coastal Floodplains



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3.5 Groundwater Dependant Ecosystems

Impacts to Groundwater Dependant Ecosystems (GDE) have been assessed in accordance with the high ecological value aquatic ecosystem (HEVAE) framework. This involved investigating the following dataset Groundwater Dependent Ecosystems Atlas (BOM 2024).

Groundwater dependent ecosystems (GDEs) rely on the presence of groundwater to function and sustain the resident assemblage of species, populations, and ecological communities. The level of groundwater dependence of vegetation communities in the Study Area has been identified using the GDE Atlas (BoM 2024) and the risk assessment guidelines for GDE (Serov et al. 2012).

The GDE Atlas delineates and provides information about the following three types of GDEs (BoM 2024):

- Aquatic ecosystems that rely on the surface expression of groundwater – this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands, and springs. Marine and estuarine ecosystems can also be groundwater dependent, but they are not mapped in the GDEs Atlas.
- Terrestrial ecosystems that rely on the subsurface presence of groundwater – this includes all vegetation ecosystems.
- Subterranean ecosystems – this includes cave and aquifer ecosystems.

According to the GDEs Atlas, the Subject Land is mapped as supporting terrestrial GDEs (**Table 3.10**).

Table 3.10 Terrestrial GDEs potentially occurring in the Study Area

GDE type	Potential GDE	Landscape feature
Terrestrial	High potential GDE – regional studies	Area of PCT 3275
Terrestrial	Moderate potential GDE – regional studies	Area of PCT 3272 and PCT 3275
Terrestrial	Low potential GDE – regional studies	Area of PCT 3275

3.6 Other Vegetation

3.6.1 Cleared Area and Non-native Vegetation

Cleared land and exotic vegetation was found to occur within the eastern portions of the subject land, within areas of the Brou WMF that is actively being used for waste disposal. These areas were either devoid of vegetation in its entirety or comprised of exotic vegetation. It should be noted that commonly occurring native species with high tolerance for ongoing disturbance regimes may occur in very low density across both the cleared land and exotic vegetation.

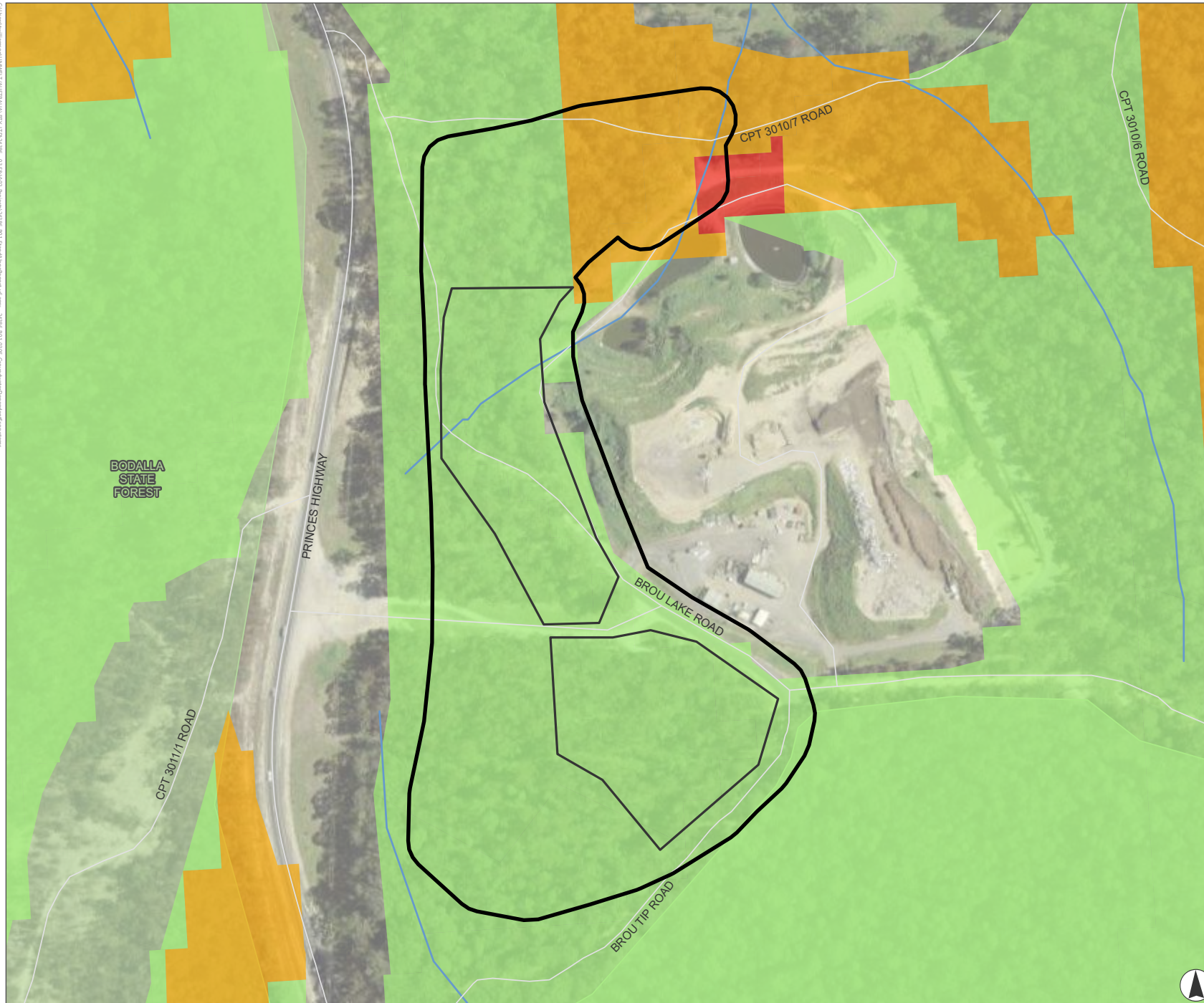
FIGURE 3.5
Groundwater Dependent
Ecosystems

Legend

- Road
- Watercourse
- ▬ Subject Land
- ▬ Development Site
- State Forest

Terrestrial Groundwater Dependent Ecosystems

- High potential GDE - from regional studies
- Low potential GDE - from regional studies
- Moderate potential GDE - from regional studies



Metres

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4.0 Threatened Species

4.1 Ecosystem Species

4.1.1 Identification of Ecosystem Credit Species

Table 4.1 identifies species that can be reliably predicted by habitat surrogates (ecosystem credit species) that were considered for assessment. Species have been identified using one or multiple of the BAM-C automatically populated list, Protected Matters Search Tool (PMST), or BioNet Atlas records. A number of species listed are classified as both ecosystem and species credit species. In this instance the species is listed in both **Table 4.1** and **Table 4.3**. Justification for inclusion in further assessment is detailed in **Table 4.2**.

Table 4.1 Summary of Ecosystem Credit Species considered as part of this assessment

Common Name <i>Species Name</i>	BC Act	EPBC Act	Credit Status	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Sensitivity to gain class
Birds								
Regent Honeyeater <i>Anthochaera Phrygia</i> (Foraging)	CE	CE	Ecosystem/Species	BAM-C, Atlas, MNES	3275 3272	Important habitat mapping	-	High
Dusky Woodswallow <i>Artamus cyanopterus cyanopterus</i>	V	-	Ecosystem	BAM-C	3275 3272	-	-	Moderate
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> (Foraging)	V	E	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	-	-	Moderate
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus lathami lathami</i> (Foraging)	V	V	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	Other Presence of <i>Allocasuarina</i> and <i>Casuarina</i> species.	-	High
Brown Treecreeper <i>Climacteris picumnus victoriae</i> (eastern subspecies)	V	V	Ecosystem	BAM-C, MNES, Atlas	3275 3272	-	-	High
Varied Sittella <i>Daphoenositta chrysoptera</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	Moderate
Little Lorikeet <i>Glossopsitta pusilla</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	High
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i> (foraging)	V	-	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	Waterbodies Within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines.	-	High
Little Eagle <i>Hieraaetus morphnoides</i> (Foraging)	V	-	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	-	-	Moderate

Common Name <i>Species Name</i>	BC Act	EPBC Act	Credit Status	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Sensitivity to gain class
White-throated Needletail <i>Hirundapus caudacutus</i>	V	V	Ecosystem	BAM-C, MNES, Atlas	3275 3272	-	-	High
Black Bittern <i>Ixobrychus flavicollis</i>	V	-	Ecosystem	BAM-C	3275 3272	Waterbodies. Land within 40m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation.	-	Moderate
Swift Parrot <i>Lathamus discolor</i> (Foraging)	E	CE	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	Important habitat mapping	-	Moderate
Square-tailed Kite <i>Lophoictinia isura</i> (Foraging)	V	-	Ecosystem/Species	BAM-C, Atlas	3275 3272	-	-	Moderate
Olive Whistler <i>Pachycephala olivacea</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	Moderate
Eastern Osprey <i>Pandion cristatus</i> (Foraging)	V	-	Ecosystem/Species	BAM-C, Atlas	3275 3272	-	--	Moderate
Scarlet robin <i>Petroica boodang</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	Moderate
Flame Robin <i>Petroica phoenicea</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	Moderate
Superb Fruit-Dove <i>Ptilinopus superb</i>	V	-	Ecosystem	BAM-C	3275 3272	-	-	Moderate
Mammals								
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	V	E	Ecosystem	BAM-C, MNES, Atlas	3275 3272	-	-	High
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	High

Common Name <i>Species Name</i>	BC Act	EPBC Act	Credit Status	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Sensitivity to gain class
Eastern Coastal Free-tailed Bat <i>Micronomus norfolkensis</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	High
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> (Foraging)	V	-	Ecosystem/Species	BAM-C, Atlas	3275 3272	Caves. Cave, tunnel, mine, culvert, or other structure known or suspected to be used to breeding including species records with microhabitat code "IC- in cave". Observation type code E nest-roost". With numbers of individuals >500 (3275).	-	Very high
Yellow-bellied Glider <i>Petaurus australis</i>	V	V	Ecosystem	BAM-C, MNES, Atlas	3275 3272	-	-	High
Golden-tipped Bat <i>Phoniscus papuensis</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	High
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> (Foraging)	V	V	Ecosystem/Species	BAM-C, MNES, Atlas	3275 3272	-	-	High
Yellow-bellied Sheathtail-bat <i>Saccolaimus flaviventris</i>	V	-	Ecosystem	BAM-C, Atlas	3272	-	-	High
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	V	-	Ecosystem	BAM-C, Atlas	3275 3272	-	-	High

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory

4.1.2 Assessment of Habitat Suitability

Table 4.2 Assessment of Habitat Suitability within the Subject Land for Ecosystem Credit Species

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Further assessment required?	
		1	2	3	4	5			
Birds									
Regent Honeyeater <i>Anthochaera Phrygia</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included - Foraging habitat occurs in or near the subject land.	Y	
Dusky Woodswallow <i>Artamus cyanopterus</i> <i>cyanopterus</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y	
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i> <i>lathami</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included – Recorded on east of Brou WMF during current surveys.	Y	
Brown Treecreeper <i>Climacteris picumnus</i> <i>victoriae</i> (eastern subspecies)	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y	
Varied Sittella <i>Daphoenositta chrysoptera</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y	
Little Lorikeet <i>Glossopsitta pusilla</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Y	

Common Name	Associated	Vegetation Zone					Justification for inclusion/exclusion	Further
Little Eagle <i>Hieraaetus morphnoides</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
White-throated Needletail <i>Hirundapus caudacutus</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Black Bittern <i>Ixobrychus flavicollis</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Swift Parrot <i>Lathamus discolor</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Square-tailed Kite <i>Lophoictinia isura</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Olive Whistler <i>Pachycephala olivacea</i>	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Y
Eastern Osprey <i>Pandion cristatus</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Scarlet robin <i>Petroica boodang</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Flame Robin <i>Petroica phoenicea</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Superb Fruit-Dove <i>Ptilinopus superbus</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Mammals								
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Eastern Coastal Free-tailed Bat <i>Micronomus norfolkensis</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y

Common Name	Associated	Vegetation Zone					Justification for inclusion/exclusion	Further
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Excluded – No caves or habitat requirements occur within the Subject Land.	N
Yellow-bellied Glider <i>Petaurus australis</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Golden-tipped Bat <i>Phoniscus papuensis</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> (Foraging)	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Y
Yellow-bellied Sheathtail-bat <i>Saccolaimus flaviventris</i>	3272	Y	Y	N	N	N	Included - Suitable habitat present within the Subject Land.	Y
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	3275 3272	Y	Y	Y	N	N	Included - Suitable habitat present within the Subject Land.	Y

4.2 Species Credit Species

4.2.1 Identification of Species Credit Species

Table 4.3 identifies species that were considered for assessment whose likelihood of occurrence cannot be reliably predicted by vegetation surrogates and/or landscape features (species credit species). Species have been identified using one or multiple of the BAM-C automatically populated list, Protected Matters Search Tool (PMST), or BioNet Atlas records.

Bushstone Curlew was added to the BAMC and subsequently to the list of candidate species list following the completion of targeted surveys. Additional surveys for this species may be required during Project EIA phase for this species.

Table 4.3 Summary of Species Credit Species considered as part of this assessment

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAII	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Vagrant Species?	Sensitivity to gain class
Flora									
Thick-lipped Spider Orchid <i>Caladenia tessellata</i>	E	V	Yes	PMST	None	-	-	N	Very High
Chef's Cap Correa <i>Correa baeuerlenii</i>	V	V	No	BAM-C, MNES	3275 3272	-	-	N	High
Leafless Tongue Orchid <i>Cryptostylis hunteriana</i>	V	V	No	BAM-C, MNES	3275 3272	-	-	N	Moderate
Square Raspwort <i>Haloragis exalata</i> subsp. <i>exalata</i>	V	V	No	PMST	None	Waterbodies. Edges of coastal lakes after flooding has removed other vegetation, creek banks within flood zone, areas close to these features subject to human disturbance including road verges and powerline easements or within 100m	-	N	Moderate
East Lynne Midge Orchid <i>Genoplesium vernale</i>	V	V	No	BAM-C	3275 3272	-	-	N	Moderate
Tall Knotweed <i>Persicaria elatior</i>	V	V	No	PMST	None	Semi-permanent/ephemeral wet areas, swamps, or waterbodies including wetlands, or within 50m.	-	N	High
Parris' Pomaderris <i>Pomaderris parrisiae</i>	V	V	No	PMST	None	-	-	N	Moderate
Scrub Turpentine <i>Rhodamnia rubescens</i>	CE	CE	No	BAM-C, MNES	3272	-	-	N	Very High
Austral Toadflax <i>Thesium australe</i>	V	V	No	PMST	None	-	-	N	Moderate

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Vagrant Species?	Sensitivity to gain class
Birds									
Regent Honeyeater <i>Anthochaera Phrygia</i> (Breeding)	CE	CE	No	BAM-C, MNES, Atlas	3275 3272	As per Important Habitat Map	-	N	High
Bush Stone-curlew <i>Burhinus grallarius</i>	E	-	No	BAM-C	3275 3272	Fallen/standing dead timber including logs	-	N	High
Gang-gang Cockatoo <i>Callocephalon</i> <i>fimbriatum</i> (Breeding)	E	E	No	BAM-C, MNES, Atlas	3275 3272	Hollow bearing trees. Eucalyptus tree species with hollows at least 3m above the ground and with hollow diameter of 7cm or larger	-	N	High
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus</i> <i>lathami lathami</i> (Breeding)	V	V	No	BAM-C, MNES, Atlas	3275 3272	Presence of <i>Allocasuarina</i> and <i>Casuarina</i> species. Hollow bearing trees Living or dead tree with hollows greater than 15cm diameter and higher than 8m above ground.	-	N	High
White-bellied Sea- Eagle <i>Haliaeetus leucogaster</i> (Breeding)	V	-	No	BAM-C, MNES, Atlas	3275 3272	Waterbodies and living or dead mature trees with suitable vegetation within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines.	-	N	High
Little Eagle <i>Hieraaetus</i> <i>morphnoides</i> (Breeding)	V	-	No	BAM-C, Atlas	3275 3272	Nest Trees- live (occasionally dead) large old trees within vegetation)	-	N	Moderate
Swift Parrot <i>Lathamus discolor</i>	E	CE	Yes	BAM-C, MNES, Atlas	3275 3272	As per Important Habitat Map	-	N	Moderate
Square-tailed Kite <i>Lophoictinia isura</i> (Breeding)	V	-	No	BAM-C, Atlas	3275 3272	Nest Trees	-	N	Moderate

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAII	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Vagrant Species?	Sensitivity to gain class
Barking Owl <i>Ninox connivens</i>	V	-	No	BAM-C, Atlas	3275 3272	Hollow bearing trees A living or dead tree with a hollow >20 cm diameter that occurs >4m above the group.	-	N	High
Powerful Owl <i>Ninox strenua</i>	V	-	No	BAM-C, Atlas	3275 3272	Hollow bearing trees A living or dead tree with a hollow >20 cm diameter that occurs >4m above the group.	-	N	High
Eastern Osprey <i>Pandion cristatus</i>	V	-	No	BAM-C, Atlas	3275 3272	Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting.	-	N	Moderate
Masked Owl <i>Tyto novaehollandiae</i>	V	-	No	BAM-C, Atlas	3275 3272	Hollow bearing trees. A living or dead tree with a hollow >20cm diameter that occurs >4m above the ground.	-	N	High
Sooty Owl <i>Tyto tenebricosa</i>	V	-	No	BAM-C, Atlas	3275 3272	Caves/cliffs. Including cliff lines/ledges/Escarpments. Including cliff lines/ledges/Hollow bearing trees. Living or dead tree with a hollow >20cm diameter that occurs >4m above the ground.	-	N	Very High
Mammals									
Eastern Pygmy- possum <i>Cercartetus nanus</i>	V	-	No	BAM-C, Atlas	3275 3272	-	-	N	High

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAII	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Vagrant Species?	Sensitivity to gain class
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	V	E	No	BAM-C, MNES	3275 3272	Cliffs Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops or crevices, or within two kilometres of old mines or tunnels.	North of Batemans Bay	N	Very High
Southern Brown Bandicoot (eastern) <i>Isoodon obesulus obesulus</i>	E	E	No	BAM-C, MNES, Atlas	3275 3272	Requires dense group cover in a variety of habitats	-	N	High
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> (Breeding)	V	-	No	BAM-C, Atlas	3275 3272	Caves. Cave, tunnel, mine, culvert, or other structure known or suspected to be used to breeding including species records with microhabitat code "IC- in cave". Observation type code E nest-roost". With numbers of individuals >500 (3275).	-	N	Very high
Southern Myotis <i>Myotis macropus</i>	V	-	No	BAM-C, Atlas	3272	Waterbodies. Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams, and other waterbodies, on or within 200m of the site.	-	N	High
Southern Greater Glider <i>Petauroides volans</i>	E	E	No	BAM-C, Atlas	3275 3272	-	-	N	High
Squirrel Glider <i>Petaurus norfolcensis</i>	V	-	No	BAM-C, Atlas	3275 3272	-	-	N	High

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Source	Associated PCTs	Habitat constraint	Geographic Limitation	Vagrant Species?	Sensitivity to gain class
Brush-tailed Phascogale <i>Phascogale tapoatafa</i>	V	-	No	BAM-C, Atlas	3275 3272	-	-	N	High
Koala <i>Phascolarctos cinereus</i>	E	E	No	BAM-C, MNES, Atlas	3275 3272	Presence of Koala use trees – refer to survey comments field in TBDC	-	N	High
Long-nosed Potoroo <i>Potorous tridactylus</i>	V	V	No	PMST	None	Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest)	-	N	Moderate
Grey-headed Flying- fox <i>Pteropus poliocephalus</i> (Breeding)	V	V	No	BAM-C, MNES, Atlas	3275 3272	Breeding camps	-	N	High
White-footed Dunnart <i>Sminthopsis leucopus</i>	V	-	No	BAM-C, Atlas	3275 3272	-	-	N	Very High
Amphibians									
Giant Burrowing Frog <i>Heleioporus australiacus</i>	V	V	No	BAM-C, MNES, Atlas	3275 3272	-	-	N	Moderate
Green and Golden Bell Frog <i>Litoria aurea</i>	E	V	No	BAM-C, MNES	3272	Semi-permanent/ephemeral wet areas. Within 1km of wet areas or swamps. Within 1km of waterbody.	-	N	High
Stuttering Frog <i>Mixophyes balbus</i>	E	V	No	BAM-C, MNES	3275 3272	-	-	N	Very High

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

4.2.2 Assessment of Habitat Suitability

Table 4.4 Assessment of habitat suitability within the Subject Land and assessment approach of retained candidate species

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Candidate species retained for further assessment?	Assessment approach	Area (ha) of suitable habitat in Subject Land
		1	2	3	4	5				
Flora										
Thick-lipped Spider Orchid <i>Caladenia tessellata</i>	None	N	N	N	N	N	Excluded – No associated PCTs or suitable habitat on Subject Land.	No	-	-
Chef's Cap Correa <i>Correa baeuerlenii</i>	3275 3272	Y	Y	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Leafless Tongue Orchid <i>Cryptostylis hunteriana</i>	3275 3272	Y	Y	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
East Lynne Midge Orchid <i>Genoplesium vernale</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Square Raspwort <i>Haloragis exalata subsp. exalata</i>	None	N	N	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Tall Knotweed <i>Persicaria elatior</i>	None	N	N	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Parris' Pomaderris <i>Pomaderris parrisiae</i>	None	N	N	N	N	N	Excluded – No associated PCTs or suitable habitat on Subject Land.	No	-	-

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Candidate species retained for further assessment?	Assessment approach	Area (ha) of suitable habitat in Subject Land
Scrub Turpentine <i>Rhodamnia rubescens</i>	3272	Y	Y	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	0.7
Austral Toadflax <i>Thesium austral</i>	None	N	N	N	N	N	Excluded – No associated PCT's or suitable habitat on Subject Land.	No	-	-
Birds										
Regent Honeyeater <i>Anthochaera Phrygia</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Excluded – The Subject Land does not include any areas of mapped important habitat for this species.	No	-	-
Bush Stone-curlew* <i>Burhinus grallarius</i>	3275 3272	Y	Y	Y	N	N	Included – Subject Land has fallen/standing dead timber	Yes	Targeted surveys	7.3
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus lathami lathami</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Yes	Targeted surveys.	7.3
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Yes	Targeted surveys.	7.3
Little Eagle <i>Hieraaetus morphnoides</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Candidate species retained for further assessment?	Assessment approach	Area (ha) of suitable habitat in Subject Land
Swift Parrot <i>Lathamus discolor</i>	3275 3272	Y	Y	Y	N	N	Included – The Subject Land includes mapped areas of important habitat.	Yes	Targeted surveys.	7.3
Square-tailed Kite <i>Lophoictinia isura</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Barking Owl <i>Ninox connivens</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Powerful Owl <i>Ninox strenua</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Eastern Osprey <i>Pandion cristatus</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Excluded – No presence of stick nests within 100m of a floodplain.	No	-	7.3
Masked Owl <i>Tyto novaehollandiae</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Sooty Owl <i>Tyto tenebricosa</i>	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Yes	Targeted surveys.	7.3
Mammals										
Eastern Pygmy-possum <i>Cercartetus nanus</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	3275 3272	Y	Y	Y	N	N	Excluded – Subject Land is located south of Batemans Bay. No cliffs or rocky areas within the Subject Land.	No	-	-

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Candidate species retained for further assessment?	Assessment approach	Area (ha) of suitable habitat in Subject Land
Southern Brown Bandicoot (eastern) <i>Isoodon obesulus obesulus</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Southern Myotis <i>Myotis macropus</i>	3272	N	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	0.7
Southern Greater Glider <i>Petauroides volans</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Squirrel Glider <i>Petaurus norfolcensis</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Brush-tailed Phascogale <i>Phascogale tapoatafa</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Koala <i>Phascolarctos cinereus</i>	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
Long-nosed Potoroo <i>Potorous tridactylus</i>	None	N	N	N	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3

Common Name <i>Scientific Name</i>	Associated PCT	Vegetation Zone					Justification for inclusion/exclusion	Candidate species retained for further assessment?	Assessment approach	Area (ha) of suitable habitat in Subject Land
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> (Breeding)	3275 3272	Y	Y	Y	N	N	Included – Suitable habitat present on Subject Land.	Yes	Targeted surveys.	7.3
White-footed Dunnart <i>Sminthopsis leucopus</i>	3275 3272	Y	Y	Y	N	N	Included – Recorded on site.	Yes	Targeted surveys.	7.3
Amphibian										
Giant Burrowing Frog <i>Heleioporus australiacus</i>	3275 3272	Y	Y	Y	N	N	Excluded – no suitable habitat present within the Subject Land (previous site visit confirmed no suitable habitat on site)	No	-	-
Green and Golden Bell Frog <i>Litoria aurea</i>	3272	N	Y	N	N	N	Excluded – No suitable habitat present within the Subject Land.	No	-	-
Stuttering Frog <i>Mixophyes balbus</i>	3275 3272	Y	Y	Y	N	N	Excluded – No suitable habitat present within the Subject Land.	No	-	-

* Bushstone Curlew was added to the BAMC and subsequently to the list of candidate species list following the completion of targeted surveys. Additional surveys for this species may be required during Project EIA phase for this species.

4.2.2.1 Candidate Species Excluded From or Added to the Assessment

Below is a summary of the candidate species that were added to the assessment based on the PMST search results (Table 4.5) and a summary of candidate species that were excluded from the assessment (Table 4.6).

Table 4.5 Candidate species added to the assessment

Species	Reason for addition
Square Raspwort <i>Haloragis exalata</i> subsp. <i>exalata</i>	Suitable habitat present on Subject Land.
Long-nosed Potoroo <i>Potorous tridactylus</i>	Suitable habitat present on Subject Land.
Tall Knotweed <i>Persicaria elatior</i>	Suitable habitat present on Subject Land.

Table 4.6 Candidate species excluded from the assessment

Species	Reason for exclusion
Thick-lipped Spider Orchid <i>Caladenia tessellata</i>	No associated PCT's or suitable habitat on Subject Land.
Parris' Pomaderris <i>Pomaderris parrisiae</i>	No associated PCT's or suitable habitat on Subject Land.
Austral Toadflax <i>Thesium australe</i>	No associated PCT's or suitable habitat on Subject Land.
Giant Burrowing Frog <i>Heleioporus australiacus</i>	Excluded – no suitable habitat present within the Subject Land (previous site visit confirmed no suitable habitat on site)
Regent Honeyeater <i>Anthochaera phrygia</i> (Breeding)	The Subject Land does not include any areas of mapped important habitat for this species.
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	The Subject Land is located south of Batemans Bay. cliffs or rocky areas within the Subject Land.
Green and Golden Bell Frog <i>Litoria aurea</i>	No suitable habitat present within the Subject Land.
Stuttering Frog <i>Mixophyes balbus</i>	No suitable habitat present within the Subject Land.

4.3 Threatened Species Survey Methodology

4.3.1 General Weather conditions During the Surveys

The weather conditions during the completed surveys are in Table 4.7 to Table 4.9 below. The data is derived from the Narooma Weather Station (069022) as per the Bureau of Meteorology (BOM) (2021). The weather was generally mild throughout the targeted surveys, with wind speed and rainfall not being a limiting factor for diurnal surveys. There was 35.8 millimetres of rain during the September Raptor and Cockatoo census surveys, with wind speed up to 28 kilometre per hour on two separate days. These conditions were suboptimal and may have impacted species detectability on those dates.

Table 4.7 Details of weather during diurnal threatened fauna surveys completed.

Survey	Date	Average temp (max. & min.)(°C)	Wind (9am speed: 3pm speed) (km/h)	Average rainfall (mm)
Threatened amphibian surveys				
Giant Burrowing Frog habitat assessment	2 June 2022 28 February 2023	2 June 2022: 17.5-8.5 28 February 2023: 25.4-17	NA	2-4 June 2022: 12.2 mm 28 February 2023: 0 mm
Threatened bird surveys				
Raptor nest stick-nest assessment	19 May 2022	19 May 2022: 18.4-6.5	6:6	19 May 2022: 0 mm
Census surveys (Raptors and Cockatoos)	31 August 2022 1 September 2022 2 September 2022 22 September 2022 30 November 2022 1 December 2022	31 August 2022: 17.0-8.4 1 September 2022: 18.0-10.2 2 September 2022: 16.2-10.2 22 September 2022: 19.0-14.6 30 November 2022: 18.5-14.0 1 December 2022: 18.0-16.0	31 August 2022: 7:9 1 September 2022: 6:17 2 September 2022: 19:19 22 September 2022: 4:28 30 November 2022: 9:28 1 December 2022: 9:7	31 August 2022: 0 mm 1-2 September 2022: 0 mm 22-23 September 2022: 35.8 mm 30 November - 1 December 2022: 0.2 mm
Tree hollow habitat assessment (general)	19 May 2022 (targeted)	19 May 2022: 18.4-6.5	NA	19 May 2022: 0 mm
Casuarina and Allocasuarina spp. assessment (Glossy Black-Cockatoo)	19 May 2022 (targeted)	19 May 2022: 18.4-6.5	NA	19 May 2022: 0 mm
Stagwatches (Gang-gang Cockatoo)	30 November 2022 1 December 2022	30 November 2022: 18.5-14.0 1 December 2022: 18.0-16.0	NA	30 November 2022: 0.2 mm 1 December 2022: 0 mm

Table 4.8 Details of weather during nocturnal threatened fauna surveys completed.

Survey	Date	Average temp (max. & min.)(°C)	Wind (9am speed: 3pm speed) (km/h)	Average rainfall (mm)
Threatened bird surveys				
Stagwatches (large forest owls)	30 August 2022 31 August 2022 1 September 2022	30 August 2022: 24.4-NA 31 August 2022: 17-NA 1 September 2022: 18-NA	30 August 2022: 46:19 31 August 2022: 7:9 1 September 2022: 6:17	30 August 2022: 1 mm 31 August 2022: 0 mm 1 September 2022: 0 mm
Call playback and spotlighting (large forest owls and arboreal mammals)	18 May 2022 19 May 2022 1 June 2022 2 June 2022	18 May 2022: 19.3-8.4 19 May 2022: 18.4-6.5 1 June 2022: 16.1-6.8 2 June 2022: 17.5-8.5	18 May 2022: 7:2 19 May 2022: 6:6 1 June 2022: 17:NA 2 June 2022: 6:9	18 May 2022: 0 mm 19 May 2022: 0 mm 1 June 2022: 0 mm 2 June 2022: 0 mm

Table 4.9 Details of weather during remote detection fauna surveys completed.

Survey	Date	Average temp (max. & min.)(°C)	Wind (9am speed: 3pm speed) (km/h)	Average rainfall (mm)
Threatened mammal surveys				
Ultrasonic call detection (all bats)	2-29 June 2022 24-27 January 2023	2-29 June 2022: 16.95-6.91 24-27 January 2023: 25.4-16.55	2-29 June 2022: 7:9 24-27 January 2023: 6: 10.75	2-29 June 2022: 0.36 mm 24-27 January 2023: 1.5 mm
Ultrasonic call detection (Southern Myotis)	24-27 January 2023	24-27 January 2023: 25.4-16.55	24-27 January 2023: 6: 10.75	24-27 January 2023: 1.5 mm
Terrestrial camera traps	19 May - 23 June 2022 1-21 September 2022	19 May - 23 June 2022: 17.54-8.25 1-21 September 2022: 18.12-9.84	19 May - 23 June 2022: 6.5:9.5 1-21 September 2022: 10:18	19 May – 23 June 2022: 0.76 mm 1-21 September 2022: 1.34 mm
Arboreal camera traps (Brush-tailed Phascogale)	23 January -21 Feb 2023 21 February - 22 March 2023	23 January -21 Feb 2023: 24.58-17.48 21 February - 22 March 2023: 23.88-16.74	23 January -21 Feb 2023: 9:16 21 February - 22 March 2023: 8:10	23 January -21 Feb 2023 6.47 mm 21 February - 22 March 2023: 1.15 mm
Arboreal camera traps (general)	1-23 June 2022 23 January -21 Feb 2023 21 February - 22 March 2023	1-23 June 2022: 17.06-7.13 23 January -21 Feb 2023: 24.58-17.48 21 February - 22 March 2023: 23.88-16.74	1-23 June 2022: 7:9 23 January -21 Feb 2023: 9:16 21 February - 22 March 2023: 8:10	1-23 June 2022: 0.46 mm 23 January -21 Feb 2023 6.47 mm 21 February - 22 March 2023: 1.15 mm

4.3.2 Habitat Assessment

The health and structure of all habitats on site are likely to change spatially, in response to changing in topography, historical disturbances, and ecotones, as well as temporally in response to seasonality, climate changes, fire or flooding events.

4.3.2.1 Forest Habitat

Within the subject land, two types of forest vegetation communities occur: riparian forest, and Spotted Gum forest. The riparian forest is associated with lowland creek flats, and predominantly occurs in the north east corner of the Subject Land associated with the ephemeral seepage area. The Spotted Gum Forest occurs in the western area of the Subject Land between the existing waste management facility to the east and Princess Highway to the west. Woodland habitat occurs across the following vegetation zones:

- Zone 1 - PCT 3272 Moderate-Good - South Coast Lowland Creekflat Forest.
- Zone 2 – PCT 3272 Thinned/disturbed South Coast Lowland Creekflat Forest.
- Zone 3 - PCT 3275 Moderate-Good - South Coast Spotted Gum Cycad Dry Forest.

The riparian forest habitat on site is predominantly open, with a dense shrub layer occurring throughout. The Spotted Gum Forest habitat on site is predominantly open forest with a dry shrub layer on upper slopes of the Subject Land.

Forest habitat is associated with most of the threatened bird species known or predicted to occur onsite. The native vegetation in the subject land is semi-contiguous (separated by the Princes Highway) with Eurobodalla National Park and Bodalla State Forest. Bodalla State Forest is part of a larger area of native vegetation that includes Kooraban National Park, Wadbilliga National Park, Gulaga National Park and Deua National Park.

The habitat would support a number of those predicted and candidate species which require a well-connected remnant woodland, for example the Sooty Owl (*Tyto tenebricosa*). Species which are known or are likely to occur include species that occupy large ranges, and are highly nomadic woodland birds, such as the White-bellied Sea Eagle (*Haliaeetus leucogaster*), and Gang-gang Cockatoo (*Callocephalon fimbriatum*). All threatened mammals potentially occurring on site are associated with woodland habitat, with koalas being almost entirely arboreal, and all the predicted bat species utilising woodland habitat as roosting or hunting grounds.

Only a small number of the flora known or predicted to occur on site are associated with PCTs that make up the forest habitat, including Chef's Cap Correa (*Correa baeuerlenii*) and orchids such as Leafless Tongue Orchid (*Cryptostylis hunteriana*).

4.3.3 Threatened Flora Surveys

Searches for threatened flora species were completed in accordance with the NSW Survey Guide, 'Surveying threatened plants and their habitats' (DPIE 2020b) and any relevant species requirements listed in the Threatened Biodiversity Data Collection (DPE 2022c). Details of the field survey methods used and species targeted are listed in **Table 4.10** and the locations of the surveys completed are mapped in **Figure 4.1**.

Table 4.10 Summary of Targeted Surveys carried out for Candidate Threatened Flora Species

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort	
									Transect Width	Km
Chef's Cap Correa <i>Correa baeuerlenii</i>	V	V	No	7.3	Parallel transect surveys.	10m maximum distance between parallel field traverse in dense vegetation.	All year.	1-2 June 2022.	10m wide transects	Throughout the Subject Land
Leafless Tongue Orchid <i>Cryptostylis hunteriana</i>	V	V	No	7.3	5m Parallel transect surveys.	5m maximum distance between parallel field traverse in dense vegetation.	November – January.	30 November 2022.	5m wide transects	Throughout the Subject Land
East Lynne Midge Orchid <i>Genoplesium vernale</i>	V	V	No	7.3	5m Parallel transect surveys.	5m maximum distance between parallel field traverse in dense vegetation.	November – December.	30 November 2022.	5m wide transects	Throughout the Subject Land
Square Raspswort <i>Haloragis exalata</i> subsp. <i>exalata</i>	V	V	No	7.3	Parallel transect surveys.	10m maximum distance between parallel field traverse in dense vegetation.	All year.	1-2 June 2022	10m wide transects	Throughout the Subject Land
Tall Knotweed <i>Persicaria elatior</i>	V	V	No	0.7	Parallel transect surveys.	10m maximum distance between parallel field traverse in dense vegetation.	December – May.	1-2 June 2022	10m wide transects	Throughout the Subject Land
Scrub Turpentine <i>Rhodamnia rubescens</i>	CE	CE	No	0.7	Parallel transect surveys.	10m maximum distance between parallel field traverse in dense vegetation.	All year.	1-2 June 2022	10m wide transects	Throughout the Subject Land

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

FIGURE 4.1

Threatened Targeted Flora Survey Effort

Legend

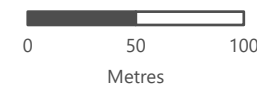
- Road
- Watercourse
- Subject Land
- Development Site
- State Forest

Threatened Flora Transects

- Medium Shrubs
- Sub-Shrubs
- Orchids

Vegetation Zones

- Zone 1 - PCT3275 Good - moderate
- Zone 2 - PCT3275 thinned/disturbed
- Zone 3 - PCT3272 Good - moderate
- Zone 4 - Non-native Vegetation
- Zone 5 - Cleared
- Water



Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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4.3.4 Threatened Fauna Surveys

4.3.4.1 Review of Existing Information

Preview of ecological databases, previous documents and reports relevant to the proposed development was undertaken. The review was used to inform the threatened species survey design and to assist in the assessment of potentially occurring ecosystem-credit and species-credit species. Relevant documents and resources included:

- BioNet Atlas of NSW Wildlife database and mapping tool (DPIE 2021a), accessed April 2024 (due to last search completed March 2023).
- Threatened Biodiversity Data Collection (DPIE 2021b) for known/predicted threatened species in the Batemans IBRA subregion, accessed April 2024 (due to last search completed March 2023).
- DCCEEW Protected Matters Search Tool (DCCEEW 2023) for known/predicted EPBC Act-listed species, accessed April 2024 (due to previous search completed April 2023).

A preliminary assessment using the TBDC was undertaken which provided a list of species-credit species that might require survey and the suitable survey periods for each species. The results of these database searches, literature review and TBDC review were used to design the appropriate survey requirements for species-credit species.

The following journal articles used to inform the assessment of the Swift Parrot include:

- Long-term ecological data confirm and refine conservation assessment of critically endangered swift parrots (Owens et al., 2022).

4.3.4.2 Field Surveys

Targeted surveys for candidate threatened fauna species were completed with reference to the Threatened Biodiversity Data Collection (DPE 2022a) and following guidelines:

- NSW Survey Guide for Threatened Frogs, A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE 2020).
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, NSW Department of Environment and Conservation (DEC 2004).
- 'Species credit' threatened bats and their habitats, NSW survey guide for the Biodiversity Assessment Method, Office of Environment and Heritage (OEH 2018b).
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the EPBC Act, Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010a).
- Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act, Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010b).

- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act, Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010c).
- Survey guidelines for Koala as per Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide, NSW Environment and Heritage (DPE 2022b).

Details of the field survey methods used and species targeted are listed in **Table 4.11** and the locations of the surveys completed are mapped in **Figure 4.2**.

Table 4.11 Summary of Targeted Surveys carried out for Candidate Threatened Fauna Species

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
Birds									
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> (Breeding)	E	E	No	7.3	Hollow bearing tree (nest tree) surveys. 8 x 20-minute diurnal census surveys.	Seasonal bird and bat utilisation surveys. Habitat surveys for suitable hollow trees.	October – January.	Stag Surveys: 29 November – 1 December 2022. Census survey: 30 August – 1 September 2022. 21 September. 29 November 2022	160 minutes of diurnal census 4 hours of active searches
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus lathami lathami</i> (Breeding)	V	V	No	7.3	Hollow bearing tree (nest tree) surveys. 8 x 20-minute diurnal census surveys.	Seasonal bird and bat utilisation surveys. Habitat surveys for suitable hollow trees.	January – September.	Habitat survey: 19 May 2022. Census survey: 30 August – 1 September 2022. 21 September. 29 November 2022. (Surveyed at the alternative location 2-3 May 2022)	160 minutes of diurnal census 4 hours of active searches
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i> (Breeding)	V	-	No	7.3	16 x 20-minute diurnal census surveys. Targeted nest tree searches.	Seasonal bird and bat utilisation surveys. Opportunistic searches for large stick nests during all surveys in the correct survey	July – December.	Raptor stick nest survey: 19 May 2022 Census surveys: 31 August 2022 1 September 2022 2 September 2022 22 September 2022 30 November 2022	320 minutes of diurnal census. 4 hours of active searches

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
						period.		1 December 2022	
Little Eagle <i>Hieraaetus morphnoides</i> (Breeding)	V	-	No	7.3	16 x 20-minute diurnal census surveys. Targeted nest tree searches.	Seasonal bird and bat utilisation surveys. Opportunistic searches for large stick nests during all surveys in the correct survey period.	August – October.	Raptor stick nest survey: 19 May 2022 Census surveys: 31 August 2022 1 September 2022 2 September 2022 22 September 2022 30 November 2022 1 December 2022	320 minutes of diurnal census. 4 hours of active searches
Square-tailed Kite <i>Lophoictinia isura</i> (Breeding)	V	-	No	7.3	16 x 20-minute diurnal census surveys. Targeted nest tree searches.	Seasonal bird and bat utilisation surveys. Opportunistic searches for large stick nests during all surveys in the correct survey period.	September – January.	Raptor stick nest survey: 19 May 2022 Census surveys: 31 August 2022 1 September 2022 2 September 2022 22 September 2022 30 November 2022 1 December 2022	320 minutes of diurnal census. 4 hours of active searches
Barking Owl <i>Ninox connivens</i>	V	-	No	7.3	Four nights of call playback and spotlighting	5 nights of call playback and spotlighting.	January – August.	Spotlighting/call playback: 18-19 May 2022 1-2 June 2022 Stag watches: 30 August – 1 September 2022.	8 hours call playback and spotlighting 4 hours stag watching

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
Powerful Owl <i>Ninox strenua</i>	V	-	No	7.3	Four nights of call playback and spotlighting	5 nights of call playback and spotlighting.	January – August.	Spotlighting/ Call playback: 18-19 May 2022 1-2 June 2022 Stag watches: 30 August – 1 September 2022.	8 hours call playback and spotlighting 4 hours stag watching
Masked Owl <i>Tyto novaehollandiae</i>	V	-	No	7.3	Four nights of call playback and spotlighting.	8 nights of call playback and spotlighting.	January – August.	Spotlighting/Call Playback: 18-19 May 2022 1-2 June 2022 Stag watches: 30 August – 1 September 2022.	8 hours call playback and spotlighting 4 hours stag watching
Sooty Owl <i>Tyto tenebricosa</i>	V	-	No	7.3	Four nights of call playback and spotlighting	6 nights of call playback and spotlighting.	January – August.	Spotlighting/Call Playback: 18-19 May 2022 1-2 June 2022 Stag watches: 30 August – 1 September 2022.	8 hours call playback and spotlighting 4 hours stag watching
Mammals									
Eastern Pygmy-possum <i>Cercartetus nanus</i>	V	-	No	7.3	45 nights arboreal remote sensor camera surveys (22 cameras).	Arboreal camera traps.	October – March.	1-23 June 2022 23 January - 22 March 2023	990 trap nights (22 arboreal cameras over 45 nights)
Southern Brown Bandicoot (eastern)	E	E	No	7.3	57 nights of terrestrial remote sensor	Terrestrial camera traps.	All Year.	19 May -23 June 2022 1-23 June 2022.	1254 trap nights (22 terrestrial cameras over 57 nights)

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
<i>Isoodon obesulus obesulus</i>					camera surveys (22 cameras).				
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> (Breeding)	V	-	No	7.3	Habitat search. 31 nights of ultrasonic call detection (3 detectors).	Habitat search for breeding habitat.	December – February.	Ultrasonic: 2-29 June 2022 24-27 January 2023	93 trap nights (3 detectors over 31 nights)
Southern Myotis <i>Myotis macropus</i>	V	-	No	0.7	Ultrasonic call detection – 1 detector over 4 nights. Detector deployed over small semi-permanent pond/seepage area.	4 nights (16 hours) of passive acoustic detection or 4 nights (8 hours) of active detection.	October – March.	23-26 Jan 2023	4 trap nights
Southern Greater Glider <i>Petauroides volans</i>	E	E	No	7.3	4 nights spotlighting.	Spotlighting surveys along transects, tracks or roads, depending on the nature of the site.	All year.	Call playback/Spotlighting: 18 May 2022 19 May 2022 1 June 2022 2 June 2022 Camera traps: 1-23 June 2022 23 January -	8 hours spotlighting

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
								22 March 2023	
Squirrel Glider <i>Petaurus norfolcensis</i>	V	-	No	7.3	22 remote sensor cameras (arboreal) deployed for 45 days	Spotlighting surveys along transects, tracks or roads, depending on the nature of the site.	All year.	1-23 June 2022 23 January - 22 March 2023	990 trap nights (22 arboreal cameras over 45 nights)
Brush-tailed Phascogale <i>Phascogale tapoatafa</i>	V	-	No	7.3	14 baited remote sensor cameras (terrestrial) deployed over 35 nights.	Camera traps with baited stations.	December – June.	Baited camera trap: 23 January - 22 March 2023	490 trap nights (14 arboreal cameras over 35 nights)
Koala <i>Phascolarctos cinereus</i>	E	E	No	7.3	Koala Spot Assessment Technique (KSAT) and spotlighting.	As per the <i>Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide</i> (DPE 2022).	All year.	KSAT: November – December 2022. Spotlighting: February 2023.	Spotlighting: 44.6hrs over 13 nights (2 people)
Long-nosed Potoroo <i>Potorous tridactylus</i>	V	V	No	7.3	22 remote sensor cameras (terrestrial) deployed for 57 nights.	Baited camera traps using universal bait.	All year.	19 May - 23 June 2022 1-21 September 2022	1254 trap nights (22 terrestrial cameras over 57 nights)
Grey-headed Flying-fox	V	V	No	7.3	Search for camps and	Spotlight observations,	October – December.	May – June 2022.	Diurnal search: 165.5 hrs over 11 visits (2-4 people)

Common Name <i>Species Name</i>	BC Act	EPBC Act	SAIL	Areas of suitable habitat (ha)	Survey Methodology Utilised	Minimum Survey Requirements	Seasonal Survey Requirements	Survey Date	Survey Effort
<i>Pteropus poliocephalus</i> (Breeding)					spotlighting.	roost surveys.			
White-footed Dunnart <i>Sminthopsis leucopus</i>	V	-	No	7.3	22 remote sensor cameras (terrestrial) deployed for 57 nights.	Terrestrial camera traps.	October – December.	19 May - 23 June 2022 1-21 September 2022	1254 trap nights (22 terrestrial cameras over 57 nights)

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

FIGURE 4.2
Threatened Targeted Fauna
Survey Effort

Legend

- ▲ Ultrasonic Call Detection
 - ▲ Bird Survey
 - Call Playback
 - Habitat Assessment
 - Hollow-bearing Tree
 - Koala SAT Survey
 - Road
 - Watercourse
 - Fauna Tracklog
 - Koala Spotlighting Transect
 - Diurnal Bird Survey Transect
 - Subject Land
 - Development Site
 - State Forest
- Vegetation Zones**
- Zone 1 - PCT3275 Good - moderate
 - Zone 2 - PCT3275 thinned/disturbed
 - Zone 3 - PCT3272 Good - moderate
 - Zone 4 - Non-native Vegetation
 - Zone 5 - Cleared
 - Water



0 50 100
Metres

Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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4.3.5 Limitations

The surveys completed were undertaken during the appropriate seasons specified within the Threatened Biodiversity Data Collection (TBDC) to maximise the probability of detection. All surveys for candidate threatened flora species consisted of multi-species searches in groups according to detection period and stratum. These surveys were limited to a maximum of five species per group and the same stratum to overcome limitations associated with species detection.

The full spectrum of flora and fauna species likely to occur in the study area were considered by identifying potential habitats for such species and assessing the potential for these species to occur on the site based on previous records, the type and condition of habitats present, the land use of the site and its landscape context.

As stated by the Department of Environment and Conservation (2004) 'The absence of a species from survey data does not necessarily mean it does not inhabit the survey area. It may simply mean that the species was not detected at that time with the survey method adopted and the prevailing seasonal or climatic conditions'. Accordingly, the full spectrum of flora and fauna species, as well as ecological processes, likely to occur on the subject site may not have been identified during the surveys detailed within this report.

4.4 Threatened Species Results

4.4.1 Ecosystem Credit Species recorded during the field survey

The species listed in **Table 4.12** are ecosystem species found during surveys. The South-eastern Glossy Black-Cockatoo was identified during the survey at the 'alternative location' expansion option east of the Brou WMF. The ecosystem species observation locations to the east of the Brou WMF are presented in **Figure 4.3**.

Table 4.12 Threatened Species Credit (Ecosystem) Species Survey Results

Species Name	Common Name	BC Act	EPBC Act	SAIL	Biodiversity Risk Weighting	Unit of measure	Assessment approach	No. Individuals present within the subject land	Area of suitable habitat (ha)
<i>Calyptorhynchus lathamii lathamii</i>	South-eastern Glossy Black-Cockatoo (Foraging)	V	V	N	2	Area	Targeted surveys	Two individuals were recorded during the survey period at the alternative location. Whilst not recorded within the Subject Land, the species is expected to forage the Subject Land due to the close proximity and similar floristic composition to the 'alternative location'. No breeding habitat was recorded within the Subject Land.	7.3
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Foraging)	V	M	N	2	Area	Targeted nest tree searches and diurnal bird surveys (4 x 20 minutes).	One individual was recorded foraging within the Subject land.	7.3
<i>Pachycephala olivacea</i>	Olive Whistler	V	-	N	-	Area	Diurnal bird census surveys.	One individual was recorded during diurnal bird surveys.	7.3
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Foraging)	V	V	N	2	Area	Targeted breeding camp search. Spotlighting.	A total of 9 individuals were recorded during targeted.	7.3

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

4.4.2 Species Credit Species recorded during the field survey

The species listed in **Table 4.13** and represented in are species credit species found during the surveys. The species credit species observation location to the east of the Brou WMF are presented in **Figure 4.4**.

Table 4.13 Species Credit Species recorded during the field surveys

Species Name	Common Name	BC Act	EPBC Act	SAIL	Biodiversity Risk Weighting	Unit of measure	Assessment approach	No. Individuals present within the subject land	Area of suitable habitat (ha)
<i>Sminthopsis leucopus</i>	White-footed Dunnart	V	-	No	2	Area	Terrestrial camera survey.	One individual was recorded on camera trap TCAM SYDWF05.	7.3
<i>Tyto tenebricosa</i>	Sooty Owl	V	-	No	3	Area	Four nights of call playback and spotlighting.	One individual was recorded during call playback surveys.	7.3
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Yes	3	Area	Important habitat mapping	n/a	7.3

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

FIGURE 4.3
Ecosystem Species
Observation Locations
Legend

- Road
- Subject Land
- Development Site
- State Forest
- Threatened Species Records**
- Grey-headed flying fox
- White-bellied sea eagle
- Strahler Stream Order**
- - - Stream order 1



0 50 100
Metres

Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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FIGURE 4.4

Species Credit Species Observation Locations

Legend

- Sooty Owl
- White-footed Dunnart
- Road
- Subject Land
- Development Site
- State Forest
- Swift Parrot Species Polygon
- White-footed Dunnart Species Polygon
- Strahler Stream Order**
- Stream order 1



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Metres

Scale 1:3,500 at A4
GDA2020 MGA Zone 56

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4.5 Aquatic Habitat and Threatened Species

4.5.1 Habitat Assessment

4.5.1.1 General aquatic habitat

An unnamed watercourse has been mapped running through the Subject Land however this could not be ground-truthed through numerous rounds of survey. A small puddle or seepage area was identified within the Subject Land however this did not correspond to the mapped watercourse. The seepage area is located along the north-eastern boundary of the draft impact boundary where the native vegetation meets the existing waste management facility infrastructure. The seepage area was not fed by a permanent or ephemeral watercourse. This seepage area is not large enough to support habitat for any fish, however non-threatened amphibians such as the Common Eastern Froglet (*Crinia signifera*) may occur.

In addition to the seepage area, the Subject Land occurs within 300 metres of two 2nd order streams. One 2nd order stream occurs to the north of the Subject Land, running through a paddock. This stream is not surrounded by native vegetation where it occurs within 300 metres of the Subject Land. The second 2nd order stream occurs to the south of the Subject Land and is surrounded by native vegetation where it occurs within 300 metres of the Subject Land. This stream was ground-truthed, with Umwelt ecologists finding no ephemeral streams with permanent pools.

4.5.2 Threatened Species

4.5.2.1 Threatened Freshwater Fish

No threatened fish distributions occur within the Subject Land (NSW DPI 2023).



Photo 4.1 **Ephemeral Pond/Seepage Area**

4.6 SEPP (Biodiversity and Conservation) 2021

Chapters 3 and 4 of State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021 (the SEPP) contain provisions for assessing impacts to Koalas for Local Council assessed development applications. As a Part 4 development, this SEPP applies to Brou WMF expansion. Chapter 3 of the SEPP has been considered below in the identification of potential Koala habitat and breeding habitat as required for the SEPP.

For RU3 Forestry zoned land, Chapter 3 Koala Habitat Protection 2020 of the SEPP describes:

- Potential habitat as areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

- Core Koala habitat as area of land with a resident population of Koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population.

This assessment of Koala habitat has used the Koala feed tree schedule itemised in both Schedule 1 and Schedule 3 of SEPP (Biodiversity and Conservation) 2021 as the latter provides a comprehensive list of preferred feed trees based on recent studies. Five of the tree species listed in Schedule 3 of the SEPP have been recorded within the Project Area. These tree species represent 15% or greater of the total number of trees within any PCT in the Subject Land and, as such, all PCTs across the Subject Land represent potential Koala habitat. **Table 4.14** lists the Koala feed trees present within the Development Footprint.

Table 4.14 Koala feed tree species listed under SEPP (Biodiversity and Conservation) 2021 present within the Subject Land

Common Name	Scientific Name
Black She-oak	<i>Allocasuarina littoralis</i>
Rough-barked Apple	<i>Angophora floribunda</i>
Spotted Gum	<i>Corymbia maculata</i>
White Stringybark	<i>Eucalyptus globoidea</i>
Silvertop Ash	<i>Eucalyptus sieberi</i>

Despite the Development Footprint containing potential habitat for the Koala, Koalas were not recorded in the Subject Land despite ecological surveys. In addition, a review of the BioNet Atlas of NSW Wildlife reveals two records of this species within 10 kilometres of the Subject Land. These records are from 1980. There are no records of koala within 1.5 kilometres of the Development Footprint.

As a result, the Subject Land does not represent core Koala habitat as the Koala was not recorded in the Project Area and no Koalas have been recorded within 5 kilometres. No further provisions of Koala habitat protection in SEPP (Biodiversity and Conservation) 2021 apply. Notwithstanding this, the Koala is a species credit species under the BAM and has been further considered as part of this BAR.

5.0 Matters of National Environmental Significance

A protected matters search was conducted (**Appendix A**) the outcomes of the search are summarised here:

- World Heritage Properties – none present in the search area.
- National Heritage Places - none present in the search area.
- Wetlands of international importance – no wetlands within search area.
- Listed threatened species and communities – 8 Threatened Ecological Communities and 89 threatened species are predicted to occur in the search area.
- Listed migratory species – 58 migratory species are predicted to occur in the search area.
- Commonwealth land (for actions outside Commonwealth Land that may impact on the environment on Commonwealth Land) (section 26 and 27A) - 6 present in the search.

A likelihood of occurrence table was completed to assist in determining if an assessment of significance (AoS) under the EPBC Act is required (**Appendix B**). A total of 28 EPBC-listed threatened entities are assessed as having a moderate or higher likelihood of occurrence in the Project Area (**Table 5.1**).

The following EPBC Act entities were recorded at the site and an Assessment of Significance (AoS) was completed for them:

- South-eastern glossy black cockatoo – Vulnerable.
- White-bellied Sea-eagle – Migratory.
- Grey-headed flying fox – Vulnerable.

Table 5.1 Species with moderate to high likelihood of occurrence within the Study Area

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
Aves					
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically endangered	Critically Endangered	2	Moderate- The Project Area is not near any known breeding population. Non-breeding flocks are known to infrequently forage on spotted gum forests within the south coast.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Endangered	18	Moderate- Suitable autumn and winter habitat is present on site

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	Vulnerable	-	37	High- Suitable foraging and breeding habitat is present on site.
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered	31	High- The Project Area contains suitable migratory foraging habitat.
<i>Pycnoptilus floccosus</i>	Pilotbird	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
Aves- migratory					
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Migratory	2	Moderate– Suitable foraging habitat may be present within the Project Area.
<i>Limosa lapponica</i>	Bar-tailed Godwit	-	Migratory	10	Moderate – Suitable foraging habitat may be present within the Project Area.
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	Migratory	22	Moderate- The Project Area contains suitable foraging and breeding habitat. Highly mobile
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Migratory	117	Moderate- The Project Area contains suitable foraging and breeding habitat. Highly mobile
<i>Sternula albifrons</i>	Little Tern	Endangered	Migratory	22	Moderate- The Project Area may contain suitable foraging and breeding habitat. Highly mobile
Amphibians					
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Vulnerable	Vulnerable	3	Moderate- Suitable habitat is present on site.
Mammals					
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered	3	Moderate- Suitable habitat is present on site.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern),	Endangered	Endangered	2	Moderate- Suitable habitat is present on site.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
	Southern Brown Bandicoot (south-eastern)				
<i>Petauroides volans</i>	Greater Glider	-	Vulnerable	9	Moderate- Suitable habitat is present on site.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	Vulnerable	-	83	High- The Project Area contains suitable foraging and breeding habitat. There is a high number of records within the search area.
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Endangered	Endangered	2	Moderate- Suitable habitat is present on site. Feed trees <i>Angophora floribunda</i> , <i>Corymbia maculata</i> , <i>Eucalyptus globoidea</i> , <i>Eucalyptus sieberi</i> , <i>Allocasuarina littoralis</i> present as per Schedule 1 and 3 of SEPP (Biodiversity and Conservation) 2021 .
<i>Potorous tridactylus trisulcatus</i>	Long-nosed Potoroo (southern mainland)	Vulnerable	Vulnerable	2	Moderate- Suitable habitat is present on site.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	9	High- Suitable foraging habitat is present on site and the Project Area is within foraging range of known camps. Recorded
Flora					
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Correa baeuerlenii</i>	Chef's Cap Correa	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Eucalyptus stenostoma</i>	Jillaga Ash	-	Endangered	-	Moderate- Suitable habitat is present on site.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort, Square Raspwort	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	Vulnerable	Vulnerable	1	Moderate- Suitable habitat is present on site.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	-	Critically Endangered	-	Moderate- Suitable habitat is present on site.
<i>Thesium australe</i>	Austral Toadflax, Toadflax	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
Threatened ecological communities					
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	NA	-	E	NA	Moderate
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	NA	-	CE	NA	Recorded

6.0 Identification of Prescribed Impacts

Prescribed impacts are those that may affect biodiversity values in addition to, or instead of, impacts from clearing native vegetation. Clause 6.1 of the Biodiversity Conservation Regulation defines Prescribed Impacts as impacts of development on the following habitat of threatened species or ecological communities (EEC):

- Karst, caves, crevices, cliffs and other geological features of significance.
- Rocks.
- Human made structures.
- Non-native vegetation.
- The impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.
- The impacts of development on movement of threatened species that maintains their lifecycle.
- The impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development).
- The impacts of wind turbine strikes on protected animals.
- The impact of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.

An assessment which identifies the prescribed impacts which are likely to occur as a result of the proposed development are assessed in **Table 6.1**.

Table 6.1 Prescribed Impacts Identified

Feature	Present Yes/No	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	There are no karst, caves, crevices, cliffs, rocks or other geological features of significance within the development footprint.	n/a
Human-made structures	Yes	None	n/a
Non-native vegetation	Yes	There is 0.1 ha of non-native and cleared vegetation within the Subject Land. Cleared land and exotic vegetation was found to	No known threatened entities will be impacted.

Feature	Present Yes/No	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
		occur within the eastern portions of the subject land, within areas of the Brou WMF that is actively being used for waste disposal. These areas were either devoid of vegetation in its entirety or comprised of exotic vegetation. It should be noted that commonly occurring native species with high tolerance for ongoing disturbance regimes may occur in very low density across both the cleared land and exotic vegetation.	
Habitat connectivity	Yes	The native vegetation in the subject land is semi-contiguous (separated by the Princes Highway) with Eurobodalla National Park and Bodalla State Forest. Bodalla State Forest is part of a larger area of native vegetation that includes Kooraban National Park, Wadbilliga National Park, Gulaga National Park and Deua National Park.	• South-eastern glossy black Cockatoo. • White-bellied Sea-eagle. • Grey-headed Flying-fox. • Olive Whistler. • White-footed Dunnart. • Sooty Owl. • Swift Parrot. Habitat connectivity will be reduced, however the threatened species recorded during the field surveys are highly mobile, capable of traversing around or flying over the areas proposed for development. Thus, are not likely to be affected through lifecycle impacts or impacts to movement patterns.
Waterbodies, water quality and hydrological processes	Yes	The subject land has an unnamed mapped watercourse running into the area from the north-eastern corner, however this could not be ground-truthed through numerous rounds of survey. A small puddle or seepage area was identified within the subject land however this appeared to be associate with the detention ponds within the waste management facility to the east of the subject land and did not appear to correspond with the mapped watercourse. One first order ephemeral tributary off Whittakers Creek is located south of the subject land.	The seepage area identified within the subject land was associated with detention ponds within the existing waste management facility. No threatened entities were observed using the seepage area present.
Wind turbine strikes (wind farm development only)	No	This area is not a wind farm development	n/a

Feature	Present Yes/No	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Vehicle strikes	Yes	Vehicle movements will occur within the impact footprint on existing access tracks and future development tracks.	White-footed Dunnart. White-footed Dunnarts are primarily nocturnal and may be susceptible to vehicle strike from the hours immediately prior to sunset until immediately after sunrise. However, the likelihood is considered low given the nocturnal nature of the species and the main operating hours of the facility.

7.0 Measures taken to avoid and minimise impacts on biodiversity values

7.1 Avoid and Minimise Direct and Indirect Impacts

Umwelt was engaged early in the project design process to conduct an ecological constraints assessment (Umwelt 2022). The ecological constraints assessment was conducted to identify and map any ecological features (threatened species, ecological communities and their habitats) that could potentially be impacted by the expansion of Brou Waste Management Facility. The results of the ecological constraints assessment were used to modify the project design to avoid impacts to biodiversity.

7.1.1 Project Location

7.1.1.1 Location of Surface Works in Areas with No or Low Biodiversity Values

The location of surface works has been refined to avoid key areas of biodiversity value. Specifically:

- The Development Site was reduced in size and extent within the northern portion of the Subject Land to avoid impacts to River-flat Eucalypt Forest on Coastal Floodplains TEC (listed as endangered under the BC Act, and critically endangered under the EPBC Act). This portion of the Subject Land is subsequently proposed to be rezoned to C2 Environment Conservation.
- The Development Site was modified to reduce impacts to areas of key habitat, including hollow bearing trees.
- The Development Site was reduced in size and extent to reduce impacts to Swift Parrot Important Habitat.
- The Development Site was reduced in size and extent to reduce impacts to threatened species known to occur within the Subject Land including Grey-headed Flying Fox, White-footed Dunnart, Sooty Owl, White-bellied Sea Eagle, and Glossy Black Cockatoo.
- The Development Site was reduced in size and in extent to minimise impacts to PCT 3275: South Coast Spotted Gum Cycad Forest.

7.1.1.2 Location of Sub-Surface Works in Areas with No or Low Biodiversity Values

No sub-surface works are proposed.

7.1.1.3 Avoidance of Wildlife Corridors

Extensive areas of remnant native vegetation surround the Subject Land. As such, impacts for wildlife corridors or connectivity are expected to be negligible. Notwithstanding, the Development Site has been reduced in size and extent to avoid and minimise impacts to fauna movement through and within the Subject Land.

7.1.1.4 Location of Works to Minimise Interactions with Threatened Entities

The Development Site was reduced in size and reduced in extent within the northern portion of the Subject Land in order to avoid impacts to River-flat Eucalypt Forest on Coastal Floodplains TEC (listed as endangered under the BC Act, and critically endangered under the EPBC Act). Furthermore, the reduction in the size of the Development Site minimises impacts to the threatened species recorded on or within close proximity to the Subject Land. This portion of the Subject Land is proposed to be rezoned to C2 Environment Conservation.

7.1.1.5 Location of Works to Avoid Impacts on Waterbodies and Hydrological Processes

The Development Site does not impact any waterbodies and the proposed WMF expansion is unlikely to impact upon hydrological processes.

7.1.1.6 Alternative options

The optimal location of a proposed expansion to waste management – an expansion or construction of a new tip – was assessed as part of the Options Analysis Assessment (Umwelt 2023). This and the other options that were considered to the current proposed expansion of Brou Waste Management Facility are outlined in **Table 7.1** and **Figure 7.1**.

Table 7.1 Other Options Considered

Option: Develop a new landfill facility in the LGA
The process for selecting and developing a new landfill facility in the LGA was previously progressed however, it was suspended indefinitely after the adoption of ESC's <i>2001 Waste Minimisation Strategy</i>. Given the likely duration of the site investigations and the required consultation and approval procedures, it would not be feasible to develop and construct a new facility to provide additional landfill volume in the short-term.
Option: Utilise Surf Beach Landfill for all LGA's waste
Eurobodalla Shire Council considered closing the Brou facility and diverting all future waste generated in the LGA to the Surf Beach facility. This approach was not undertaken because of the additional pressure that would be placed on the Surf Beach facility and the potential drawbacks of closing the Brou site. The closing of the Brou site would cause an excessive amount of additional waste to be diverted to the Surf Beach site, shortening its life by several years – and creating the need for expansion. If the Brou facility was closed the Moruya Waste Transfer Station would require upgrading to become a compacting transfer facility. This would require additional approval from the Environment Protection Authority (EPA) and application for development consent.
Option: Eastern expansion
The eastern expansion alternative location considered was larger, approximately 22.93 ha (though was not refined to a development site) as opposed to the current development site 2.8 ha. The eastern alternative area supports similar biodiversity values to the subject land including: • Important habitat mapping for the Swift Parrot (<i>Lathamus discolor</i>). • Both sites contain PCT 3275 and are adjacent to Bodalla State Forest. As mentioned in the Options Analysis Assessment (Umwelt 2023): • The White-footed Dunnart (<i>Sminthopsis leucopus</i>), White-bellied Sea-eagle (<i>Haliaeetus leucogaster</i>), Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) and Sooty Owl (<i>Tyto tenebricosa</i>) were recorded at the preferred location and not at the eastern alternative location, although targeted surveys were not carried out at the alternative location. • The White-bellied Sea-eagle and Grey-headed Flying-fox were incidentally recorded at the preferred location while the Glossy Black-Cockatoo (<i>Calyptrorhynchus lathami</i>) was incidentally recorded at the alternative location.

Option: Develop a new landfill facility in the LGA

- The alternative location was observed to support a higher abundance of the preferred Glossy Black-Cockatoo feed tree *Allocasuarina littoralis*.
- Both locations supported an abundance of hollow bearing trees, some of which contained large (11-30 cm wide) and extra-large (> 30 cm wide) hollows. The alternative location supported more hollow bearing trees (78) than the preferred location (10) this is likely because its footprint surveyed was substantially smaller, rather than the selected site having a lower density of hollows.

The current footprint (which has been adjusted and reduced since writing of the Options Analysis Assessment (Umwelt 2023) now excludes impact to the TECs:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act - endangered).
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (EPBC Act - critically endangered).

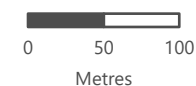
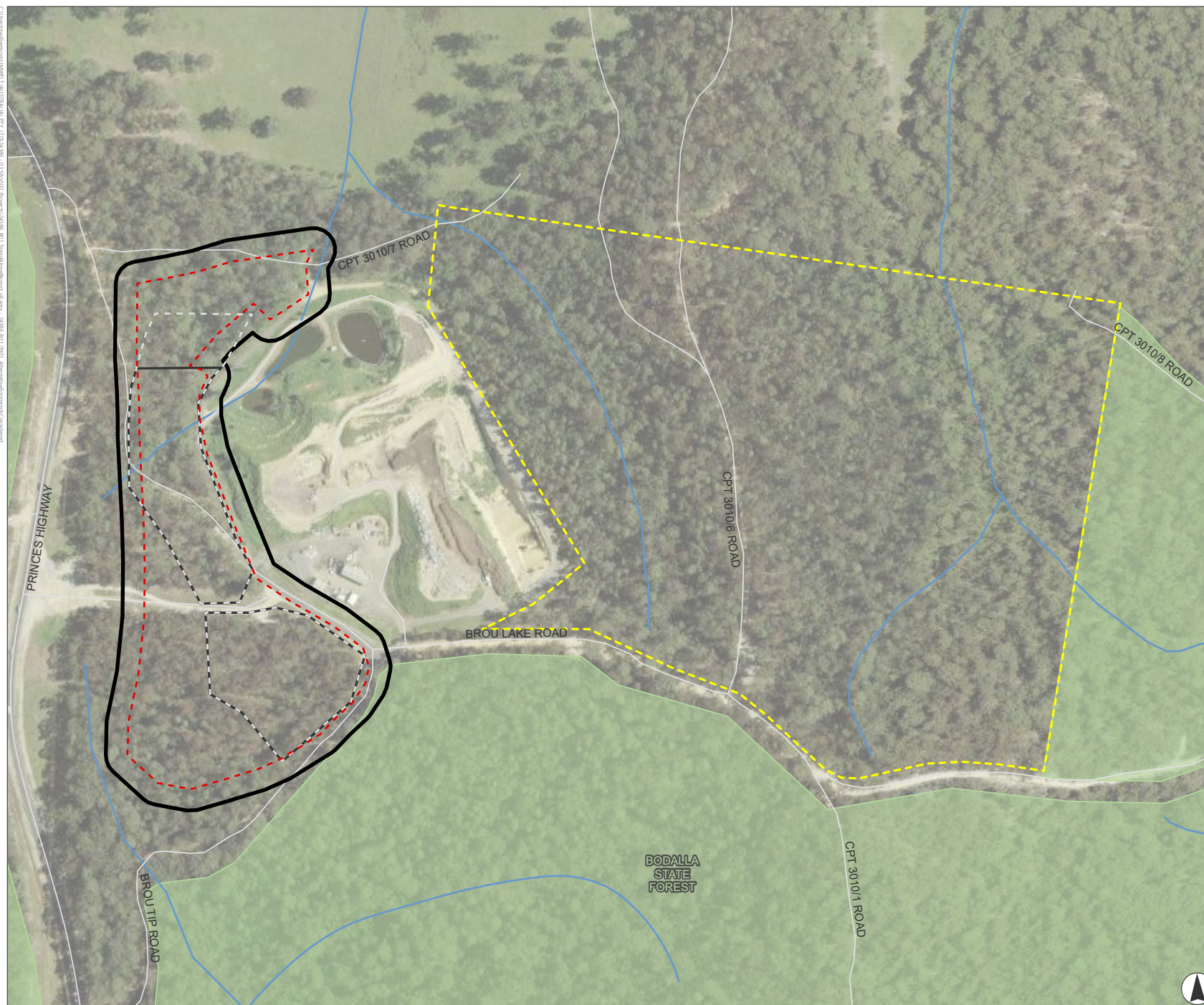
Assuming the whole area would have been rezoned, the potential impacts associated with WMF eastern expansion may be greater than on the current subject land.

FIGURE 7.1

Alternative Footprints Considered

Legend

- Road
- Watercourse
- ▭ Eastern Expansion Option
- ▭ Development Site (17/05/2022)
- ▭ Development Site (05/05/2023)
- ▭ Development Site (current)
- ▭ Subject Land
- ▭ State Forest



Scale 1:5,000 at A4
GDA2020 MGA Zone 56

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8.0 Impact Assessment

8.1 Direct Impacts

8.1.1 Direct impact to native vegetation

The proposed Brou WMF expansion would impact one PCT. Up to 2.6 hectares of PCT 3275: South Coast Spotted Gum Cycad Forest would be removed as part of any WMF expansion works. All structural and floristic component of the PCT would be removed as part of the expansion works. Refinements in project design have resulted in a reduction in the extent of the Development Footprint such that impacts have been to PCT 3732: South Coast Lowland Creekflat Forest.

The area of each native PCT and non-native communities impacted by the proposed expansion for Brou WMF is provided in **Table 8.1**.

Table 8.1 Direct impacts to native vegetation

Zone ID	PCT	Condition	BC Act	EPBC Act	Area within Subject Land (ha)	Area within Development Footprint (ha)
Zone 1	PCT 3275: South Coast Spotted Gum Cycad Dry Forest	Moderate-good	-	-	6.3	2.7
Zone 2	PCT 3275: South Coast Spotted Gum Cycad Dry Forest	Thinned/Disturbed	-	-	0.3	0.1
Zone 3	PCT 3272: South Coast Lowland Creekflat Forest	Moderate-good	River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	0.7	0.0
Zone 4	Non-native	-	-	-	0.5	0.0
Zone 5	Cleared	-	-	-	0.8	0.1
Total					8.6	2.9

8.1.2 Direct impacts to Threatened Ecological Communities

Two TECs, listed as endangered under the BC Act and critically endangered under the EPBC Act, were recorded within the Subject Land. Refinements in project design have resulted in a reduction in the extent

of the Development Footprint such that impacts to the TECs have been avoided (**Table 8.2**). It is intended that areas identified as TECs will be rezoned to C2 Environment Conservation.

Table 8.2 Direct Impacts to TECs

TEC	PCT	Condition Class	BC Act	EPBC Act	Area within the Subject Land (ha)	Area within the Development Footprint (ha)
River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	PCT 3272: South Coast Lowland Creekflat Forest	Moderate-good	Endangered	-	0.7	0.0
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria			-	Critically Endangered		

8.1.3 Direct Impacts to Threatened Flora

No threatened flora species were observed during the targeted surveys. As such, no impacts to threatened flora are expected to occur as part of the Brou WMF expansion.

8.1.4 Direct Impacts to Threatened and Migratory Fauna

There were six (6) threatened species and one (1) migratory species identified within and/or near the subject land during the site surveys. The proposed works would result in the removal of approximately 2.8 hectares of suitable habitat for these species.

Important habitat mapping for Swift Parrot occurs within the Subject Land and would be directly impacted by the proposed Brou WMF expansion works. Whilst no individuals of the species were recorded during the current surveys, numerous records for the species have been recorded within close proximity of the Subject Land. In accordance with the BAM, this species has been assumed to be present on the Subject Land. Approximately 2.8 hectares of mapped Important Habitat would be impacted as part of the proposed Brou WMF expansion works.

Assessments of significance under the EPBC Act have been prepared for MNES recorded within or within close proximity to the Subject Land during the current surveys. The AoS found the proposed works may have a significant impact in Swift Parrot. Post rezoning of the site further assessment under the BC Act and EPBC Act would be required to inform the EIA for the proposed expansion.

Direct impacts to threatened fauna recorded within or close proximity to the Subject Land is detailed in **Table 8.3**.

Table 8.3 Direct impacts to threatened fauna.

Common Name <i>Species Name</i>	BC Act	EPBC Act	Area within the Subject Land (ha)	Area within the Development Footprint (ha)
Swift Parrot <i>Lathamus discolor</i>	E	CE	7.3	2.8
South-eastern Glossy Black-Cockatoo <i>Calyptorhynchus lathami lathami</i>	V	V	7.3	2.8
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	V	M	7.3	2.8
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	V	7.3	2.8
Olive Whistler <i>Pachycephala olivacea</i>	V	V	7.3	2.8
White-footed Dunnart <i>Sminthopsis leucopus</i>	V	-	7.3	2.8
Sooty Owl <i>Tyto tenebricosa</i>	V	-	7.3	2.8

Key: CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory.

8.1.4.1 Indirect impacts

The proposed works have the potential to indirectly impact the biodiversity occurring within the Subject Land. These indirect impacts and a description of how they may impact the biodiversity present within the Subject Land is outlined in **Table 8.4** below.

Table 8.4 List of indirect impacts on the study area due to the proposed works

Indirect impact	Explanation	Affected biodiversity
Erosion	Removal of vegetation may lead to erosion adjacent to cleared areas.	- PCT 3272 - PCT 3275
Changes to hydrology	The proposed works may increase the area of impervious watershed subsequently increasing runoff.	- PCT 3272 - PCT 3275 - Olive Whistler - White-footed Dunnart - Grey-headed Flying-fox - South-eastern Glossy Black-Cockatoo
Spread of exotic weeds	Exotic weeds are common throughout the study area. The movement of machinery and people have the potential to spread these weeds.	- PCT 3272 - PCT 3275 - Olive Whistler - White-footed Dunnart - Grey-headed Flying-fox - South-eastern Glossy Black-Cockatoo
Spread of pathogens and disease	Clearing of native vegetation has the potential to provide new areas for weed colonisation.	- PCT 3272 - PCT 3275 - Olive Whistler

Indirect impact	Explanation	Affected biodiversity
		- White-footed Dunnart - Grey-headed Flying-fox - South-eastern Glossy Black-Cockatoo

8.1.4.2 Mitigation measures

The indirect and direct impacts listed above would be managed by implementing management actions during and post construction. Potential measures to avoid and minimise the impacts of the proposed expansion of Brou WMF on the biodiversity values identified in the study area are detailed in **Table 8.5** below. The full suite of mitigation measure required for the proposed expansion would be determined during the EIA approval for the project.

Table 8.5 Mitigation measures

Impact	Mitigation	Timing
Removal of vegetation (breeding and foraging habitat)	Removal of vegetation will be limited to the development site.	During construction
	An ecologist will carry out preclearance surveys.	Pre-construction
	Works outside of breeding time for the White-bellied Sea-eagle.	During construction
	Replace hollow bearing trees with nest boxes to reduce likelihood of Beak and Feather Disease introduction/spread	During construction
Erosion	The risk of erosion and sedimentation would be managed through the implementation of an erosion and sediment control plan.	During construction
Changes to hydrology	Appropriate drainage would be created as a part of the proposed works.	During construction
Spread of weeds	Machinery will be washed following best practice hygiene protocols prior to being brought to site to prevent the spread of weeds.	During construction
Spread of pathogens and disease	Machinery will be washed following best practice hygiene protocols prior to being brought to site to prevent the spread of pathogens and fungi. Hollows of felled hollow bearing trees would be inspected, if any passerine birds present appear to have a disease they will be quarantined and assessed by a WIRES member or a veterinarian for Beak and Feather Disease. If found to have this disease they will be euthanised to assist in preventing further spread.	During construction

9.0 Serious and Irreversible Impacts

9.1 Additional Impact Assessment Provisions for Threatened Species at Risk of an SAI

One threatened species, the Swift Parrot, is a SAI entity. The Swift Parrot is currently listed as Endangered under BC Act and Critically Endangered under the EPBC Act. It is listed as a Serious and Irreversible Impact (SAI) entity under Principle 1: rapid population decline (NSW DPE 2023).

Development proposals assessed under Part 4 of the EP&A Act must not be approved by an approval authority if they determine the proposal is likely to have an SAI on biodiversity values.

Under Principle 1 of Clause 6.7 of the NSW Biodiversity Conservation Regulation 2017, it must be determined whether a proposed impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline. Given the current small population size of the Swift Parrot (see below) Principle 2 is also relevant but it is not currently determining its SAI status. Regardless, it must also be determined whether a proposed impact 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.

The Swift Parrot has an extensive range in NSW, including all coastal regions and the western slopes (north and south). Its NSW extent of occurrence does not appear to have changed, despite its decline in population numbers.

Current threats to the Swift Parrot include:

- Habitat loss and alteration in breeding and foraging habitat (including foraging habitat on the mainland) through:
 - Forestry activities, including firewood harvesting.
 - Residential and industrial development.
 - Agricultural tree senescence and dieback.
 - Regeneration suppression.
- Frequent fire.
- Climate change.
- Collision mortality (fencing, windows, cars, wind turbines).
- Competition from large, aggressive honeyeaters.
- Psittacine beak and feather disease.
- Illegal wildlife capture and trading.

- Sugar Glider (*Petaurus notatus*) predation while nesting in Tasmania.

Clause 6.7 of the Biodiversity Conservation Regulation 2017 provides four principles to be used in determining whether a proposal is likely to have an SAI on a threatened entity:

- Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- Principle 2: The impact 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.
- Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

An SAI assessment must address the requirements as detailed within Section 9.1 of the BAM. This assessment is provided in **Table 9.1**.

Table 9.1 SAI Impact Assessment – Swift Parrot

SAI assessment requirement	Response to BAM Section 9.1 Criteria
1. The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAI, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAI. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.	Actions and measures to avoid direct and indirect impacts on biodiversity values in general include the following: • Reduction in the extent of the Development Site, minimising suitable habitat to be removed. • Preparation of a biodiversity management plan to manage potential impacts to biodiversity values during construction and operation of the expanded waste management facility. • Preclearance surveys will be carried out prior to vegetation removal within the development footprint. • Exclusion zones will be set up at the limit of clearing. • Weeds would be managed in accordance with best practice. • Pathogens would be managed in accordance with best practice. • Bush rock and woody debris would be relocated from within the development footprint to the subject land, or elsewhere within the property prior to vegetation clearance. • Notwithstanding, it should be noted that land within close proximity of the proposed works would be rezoned from RU3 to C2, increasing the level of protection over land via limits to land use associated with the C2 zoning. Given that swift parrots do not inhabit the site on a permanent basis, and that the habitat to be removed consists of foraging habitat only, there are limited options for mitigating direct and indirect impacts to this species.

SAIL assessment requirement	Response to BAM Section 9.1 Criteria
2. The assessor must consult the TBDC and/or other sources to report on the current population of the species including: a. evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the: i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites b. evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by: i. an estimate of the species' current population size in NSW, and ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations c. evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation) presented by: i. extent of occurrence ii. area of occupancy iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and iv. whether the species' population is likely to undergo extreme fluctuations d. evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because: i. known reproductive characteristics severely limit the ability to increase the	(a)(i) The Swift Parrot breeds in Tasmania and over-winters on the mainland. There is no separate NSW population estimate. However, genetic research shows that there is a single Swift Parrot population (Stojanovic et al. 2018). An unknown proportion of this population over-winters in NSW. Moreover, the numbers over-wintering in NSW varies between years by region, reflecting temporal variation in the availability of nectar and lerps (Saunders and Heinsohn 2008). The Swift Parrot population has declined from an estimated 1,320 pairs in 1988 to 940 pairs in 1995 (Saunders and Tzaros 2011). Its current population size is estimated to be 60 – 338 (based on an effective population size (N_e) of 44 – 140 and an N_e ~50% of the census population N using three different N_e estimation methods) (Olah et al. 2020). In NSW, the Swift Parrot has declined by >80% over the last three generations (NSW Government 2023). The species is predicted to undergo a further 94% population decline over the next three generations (11 years) (Owens et al. 2022). (a)(ii) In NSW, the Swift Parrot has declined by >80% over the last three generations (NSW Government 2023). The Swift Parrot is predicted to undergo a further 94% population decline over the next three generations (11 years) (Owens et al. 2022). (b)(i) The current total Swift Parrot population size is estimated to be 60 – 338 individuals (Olah et al. 2020). A separate NSW population estimate is not available. Saunders and Heinsohn (2008) estimated that one-third of the then-current total population occurred at one coastal roost site during drought in 2002. Thus, a significant proportion of the total population may over-winter in NSW. Coastal areas are an important part of the species' over-wintering range, becoming even more so during droughts (Saunders and Heinsohn 2008). (b)(ii) Given that there is only a single, highly mobile Swift Parrot population, it is likely that the NSW population trend is similar to the broader population trend. Accordingly, a population decline of >80% has occurred over the past ten years. An estimated population decline of 94% is expected over the next three generations (11 years) (Owens et al. 2022). (b)(iii) The current total Swift Parrot population size is estimated to be 60 – 338 individuals (Olah et al. 2020). Due to the ephemeral nature of its foraging resources (nectar and lerp), there is considerable regional variation in the regional abundance of the Swift Parrot between years (Saunders and Heinsohn 2008). However, this represents temporal variation in the relative proportion of the total population in a given area set against the background of on-going population decline. (c)(i) The extent of occurrence of the Swift Parrot in NSW is not available. The Swift Parrot continues to be found in NSW across all coastal areas and the western slopes. Thus, it does

SAIL assessment requirement	Response to BAM Section 9.1 Criteria
existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).	not have a limited geographic range and its extent of occurrence does not appear to have changed over time. (c)(ii) The area of occupancy of the Swift Parrot in NSW is not available. The species undergoes annual spatio-temporal variation in local abundance in response to ephemeral food resources. The Swift Parrot may occupy areas throughout its NSW extent of occurrence at different times given sufficient food availability in relation to that available in alternative habitat areas during a given season (c)(iii) No specific threat-defined locations are given for the Swift Parrot. Threats to the Swift Parrot include land clearing, frequent fire and climate change induced drought. Droughts occur at the landscape scale and can simultaneously affect many ecologically distinct areas and, thus, affect the entire Swift Parrot population. The frequency and severity of droughts is expected to be exacerbated by climate change in many regions (e.g. Arnell 2008; Cook et al. 2018). Drought is also associated with an increased fire risk. The fires of 2019/20 showed that fire can rapidly affect many parts of the geographical range even of species with a wide distribution (Ward et al. 2020). Thus, the effects of land clearing, climate change, drought and fire may operate simultaneously and with a sufficient extent and intensity affect a species' conservation status (e.g. Smith and Smith 2022). (c)(iv) There is no evidence that the Swift Parrot population undergoes extreme fluctuations. Rather, a consistent population decline is apparent (see above). (d)(i) The Swift Parrot does not breed in NSW. Current threats to the Swift Parrot include logging and nest predation by Sugar Gliders in its Tasmanian breeding range. These factors limit the reproductive output of the Swift Parrot. (d)(ii) The Swift Parrot does not rely on any abiotic habitat features. (d)(iii) It is possible to control some key threatening processes (e.g. frequent fire) for the Swift Parrot at biodiversity stewardship sites.
3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.	The TBDC does not indicate that the Swift Parrot is 'unknown' or 'data deficient'.
4. In relation to the impacts from the proposal on the species at risk of an SAIL, the assessor must include data and information on: e. the impact on the species' population (Principles 1 and 2) presented by: i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW	(a)(i) The number of individual Swift Parrots using the subject land would be highly variable, depending on the annual availability of nectar and lerp relative to that available elsewhere within its range. Saunders and Heinsohn (2008) observed 650 individuals at a single roost on the NSW Central Coast during drought, estimating this to be about one-third of the total population at the time. Important habitat for Swift Parrot is areas of land with sightings of five or more birds recorded over any two or more years, or single sightings of 40 or more birds. A search of BioNet Atlas has found 33 records of the species

SAIL assessment requirement	Response to BAM Section 9.1 Criteria
population, and ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal f. impact on geographic range (Principles 1 and 3) presented by: i. the area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total area of occupancy (AOO), or extent of occurrence (EOO) within NSW ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted iii. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species iv. to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the	within the locality surrounding the subject site. A total of 2176 individual swift parrot observations are associated with these records. Numerous records within the locality are associated with high number of individual swift parrot sightings, with six records observing more than 100 individuals at one time. Up to 1200 swift parrots were recorded within 900 metres from the boundary of the subject site.
	(a)(ii) The number of Swift Parrots using the subject land would vary between years. The percentage of the NSW population cannot be determined.
	(a)(iii) The number of Swift Parrots using the subject land would vary between years. 2.8 ha of foraging habitat would be removed by the proposal.
	(b)(i) The AOO and EOO of the Swift Parrot in NSW have not been established. The proposal would remove 2.8 ha of foraging habitat. It is not possible to estimate the percentage of the AOO or EOO this represents. The important habitat mapped within and surrounding the Subject Land contains important foraging refugia for the species. It is important not to look at small areas of habitat in isolation, particularly with highly mobile species like the Swift Parrot. Relatively small areas may be corridors, stopover sites and refugia. Note that the contiguous area of mapped important area that intersects the development footprint broadly shows it to be a relatively unburnt fire refuge compared to other areas in this part of the south coast's mapped important habitat since the 2016-2017 Fire Extent and Severity Mapping (DECCEEW 2020), and particularly during the 2019-2020 fires. Saunders, D.L. and Tzaros, C.L. (2021) note that an initial analysis estimates that between 10 - 30 percent of the distribution range of the Swift Parrot was impacted to some degree during the 2019-2020 fires. This type of event is increasingly likely to reoccur as a result of climate change. Coastal areas are an important part of the species' over-wintering range, becoming even more so during droughts (Saunders and Heinsohn 2008 cited in Saunders, D.L. and Tzaros, C.L. 2021). Small areas identified as important habitat may offer significant temporal habitat where availability of resources at one time may be scarce or localised, with often large percentages of the total population utilizing very limited areas of important habitat at one time. The Swift Parrot likely has such a large winter range because only a small proportion of the habitat within their range will represent viable foraging habitat at any one time. (b)(ii) The proposal will remove 2.8 ha of foraging habitat for the Swift Parrot. This would affect a small and temporally variable proportion of the total population. However, it is unlikely that any individuals would be directly impacted by the proposal given the species' high mobility. (b)(iii) The Swift Parrot is highly mobile and the proposal will

SAIL assessment requirement	Response to BAM Section 9.1 Criteria
assessor may refer to the relevant sections of the BDAR or BCAR.	not cause its population to become fragmented. (b)(iv) The proposal entails an expansion of an existing landfill operation. It is possible that the proposal may affect fire regimes, alter hydrology, increase exposure to pollutants, alter species interactions and result in an expansion and/or migration of edge effects. It is unclear what the intensity of these changes would be and whether they would result in any detectable effect on the Swift Parrot's use of the subject land.
5. The assessor may also provide new information that can be used to demonstrate that the principle identifying the species as at risk of an SAIL, is inaccurate.	Umwelt cannot provide any new information for the species which demonstrates that the principal identifying Swift Parrot as an entity at risk of SAIL is inaccurate.

10.0 Conclusion

Eurobodalla Shire Council (ESC) is proposing the expansion of Brou Waste Management Facility (Brou WMF). A new landfill cell is proposed for the Brou WMF, immediately adjacent to the existing cells on land owned by Council. The proposed location requires the land to be rezoned, an approximate area of 6 hectares. The re-zoning will also allow for the relocation of the waste recovery and administration facilities at the landfill.

This BAR has been prepared to support the Planning Proposal required for the rezoning. The proposed expansion will require approval under Part 4 of EP&A Act, and the preparation of a BDAR in accordance with the BAM. As such, this BAR includes Stage 1 of the Biodiversity Assessment Method (BAM) and an assessment of Serious and Irreversible Impacts (SII) on Swift Parrot (*Lathamus discolor*). However, given this report supports a Planning Proposal, Stage 2 of the BAM has not been carried out, instead a more generalised impact assessment has been carried out.

Surveys carried out for the BAR determined that two PCTs occur within the Subject Land:

- PCT 3272: South Coast Lowland Creekflat Forest.
- PCT 3275: South Coast Spotted Gum Cycad Dry Forest.

PCT 3272: South Coast Lowland Creekflat Forest is a component of two TECs listed under the BC Act and the EPBC Act, namely:

- River-flat eucalypt forest on coastal floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – listed as endangered under the BC Act.
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria – listed as critically endangered under the EPBC Act.

The proposed expansion would result in impacts to 2.8 hectares of PCT 3275. Refinements in project design have resulted in a reduction in the extent of the Development Footprint such that impacts to the TECs have been avoided. Furthermore, the area of TEC will be rezoned to C2 to further protect the extent of the community.

The following threatened (five) and migratory (one) species were identified during site surveys within or adjacent to the Subject Land. Approximately 2.8 hectares of suitable habitat for these species would be impacted as part of the proposed expansion works:

- Grey-headed Flying-fox.
- South-eastern Glossy Black-Cockatoo.
- White-bellied Sea-eagle.
- Olive Whistler.
- White-footed Dunnart.
- Sooty Owl.

The Subject Land also contains Important Habitat for Swift Parrot. Swift Parrot is an entity with the potential for SAIL, as such an SAIL assessment has been completed in accordance with Section 9.1 of the BAM. It is the duty of the determining authority (ESC) to make a decision regarding SAIL on Swift Parrot.

AoS for MNES were carried out as part of the BAR and contained within **Appendix C**. The Grey-headed Flying-fox, South-eastern Glossy Black Cockatoo, White-bellied Sea-eagle were deemed by the AoS to not be significantly impacted by the proposed works. These species would still be impacted with the clearing of approximately 2.8 hectares of suitable habitat, as such, after rezoning of the area these species would need to be further assessed using the BAM calculator, whereby species credits would be created. The AoS carried out for the Swift Parrot found there was a risk that the proposed expansion would have a significant impact on the Swift Parrot. A referral under the EPBC Act is required.

The Swift Parrot is a dual credit species and considered to occur within the subject land by the Important Habitat Map. Post rezoning the area would need to be further assessed using the BAM calculator whereby species credits would be created.

Some impact of the works would be minimised due to the revision of the development site. Other impacts can be mitigated through the implementation of measures such as conducting pre-clear assessment for threatened species, cleaning vehicles, conducting clearing works outside breeding times and adding nest boxes.

11.0 References

Department of Agriculture, Water and the Environment (2020). Conservation Advice for the River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria.

DPE (2022b), Koala (*Phascolarctos cinereus*): Biodiversity Assessment Method Survey Guide | NSW Environment and Heritage.

DPIE (2020), NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method.

Department of Environment and Conservation (2004), Threatened biodiversity survey and assessment guidelines for developments and activities (working draft).

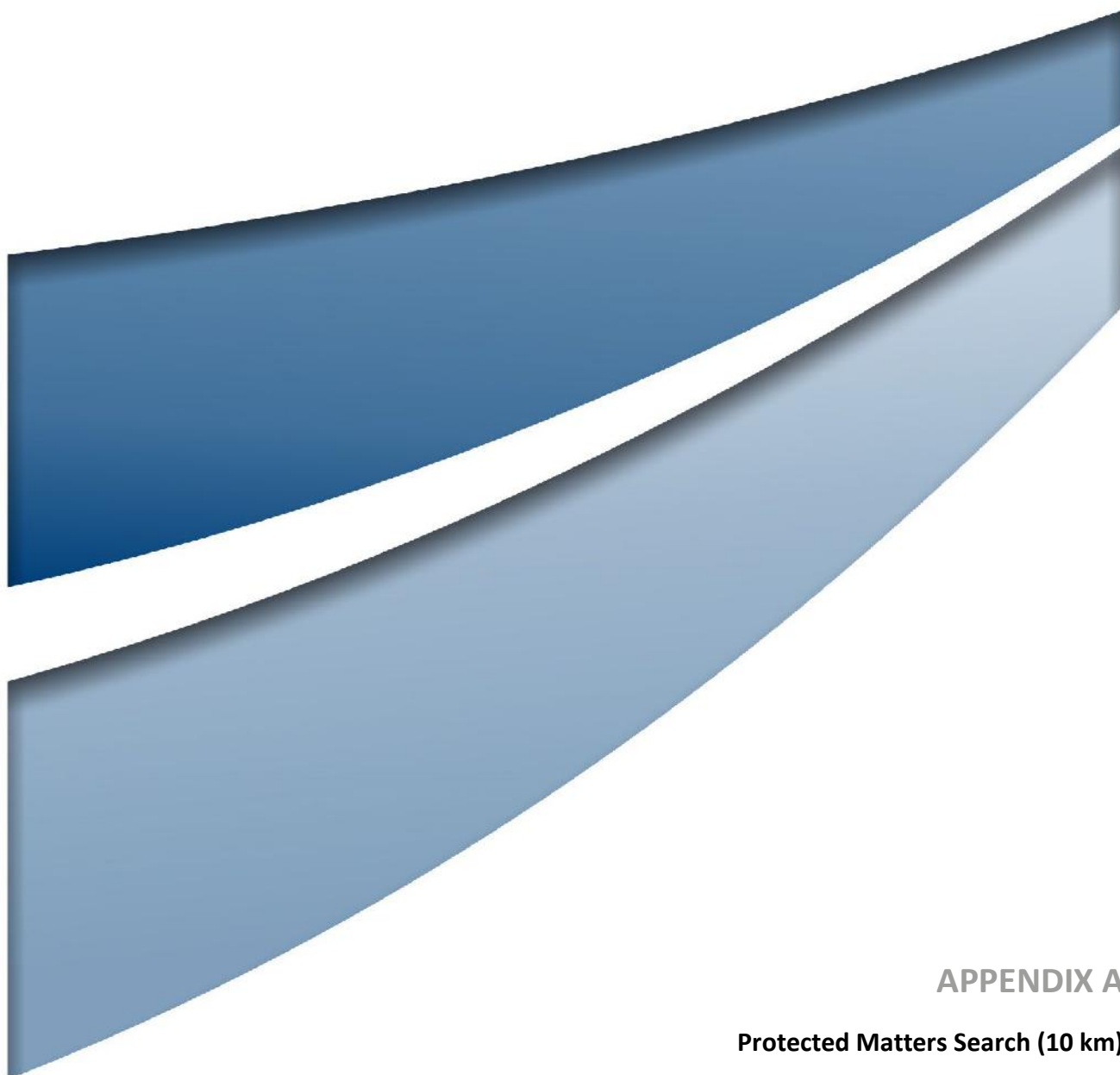
OEH (2018), 'Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method.

Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010a), Guidelines for detecting bats listed as threatened under the EPBC Act.

Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010b) Guidelines for detecting mammals listed as threatened under the EPBC Act.

Department of Sustainability, Environment, Water, Population and Communities (DEWHA 2010c), Guidelines for detecting birds listed as threatened under the EPBC Act.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). Conservation advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo).



APPENDIX A

Protected Matters Search (10 km)



Australian Government

Department of Climate Change, Energy,
the Environment and Water

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: 05-Apr-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	89
Listed Migratory Species:	58

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:	6
Commonwealth Heritage Places:	None
Listed Marine Species:	79
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:	3
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	1
Biologically Important Areas:	14
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 may occur within area	
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In buffer area only
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community may occur within area	
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
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 buffer area only

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 may occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
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 known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 buffer area only
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
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 buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
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 buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may 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 buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 buffer area only
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	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Mordacia praecox Non-parasitic Lamprey, Precocious Lamprey [81530]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Serirolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	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 may 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
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
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 buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
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 known 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 novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat may occur within area	In feature area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area	In feature area
Correa baeuerlenii Chef's Cap [17007]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eucalyptus stenostoma Jillaga Ash [3976]	Endangered	Species or species habitat may occur within area	In feature area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pomaderris parrisiae Parris' Pomaderris [22119]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

SHARK			
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Congregation or aggregation known to occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Migration route known to occur within area	In buffer area only
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 buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardeenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Ardeenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Breeding known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Migratory Marine Species			
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 may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Migration route known	In buffer area only to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In buffer area only
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 buffer area only
Megaptera novaeangliae Humpback Whale [38]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat 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 buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
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
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 likely to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known 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
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known 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
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
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 - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [12052]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [12053]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12049]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12050]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [15888]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [12051]	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
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to 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 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 buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
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 buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
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
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
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 known to occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In buffer area only
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 buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In buffer area only
Cosmocampus howensis Lord Howe Pipefish [66208]		Species or species habitat may occur within area	In buffer area only
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In buffer area only
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In buffer area only
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In buffer area only
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In buffer area only
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In buffer area only
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only

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 buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Whales and Other Cetaceans		[Resource Information]	
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Balaenoptera borealis Sei Whale [34]		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 may 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]	Endangered	Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]		Species or species habitat known to occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
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 buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Batemans	Marine Park	NSW	In buffer area only
Eurobodalla	National Park	NSW	In buffer area only
Silvestris	Flora Reserve	NSW	In buffer area only

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
Southern RFA	New South Wales	In feature area

Nationally Important Wetlands

[Resource Information]

Wetland Name	State	Buffer Status
Tuross River Estuary	NSW	In buffer area only

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Dredging of Tuross Lake channel and depositon of spoil in lake	2004/1554	Not Controlled Action	Completed	In feature area
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
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In buffer area only

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 buffer area only
Seabirds			

Scientific Name	Behaviour	Presence	Buffer Status
Ardenna carneipes Flesh-footed Shearwater [82404]	Foraging	Known to occur	In buffer area only
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 antipodensis Antipodean Albatross [82269]	Foraging	Known to occur	In buffer area only
Eudyptula minor Little Penguin [1085]	Breeding	Likely to occur	In buffer area only
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur	In buffer area only
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur	In buffer area only
Thalasseus bergii Crested Tern [83000]	Breeding	Known to occur	In buffer area only
Thalasseus bergii Crested Tern [83000]	Foraging	Likely to occur	In feature area
Sharks			
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur	In buffer area only
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In buffer area only
Whales			
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](#)
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The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

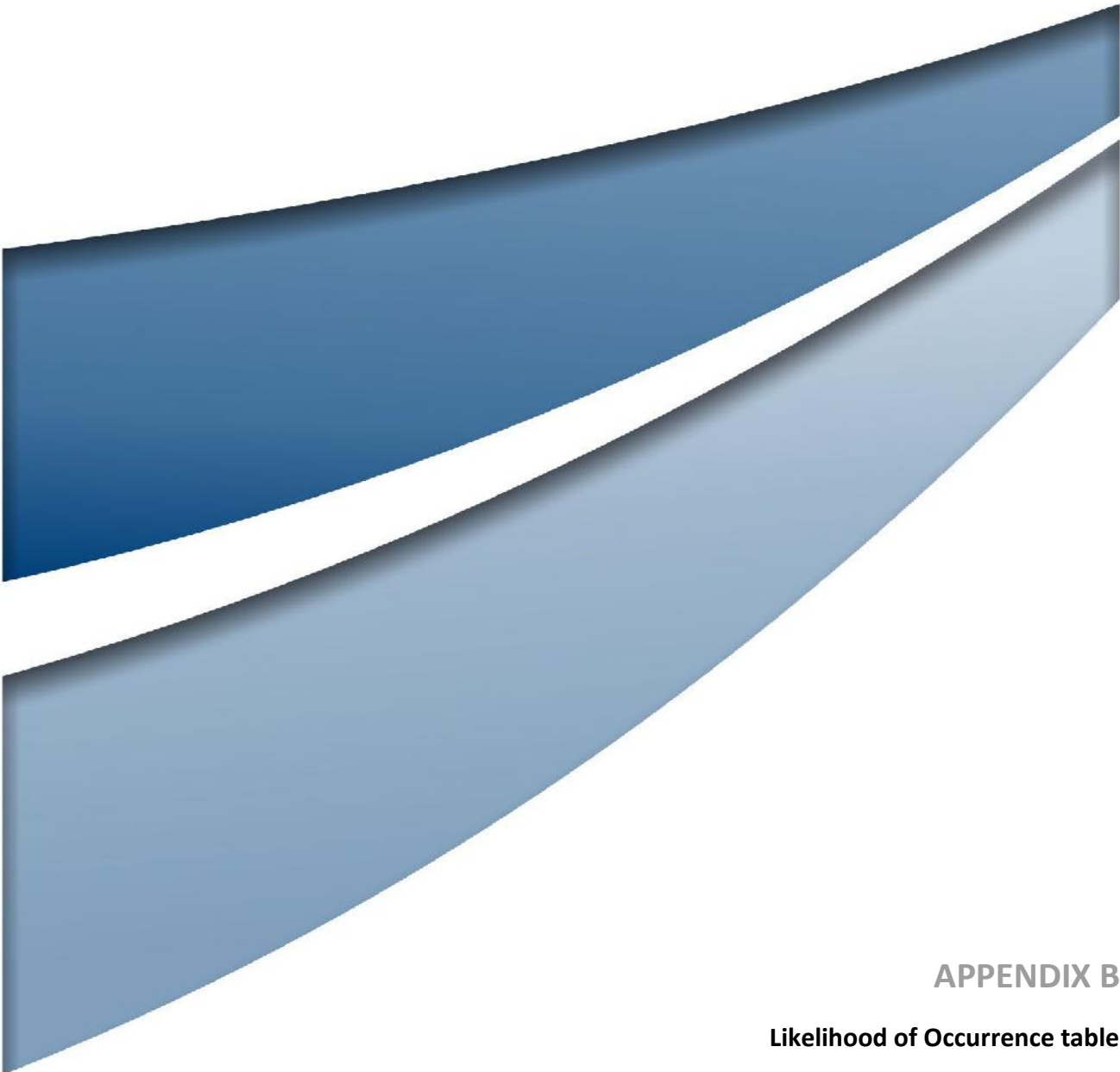
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APPENDIX B

Likelihood of Occurrence table

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
Aves					
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically endangered	Critically Endangered	2	Moderate- The Project Area is not near any known breeding population. Non-breeding flocks are known to infrequently forage on spotted gum forests within the south coast.
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Vulnerable	Vulnerable	-	Low – No suitable habitat within the Project Area.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	-	Endangered	-	Low- No suitable habitat within the Project Area.
<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered	2	Low- No suitable habitat within the Project Area.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Endangered	18	Moderate- Suitable autumn and winter habitat is present on site
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	Vulnerable	-	37	High- Suitable foraging and breeding habitat is present on site. Recorded.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Vulnerable	-	1	Low- Suitable habitat is present, however, few individuals have been recorded in the search buffer.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	-	Endangered	-	Low- No suitable habitat within the Project Area.
<i>Diomedea antipodensis gibsoni</i>	Gibson's Albatross	Vulnerable	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Falco hypoleucos</i>	Grey Falcon	-	Vulnerable		Low- No suitable habitat within the Project Area.
<i>Fregetta grallaria grallaria</i>	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	-	Vulnerable	-	Low- No suitable habitat within the Project Area.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Grantiella picta</i>	Painted Honeyeater	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered	31	High- The Project Area contains suitable migratory foraging habitat.
<i>Limosa lapponica baueri</i>	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Melanodryas cucullate cucullata</i>	South-eastern Hooded Robin, Hooded Robin	Endangered	Endangered	1	Low- Suitable habitat is present, however, few individuals have been recorded in the search buffer.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	Critically Endangered	Critically Endangered	-	Low – Suitable habitat is present, however, no individuals have been recorded in the search buffer.
<i>Neophema chrysostoma</i>	Blue-winged Parrot	Vulnerable	Vulnerable	-	Low – Suitable habitat is present, however, no individuals have been recorded in the search buffer.
<i>Numenius madagascariensis</i>	Eastern Curlew	-	Critically Endangered	11	Low- No suitable habitat within the Project Area.
<i>Pachyptila turtur subantarctica</i>	Fairy Prion	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel, Australian Gould's Petrel		Endangered	-	Low- No suitable habitat within the Project Area.
<i>Pycnoptilus floccosus</i>	Pilotbird	-	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	-	Low- No suitable habitat within the Project Area.
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Vulnerable	-	Low- No suitable habitat within the Project Area.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Sternula nereis nereis</i>	Australian Fairy Tern	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Dotterel, Eastern hooded Plover	Endangered	Vulnerable	2	Low - No suitable habitat within the Project Area.
Aves- migratory					
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Migratory	2	Moderate – Suitable foraging habitat may be present within the Project Area.
<i>Apus pacificus</i>	Fork-tailed Swift	-	Migratory	-	Low – This species is almost exclusively aerial and while it may use the airspace above the Project Area, it is unlikely to utilise the habitat within the Project Area.
<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Fleshy-footed Shearwater	Vulnerable	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Ardenna grisea</i>	Sooty Shearwater	-	Vulnerable	1	Low – Suitable habitat is present on site, however, there are few records in the search buffer.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	Vulnerable, Migratory	-	Low - Suitable habitat is present within the search buffer however, no individuals have been recorded within the Project Area.
<i>Calidris canutus</i>	Red Knot	-	Endangered	7	Low - No suitable habitat within the Project Area.
<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Critically Endangered	2	Low - No suitable habitat within the Project Area.
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	Migratory	-	Low - No suitable habitat within the Project Area.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Cuculus optatus</i>	Horsfield's Cuckoo	-	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Diomedea antipodensis</i>	Antipodean Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Diomedea epomophora</i>	Southern Royal Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Diomedea exulans</i>	Wandering Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Diomedea sanfordi</i>	Northern Royal Albatross	-	Endangered	-	Low - No suitable habitat within the Project Area.
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Gallinago megala</i>	Swinhoe's Snipe	-	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Gallinago sentura</i>	Pin-tailed Snipe	-	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Limosa lapponica</i>	Bar-tailed Godwit	-	Migratory	10	Moderate – Suitable foraging habitat may be present within the Project Area.
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	-	Endangered	-	Low - No suitable habitat within the Project Area.
<i>Macronectes halli</i>	Northern Giant Petrel	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	Migratory	22	High - The Project Area contains suitable foraging and breeding habitat.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	Migratory	2	Low – The Project Area may contain suitable foraging and breeding habitat, however there are few records in the search buffer.
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	-	Critically Endangered	-	Low - No suitable habitat within the Project Area.
<i>Numenius minutus</i>	Little Curlew, Little Whimbrel	-	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Pandion haliaetus</i>	Osprey	-	Migratory	-	Low - Suitable habitat may be present on site, however, there are no records in the search buffer.
<i>Phaethon leucurus</i>	White-tailed Tropicbird	-	Migratory	-	Low - No suitable habitat within the Project Area.
<i>Phoebastria fusca</i>	Sooty Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Migratory	117	High - The Project Area contains suitable foraging and breeding habitat.
<i>Sternula albifrons</i>	Little Tern	Endangered	Migratory	22	High - The Project Area may contain suitable foraging and breeding habitat.
<i>Thalassarche bulleri</i>	Buller's Albatross, Pacific Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche carteri</i>	Indian Yellow-nosed Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche cauta</i>	Shy Albatross	-	Endangered	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche eremita</i>	Chatham Albatross	-	Endangered	-	Low - No suitable habitat within the Project Area.

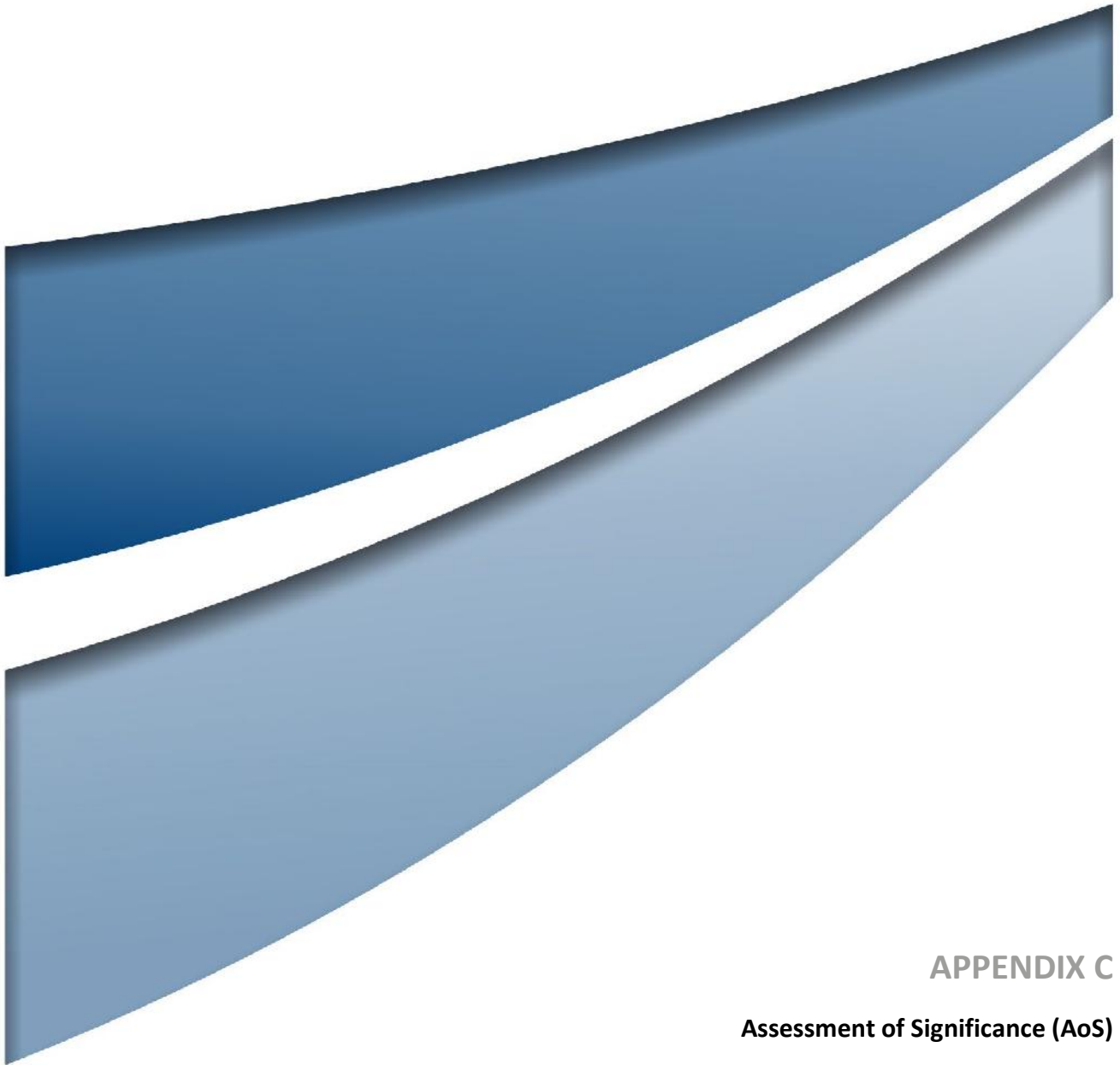
Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Thalassarche impavida</i>	Campbell Albatross, Campbell Black-browed Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche melanophris</i>	Black-browed Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche salvini</i>	Salvin's Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Thalassarche steadi</i>	White-capped Albatross	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Tringa nebularia</i>	Common Greenshank	-	Endangered	1	Low - Suitable habitat is present, however, few individuals have been recorded in the search buffer.
Reptiles					
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard, Pink-tailed Legless-lizard	Vulnerable	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Endangered	-	Low - Low- No suitable habitat within the Project Area.
<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Vulnerable	-	Low - Low- No suitable habitat within the Project Area.
<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle	Endangered	Endangered	-	Low - No suitable habitat within the Project Area.
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Natator depressus</i>	Flatback Turtle	-	Vulnerable	-	Low - No suitable habitat within the Project Area.
Amphibians					
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Vulnerable	Vulnerable	3	Moderate - Suitable habitat is present on site.
<i>Litoria aurea</i>	Green and Golden Bell Frog	-	Vulnerable	-	Low - No suitable habitat within the Project Area.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Mixophyes balbus</i>	Stuttering Frog, Southern Barred Frog (in Victoria)	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
Fish					
<i>Epinephelus daemeli</i>	Black Rockcod	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Mordacia praecox</i>	Non-parasitic Lamprey, Precocious Lamprey	-	Endangered	-	Low- No suitable habitat within the Project Area.
<i>Prototroctes maraena</i>	Australian Grayling	-	Vulnerable	-	Low- Suitable habitat may be present within the Project Area, however no individuals have been recorded within the search buffer.
<i>Serirolella brama</i>	Blue Warehou	-	Conservation Dependant	-	Low- No suitable habitat within the Project Area.
<i>Thunnus maccoyii</i>	Southern Bluefin Tuna	-	Conservation Dependant	-	Low- No suitable habitat within the Project Area.
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat, Large Pied Bat	-	Vulnerable	-	Low- No suitable roosting habitat within the Project Area.
<i>Dasyurus maculatus</i> <i>maculatus</i> (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered	3	Moderate- Suitable habitat is present on site.
<i>Isoodon obesulus</i> <i>obesulus</i>	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south- eastern)	Endangered	Endangered	2	Moderate- Suitable habitat is present on site.
<i>Petauroides volans</i>	Greater Glider	-	Vulnerable	9	Moderate- Suitable habitat is present on site.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	Vulnerable	-	83	High- The Project Area contains suitable foraging and breeding habitat. There is a high number of records within the search area.
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Endangered	Endangered	2	Moderate- Suitable habitat is present on site.
<i>Potorous tridactylus trisulcatus</i>	Long-nosed Potoroo (southern mainland)	Vulnerable	Vulnerable	2	Moderate- Suitable habitat is present on site.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	9	High- Suitable foraging habitat is present on site and the Project Area is within foraging range of known camps. Recorded
Flora					
<i>Astrotricha crassifolia</i>	Thick-leaf Star-hair	-	Vulnerable	-	Low- No suitable habitat within the Project Area.
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	Endangered	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Correa baeuerlenii</i>	Chef's Cap Correa	Vulnerable	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	Vulnerable	Vulnerable	-	Moderate- Suitable habitat is present on site.
<i>Eucalyptus stenostoma</i>	Jillaga Ash	-	Endangered	-	Moderate- Suitable habitat is present on site.
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort, Square Raspwort	-	Vulnerable	-	Moderate- Suitable habitat is present on site.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	Vulnerable	Vulnerable	1	Moderate - Suitable habitat is present on site.
<i>Pomaderris parrisiae</i>	Parris' Pomaderris	Vulnerable	Vulnerable	-	Low - No suitable habitat within the Project Area.
<i>Rhodamnia rubescens</i>	Scrub Turpentine, Brown Malletwood	Critically Endangered	Critically Endangered	-	Moderate - Suitable habitat is present on site.
<i>Thesium australe</i>	Austral Toadflax, Toadflax	Vulnerable	Vulnerable	-	Moderate - Suitable habitat is present on site.
Threatened ecological communities					
Brogo Vine Forest of the South East Corner Bioregion	NA	-	E	NA	Low - Not recorded during site assessment.
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	NA	-	E	NA	Low - Not recorded during site assessment.
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	NA	-	E	NA	Moderate
Illawarra and south coast lowland forest and woodland ecological community	NA	-	CE	NA	Low - Not recorded during site assessment.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	NA	E	CE	NA	Low - Not recorded during site assessment.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet Records	Likelihood of Occurrence
Lowland Grassy Woodland in the South East Corner Bioregion	NA	E	CE	NA	Low- Not recorded during site assessment.
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	NA	-	CE	NA	Recorded
Subtropical and Temperate Coastal Saltmarsh	NA	-	V	NA	Low- Not recorded during site assessment.



APPENDIX C

Assessment of Significance (AoS)

C.1 Assessment of Significance (AoS)

C.2 Grey-headed Flying-fox

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and BC Act. The Assessment of Significance for this species is provided in **Table C.1**.

Table C.1 Assessment of Significance – Grey-headed Flying-fox

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:
(a) Lead to a long-term decrease in the size of an important population The Grey-headed Flying-fox is considered to be a 'single, mobile population' according to the National Recovery Plan ((DAWE 2021), therefore any individuals are part of an 'important population'. There were eight grey-headed flying-fox (<i>Pteropus poliocephalus</i>) seen during the surveys. The species has also been recorded within 10 km of the Project Area (BioNet 2024). Roosting camps have been mapped for 'Nationally Important' camps and 'other' camps. Nationally important camps have $\geq 10,000$ individuals in more than one year within the last 10 years or have been occupied by more than 2500 individuals permanently or seasonally every year for the last 10 years (DCCEEW 2024). The closest roosting camp site is approximately 1.1 km away at Dalmeny. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Suitable foraging habitat is present in the development site for individuals in the camp. The grey-headed flying-fox can travel up to 50 km from the camp to forage; commuting distances are more often < 20 km (DCCEEW 2024). The proposed works will include the clearing of 2.8 ha in potential foraging habitat within the Project Area. Due to the negligible size proposed to be cleared, the availability of surrounding suitable foraging habitat, and the mobility of this species the works would be unlikely to lead to a long-term decrease in the size of this important population.
(b) reduce the area of occupancy of an important population The proposed works will include the clearing of 2.8 ha of potentially suitable foraging habitat for individuals observed during site surveys in the alternate location and for other that may occur locally. Extensive areas of foraging habitat occur in the state forests and adjoining conservation reserves (DCCEEW 2024). There are no camps within the Subject Land. Due to the ability of this species to commute up to 20 km for foraging, the habitat connectivity surrounding the development site and given there are no camps within the Subject Land, the proposed works be unlikely to reduce the area of occupancy for the population.
(c) fragment an existing important population into two or more populations This species has been recorded at several locations in Bodalla State Forest with several records of this species within the development site (ALA 2024) along with eight observed during Umwelt surveys. Roosting camps are generally located within 20 km of a regular food source, the closest camp is approximately 1.1 km away at Dalmeny. Extensive areas of foraging habitat occur in the state forests and adjoining conservation reserves. The proposed works would include removal of approximately 2.8 ha of foraging habitat, however, given the high mobility this species and there is established connectivity with surrounding foraging habitats, the small development would be unlikely to fragment the population
(d) adversely affect habitat critical to the survival of a species Habitat critical to the survival of the grey-headed flying-fox is likely to include roosting camps and areas with winter flowering species such as <i>Corymbia maculata</i>. PCT 3275 is dominated by <i>Corymbia maculata</i> thus contains the Subject Land contains habitat suitable for the survival of Grey-headed Flying-fox. The nearest camp is at Dalmeny and is approximately 1.1 km away for the development site. The proposed works would impact approximately 2.8 hectares of habitat critical to the survival of Grey-headed Flying-fox.

(e) disrupt the breeding cycle of an important population
Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. There is no recorded grey-headed flying-fox camps within the Subject Land, the closest camp is approximately 1.1 km away at Dalmeny. The number of BioNet records (9) and observed sightings on site (8) are considered unreliable in determining the level of utilisation of the Subject Land given the high mobility nature of the species. The grey-headed flying-fox can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. The proposed works would include the clearing of approximately 2.8 ha of native vegetation in the Subject Land. Given the Subject Land does not host a camp and is surrounded by extensive areas of foraging habitat the works would be unlikely to disrupt the breeding cycle of an important population.
(f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Extensive areas of foraging habitat occur in the state forests and adjoining conservation reserves. This species is highly mobile with the general commuting distance from camps to foraging habitat being 20 km, along with the ability to travel up to 50km for foraging recorded. Given the adjoining foraging habitat, the mobility of the species and lack of a camp site within the Subject Land the clearing of approximately 2.8 ha of native vegetation in the development site is a negligible loss. The proposed works would be unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat of the species such that the species is likely to decline.
(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
The proposed works are not considered to result in the establishment of invasive species, such as the European fox and cat, that would threaten habitat for grey-headed flying-fox. Thus, it is not anticipated that the proposed work would lead to the invasion of any exotic species that would threaten habitat for this species.
(h) introduce disease that may cause the species to decline, or
The National recovery plan for the grey-headed flying-fox (<i>Pteropus poliocephalus</i>) (DAWE 2021) does not list any diseases as threatening to this species. The effects of the pathogens, Australian bat Lyssavirus (ABL), Bat Paramyxovirus and Menangle Pig virus on the Grey Headed Flying Fox are unknown. Thus, it is not anticipated that the proposed work would lead to the invasion of any diseases that would threaten habitat for this species.
(i) interfere substantially with the recovery of the species.
The National recovery plan for the grey-headed flying-fox (<i>Pteropus poliocephalus</i>) (DAWE 2021) lists the following as a key threatening process which may result from the proposed works: Habitat loss, particularly clearing of winter foraging species. The works would clear approximately 2.8 ha of potential foraging habitat and represents a negligible reduction in the extent of habitat relative to availability of habitat in Eurobodalla National Park and Bodalla State Forest. Bodalla State Forest is part of a larger area of native vegetation that includes Kooraban National Park, Wadbilliga National Park, Gulaga National Park and Deua National Park. Thus, the proposed works are unlikely to lead to the loss, alteration or fragmentation of habitats for the species to the extent that may substantially interfere with the recovery of this species.
Conclusion
Given the relatively small area (.27 ha) of potential foraging habitat to be removed with an extensive area of potentially suitable habitat, and the mobility of this species, the proposed work is unlikely to have a significant impact on the grey-headed flying-fox.

C.3 Glossy Black Cockatoo

The Glossy Black Cockatoo is listed as Vulnerable under the EPBC Act and BC Act. The Assessment of Significance for this species is provided in **Table C.2**.

Table C.2 Assessment of Significance – Glossy Black Cockatoo

Response
(a) lead to a long-term decrease in the size of an important population
No. It would not lead to a long-term decrease in size of an important population, as no important populations have been identified in the study area. Additionally, no important populations have been identified within NSW. Approximately 37 Glossy Black Cockatoo sightings have been recorded by others within 10 km of the Subject Land. This species occurs from the coast near Eungella in eastern Queensland to Mallacoota in Victoria. The Glossy Black-Cockatoo generally lives in coastal woodlands and drier forest areas, open inland woodlands, or timbered watercourses where its main food source, the <i>Casuarina/Allocasuarina</i> is common. No key source populations for breeding or dispersal have been identified. Nor is this area close to the limit of the species range. However, the species has had a substantial reduction in the last three generations of 30-50% of the population as a whole.
(b) reduce the area of occupancy of an important population
No. The area of occupancy would not be reduced for an important population, as no important populations have been identified in the study area. The area of occupancy for the national population of the Glossy Black Cockatoo is estimated to be stable at 40,000 km² (DCCEEW 2022). The proposed works will include the clearing of approximately 2.8 ha of potential habitat over distance of 1.5 km, with the proposal clearing potential roosting habitat and therefore the proposed works would result in a reduction in occupancy of the species.
(c) fragment an existing important population into two or more populations
No. The development site is unlikely to fragment an existing important population into two or more populations
(d) adversely affect habitat critical to the survival of a species
No. There is currently no national recovery plan for the Glossy Black Cockatoo. <i>The Conservation Advice for Calyptorhynchus lathami lathami (Glossy Black Cockatoo)</i> (DCCEEW 2022), however, defines habitat critical to the survival of the Glossy Black Cockatoo to include all foraging habitat during both the breeding and non-breeding season. This includes trees that have nests which take centuries to form naturally. Glossy Black Cockatoos rely on stands of suitable hollow-bearing trees which are a key component of their breeding habitat. Habitat critical to the survival includes hollow bearing trees with known or potential nest hollows 8 m or higher above the ground, located in branches greater than 30 cm in diameter, and have a minimum entrance of 15 cm. Stands of trees within or adjacent to known breeding areas, that are likely to become hollow bearing in future years, are also key components of this species' habitat. The proposed work would impact critical habitat; however, this would be to a minor extent given the size of the development site (2.8 ha) within a large tract of native forest. It is recommended that nest boxes be placed in nearby areas to mitigate the impact of hollow bearing tree loss.
(e) disrupt the breeding cycle of an important population
No. An important population is considered not to occur within the Subject Land. The species prefers old growth Eucalypt forests for breeding habitat that have large nest hollows with an entrance of 15 cm or greater. Potential breeding habitat for this species is present. To avoid impact to the breeding cycle of this species clearing would occur outside of the breeding time (breeding time occurs March to August) and nest boxes put up to reduce competition with other species. With these measure in place the proposed works would be unlikely to disrupt the breeding cycle of the population. It is recommended that preclear assessments, hollow bearing tree (hbt) inspection (to occur prior

to and immediately after hbt felling) be conducted and if possible, construction works occur outside the breeding time of this species.
(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
No. While suitable habitat for the species is within the development site, the removal of approximately 2.8 ha is relatively small compared to the suitable habitat surrounding the development site. Given this and the mobility of this species, the proposed works are not likely to decrease the quality of habitat to the extent the species is likely to decline. It is recommended nest boxes are put in place in adjacent areas to mitigate the impact of loss of hollow bearing trees.
(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
No. There is potential for the introduction/spreading of invasive weeds during construction, which can cause food shortages for the species. Mitigations have been included to reduce this risk such as cleaning machinery prior to site visits.
(h) introduce disease that may cause the species to decline, or
No. The works are unlikely to introduce disease to the development site. However, it is recommended nest boxes are installed adjacent to the development site to replace hbts felled during construction works. A reduction in large hbts that provide nest sites can increase competition for hollows which can lead to amplification of <i>Psittacine circovial</i> (beak and feather disease). The Glossy Black Cockatoo is susceptible to infection by this disease.
(i) interfere with the recovery of the species
No. The proposed works are small in comparison to the habitat surrounding the development site. It is recommended that suitably sized nest boxes be installed to replace the number of hbts removed during construction to decrease competition for nesting sites. If possible, the works should occur outside the breeding time (breeding time occurs March to August) and nest boxes put up in place to reduce competition with other species. The proposed works would not interfere with species recovery, as only a small amount of foraging habitat is being disturbed.
Conclusion
It is unlikely there will be a significant impact to the Glossy Black Cockatoo due to the relatively small area being cleared, the surrounding habitat. If the Clearing occurs outside of the breeding time (breeding time occurs March to August) and nest boxes are put up to reduce competition with other species is recommended.

C.4 White-bellied Sea-eagle

The White-bellied Sea-eagle is listed as a Migratory species under the EPBC Act and as Vulnerable under the BC Act. The Assessment of Significance for this species is provided in **Table C.3**.

Table C.3 Assessment of Significance – White-bellied Sea-eagle

(a) 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
No. The works would likely remove a small amount (2.8 ha) of terrestrial habitat for the White-bellied Sea-eagle, however due to the availability of other suitable habitat surrounding the site and the relatively small Impact Area, this is unlikely to result in a substantial modification of important habitat.
(b) 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
No. While there is the potential for introduction of invasive weeds, which can cause habitat degradation for the species, mitigations have been recommended to reduce this risk.
(c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.
No. While the study area has suitable terrestrial habitat, there is other suitable habitat surrounding the site which includes living and dead mature trees with suitable vegetation within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines. Given this and the high mobility of this species, the proposed works are unlikely to result in a serious disruption to the lifecycle of the White-bellied Sea-eagle. It is recommended the clearing is undertaken outside of the breeding time for this species.
Conclusion
It is unlikely there will be a significant impact for White-bellied Sea-eagle given the high mobility of this species, the relatively small area to be cleared. It is recommended clearing occurs outside of the breeding time for this species

C.5 Swift Parrot

The Swift Parrot is listed as Critically Endangered under the EPBC Act and as Endangered under the BC Act. The Assessment of Significance for this species is provided in **Table C.4**.

Table C.4 Assessment of Significance – Swift Parrot

(a) Lead to a long-term decrease in the size of an important population
The Swift Parrot occurs as a single, migratory population (Saunders & Tzaros 2011). In 2010, the Action Plan for Australian Birds suggested there were approximately 2,000 mature individuals in the wild (Garnett et al. 2011, cited in Saunders, D.L. and Tzaros, C.L. 2021), but these numbers have declined since and the population estimated to be 750 (range 300- 1,000) mature individuals in 2020 (Webb et al. 2021, cited in Saunders, D.L. and Tzaros, C.L. 2021). A preliminary study using genetic data has estimated the effective population size (N_e) of the Swift Parrot to be between 60–338 individuals (Olah et al. 2020 cited in cited in Saunders, D.L. and Tzaros, C.L. 2021).
The action proposes to directly remove 2.8 hectares of habitat mapped as important Swift Parrot habitat area, specifically foraging habitat, as per 5.1.3 of the Biodiversity Assessment Method (DPIE, 2020). Important habitat maps identify areas that are considered essential to support critical life stages of the species, e.g. breeding areas or locations important for foraging/over-wintering for migratory species. In addition to this area directly removed, there may be indirect impacts to the surrounding mapped important Swift Parrot area. Removal and impacts to foraging areas have been identified as a principal ongoing threat and cause of decline to the species, and any impact to important Swift Parrot habitat could reasonably be expected to further decrease the population.

(b) reduce the area of occupancy of an important population

The current area of occupancy of the Swift Parrot across its foraging range has not been established. The proposal would directly remove 2.8 ha of mapped important Swift Parrot foraging habitat and so would likely reduce the area of occupancy of the population. Additional indirect impacts to adjoining mapped important habitat may further affect their habitat values and result in further reduction to this likely area of occupancy. It is not possible to estimate this likely reduction of area of occupancy as a percentage of the total population's area of occupancy.

(c) fragment an existing important population into two or more populations

The Swift Parrot is highly mobile and the proposal will not cause its population to become fragmented.

(d) adversely affect habitat critical to the survival of a species

The National Recovery Plan identifies that habitat critical to the survival of the Swift Parrot includes:

- Breeding and foraging habitat in Tasmania.
- Foraging habitat on the Australian mainland which contains preferred foraging species within known and likely foraging habitat.

The action proposes to directly remove 2.8 ha of habitat mapped as important Swift Parrot habitat (area) as per 5.1.3 of the Biodiversity Assessment Method (DPIE, 2020). Important habitat maps identify areas that are considered essential to support critical life stages of the species, e.g., breeding areas or locations important for foraging/over-wintering for migratory species. In addition to this area directly removed, there would likely be indirect impacts to the surrounding mapped important Swift Parrot area.

It is important not to look at small areas of habitat in isolation, particularly with highly mobile species like the Swift Parrot. Relatively small areas may be corridors, stopover sites and refugia. Note that the contiguous area of mapped important area that intersects the development footprint broadly shows it to be a relatively unburnt fire refuge compared to other areas in this part of the south coast's mapped important habitat since the 2016-2017 Fire Extent and Severity Mapping (DECCEEW 2020), and particularly during the 2019-2020 fires. Saunders, D.L. and Tzaros, C.L. (2021) note that an initial analysis estimates that between 10 - 30 percent of the distribution range of the Swift Parrot was impacted to some degree during the 2019-2020 fires. This type of event is increasingly likely to reoccur as a result of climate change. Coastal areas are an important part of the species' over-wintering range, becoming even more so during droughts (Saunders and Heinsohn 2008 cited in Saunders, D.L. and Tzaros, C.L. 2021).

Small areas identified as important habitat may offer significant temporal habitat where availability of resources at one time may be scarce or localised, with often large percentages of the total population utilizing very limited areas of important habitat at one time. The Swift Parrot likely has such a large winter range because only a small proportion of the habitat within their range will represent viable foraging habitat at any one time.

Without evidence to argue otherwise, it must be assumed that the area directly and indirectly impacted that is mapped as important habitat would be essential to support critical life stages of the species across its population.

(e) disrupt the breeding cycle of an important population

The Swift Parrot breeds in Tasmania and over-winters on the mainland. The removal of 2.8 ha of foraging habitat is unlikely to directly disrupt the breeding cycle of Swift Parrot.

(f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposal would remove 2.8 ha of mapped important habitat. It is also likely to have a degrading indirect effect on surrounding habitat through edge effects, localised fragmentation of canopy, and changes to the foraging habitat such as increasing the risk of activity of overabundant aggressive native birds resulting in competition and changes in available foraging resources like Eucalypt nectar/pollen and lerps. Species like Noisy

Miners and Rainbow Lorikeets are large and aggressive nectar feeders that compete for foraging habitat and are more likely to adapt and outcompete Swift Parrots in habitats that are modified through clearing and edge effects. Increased weed growth associated with edge effects would likely offer some competition to the vigour and intergenerational recruitment of important feed trees.
(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Clearing and likely indirect degradation of important Swift Parrot habitat because of the proposal would not be likely to establish invasive species such that they are harmful to Swift Parrot.
(h) introduce disease that may cause the species to decline, or
Swift Parrots are at risk from Psittacine Beak and Feather Disease (PBFD). PBFD already occurs in the Swift Parrot population. The proposal would not likely directly introduce the disease to birds that may utilise the site, or necessarily exacerbate the disease for any already affected birds that use the site, but the reduction of important habitat would likely increase the effect of the disease such that it may compound Swift Parrot decline.
(i) interfere substantially with the recovery of the species.
The direct clearing and likely indirect impacts to Swift Parrot mapped important habitat, as discussed above, would likely have impacts over at least 2.8 hectares of this habitat considered essential to the species' critical life stages such that the proposal would likely interfere substantially with the recovery of the species.
Conclusion
Based on the assessment factors discussed above, the proposal to clear 2.8 hectares of mapped important habitat would have direct and indirect, spatially and temporally compounding impacts on habitat considered essential to support critical life stages of the species such that Swift Parrot would likely be significantly impacted by the proposal. As such it is recommended that the action be referred under the EPBC Act to determine whether the Project is a controlled action.

