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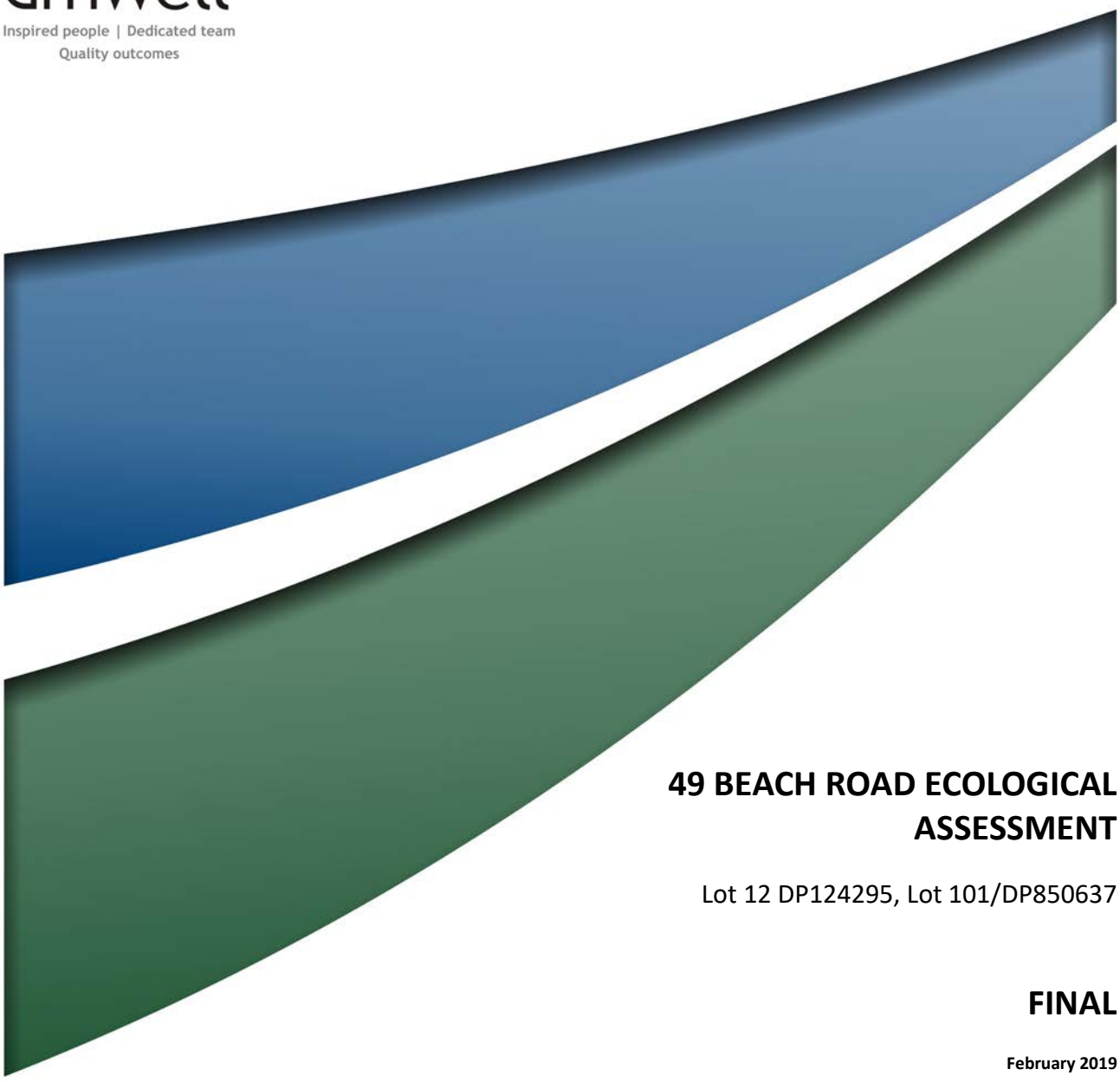

# 49 BEACH ROAD ECOLOGICAL ASSESSMENT

Lot 12 DP124295, Lot 101/DP850637

## FINAL

**February 2019**

# 49 BEACH ROAD ECOLOGICAL ASSESSMENT

Lot 12 DP124295, Lot 101/DP850637

## FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Global Lifestyle Communities Pty Ltd

| | |
|---|---|
| Project Director: | David Moore |
| Project Manager: | David Moore |
| Report No. | 8165/R02/Final |
| Date: | February 2019 |


**Canberra**

PO Box 6135
Unit 2 / 99 Northbourne Avenue
Turner ACT 2612

Ph. 1300 793 267

www.umwelt.com.au


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# 1.0 Introduction

## 1.1 Purpose

Umwelt (Australia) Pty Limited (Umwelt) has been commissioned by City Plan Services (City Plan) on behalf of Global Lifestyle Communities Pty Ltd (GLC) to prepare a flora and fauna report for Lot 12 DP124295 and Lot 101 DP850637, located at 49 Beach Road, Batemans Bay, NSW (the 'Project Area'; **Figure 1**).The purpose of this report is to confirm that the Biodiversity Offsets Scheme (BOS) is not triggered under the NSW *Biodiversity Conservation Act 2016* (BC Act) and to inform a self-assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report documents the extent and type of native vegetation present on site, assesses current biodiversity values of the Project Area and assessing the significance of potential impacts of the proposed development on threatened species, populations and communities that are listed under the schedules of the BC Act and the EPBC Act.

## 1.2 Project Area

The Project Area is made up of Lot 12 DP124295 and Lot 101 DP 850637 in Eurobodalla Shire Council LGA, and covers a total area of 6.2 hectares (**Figure 2**).

The Project Area is currently a tourist accommodation facility ('*the Coachhouse*') in an urban context on the eastern edge of Batemans Bay, within the Eurobodalla Shire Council, local government area. The Project Area is located in two zones; SP3: Tourist and R3: Medium Residential under the Eurobodalla Local Environmental Plan 2012 (LEP).

The coastal edge along the northern site boundary has been filled beyond the natural coastline and a temporary embankment established to the site boundary. It is understood that Bateman's Marine Park currently extents to the original coast line (**Figure 2**).

## 1.3 Project understanding

GLC propose to develop the Project Area for an age care facility, seniors living and residential flat development (**Figure 3**). Specifically, it is understood that the facility would include:

- senior and residential units
- an age care facility
- a public restaurant and
- associated roads and services.

Umwelt understands that minor stormwater works are proposed within the Bateman's Marine Park Boundary. A proposed boardwalk and rock batter along Hanging Rock Creek and associated intertidal mud flats within the Bateman's Marine Park Boundary has been removed from the scope of the proposal.

The indicative Development Footprint is shown in **Figure 2.** No final impact footprint has been provided, however native vegetation outside the development footprint (i.e. areas in green on **Figure 3**) would be retained where possible. No disturbance would occur in areas supporting mangrove forest or intertidal

mud flats. A Development Application under Part 4 of the *Environment Protection and Assessment Act 2004* (EP&A Act) is being submitted for the proposed works.

The *Biodiversity Conservation Act 2016* (BC Act) applies to all Development Applications submitted under Part 4 of the EP&A Act. Under the BC Act any proposal would need to be considered against thresholds for entry into the Biodiversity Offsets Scheme (BOS) under the *Biodiversity Conservation Act 2016* (BC Act). Potential triggers for the BOS are:

- If native vegetation exceeds the applicable native vegetation clearance threshold
- If clearing of areas mapped on the Biodiversity Values Map (BVM) and
- If significant impacts on threatened species are likely.

No minimum lot size is applicable to the Project Area, hence the actual lot size (i.e. Lot 12 DP124295; 4.1 ha and Lot 101 DP 850637; 1.7 ha) applies to determining native vegetation clearance thresholds for the BOS. The application BOS threshold for clearing native vegetation is therefore 0.5 ha.

If the BOS is not triggered, any DA under Part 4 needs to be accompanied by a Flora and Fauna Assessment, demonstrating that thresholds of the BOS are not triggered, including significance assessments for threatened species, demonstrating that impacts would not be significant.

This document documents the assessment against triggers for the BOS, and confirms that assessment by the proposed development on the following basis:

- The Project Area supports less than 0.5 hectares of native vegetation, and less than 0.5 hectares of native vegetation would be cleared (**Sections 3.2** and **4.1**)
- The Project Area does not cover any areas identified on the Biodiversity Values Map (OEH 2019; accessed 20 February 2019)
- No significant impacts on NSW BC Act threatened species or ecological communities are anticipated (**Section 4.0**).

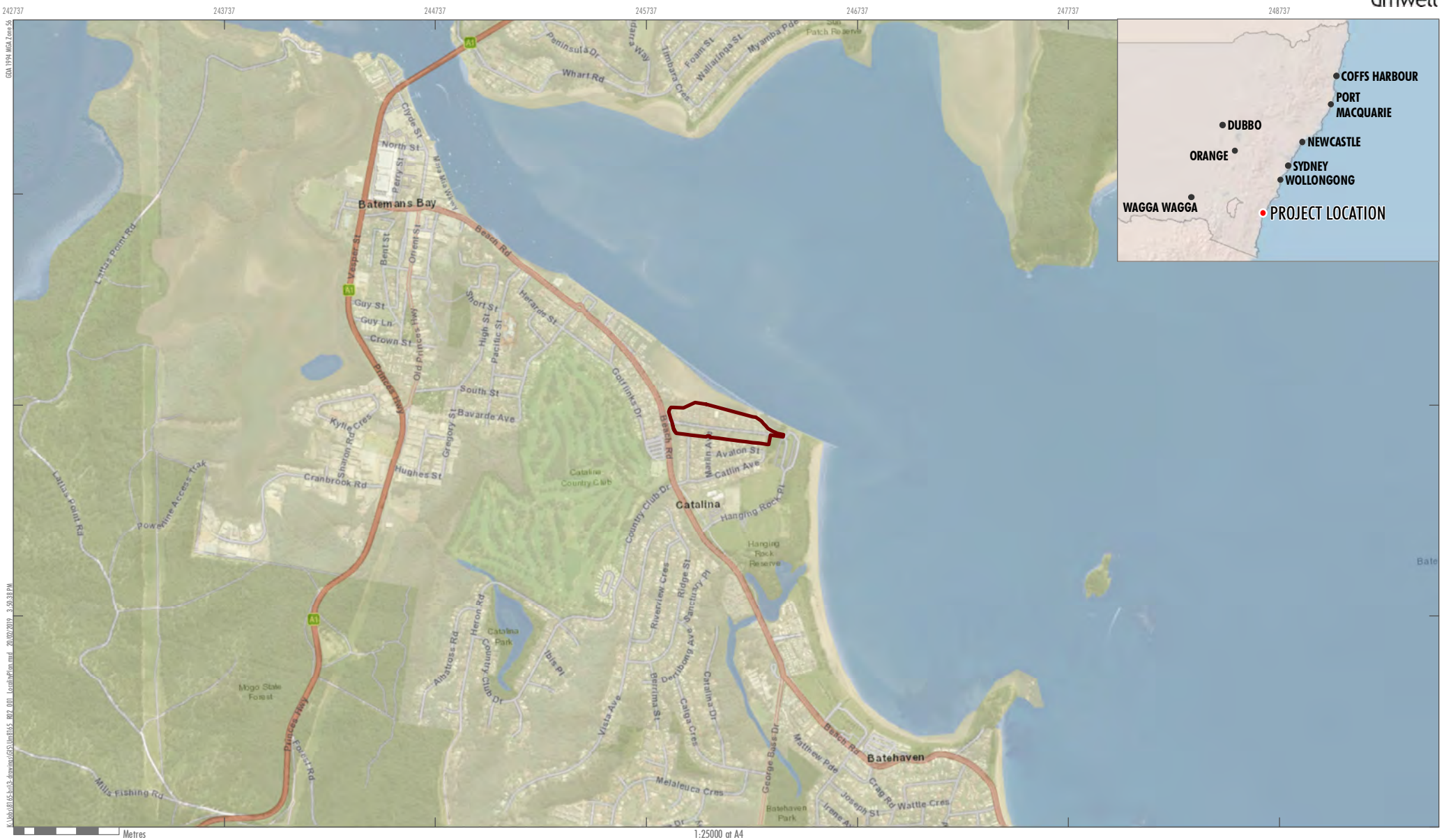
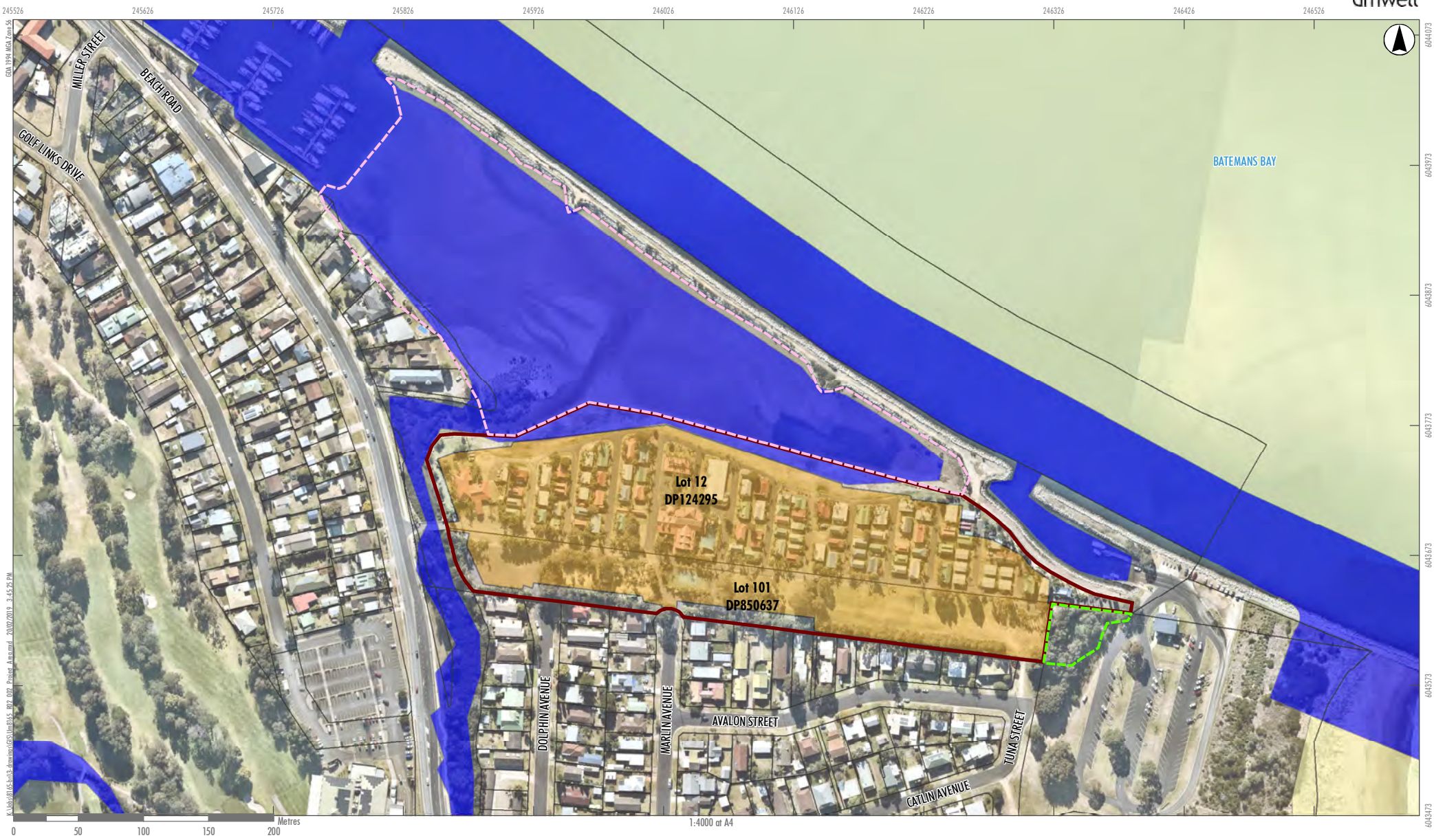



FIGURE 1

## Project Location




## Legend

- Mudflat Area Adjacent to Project Area
- Project Area
- Swamp Oak Floodplain Swamp Forest Adjacent to the Project Area

**NSW Marine Protected Areas**

- Habitat Protection Zone (IUCN IV)
- Special Purpose Zone (IUCN II)

FIGURE 2

# Project Area

Image Source: Nearmap 15 July 2018; NSW Fisheries Data source: NSW LPI DCDB

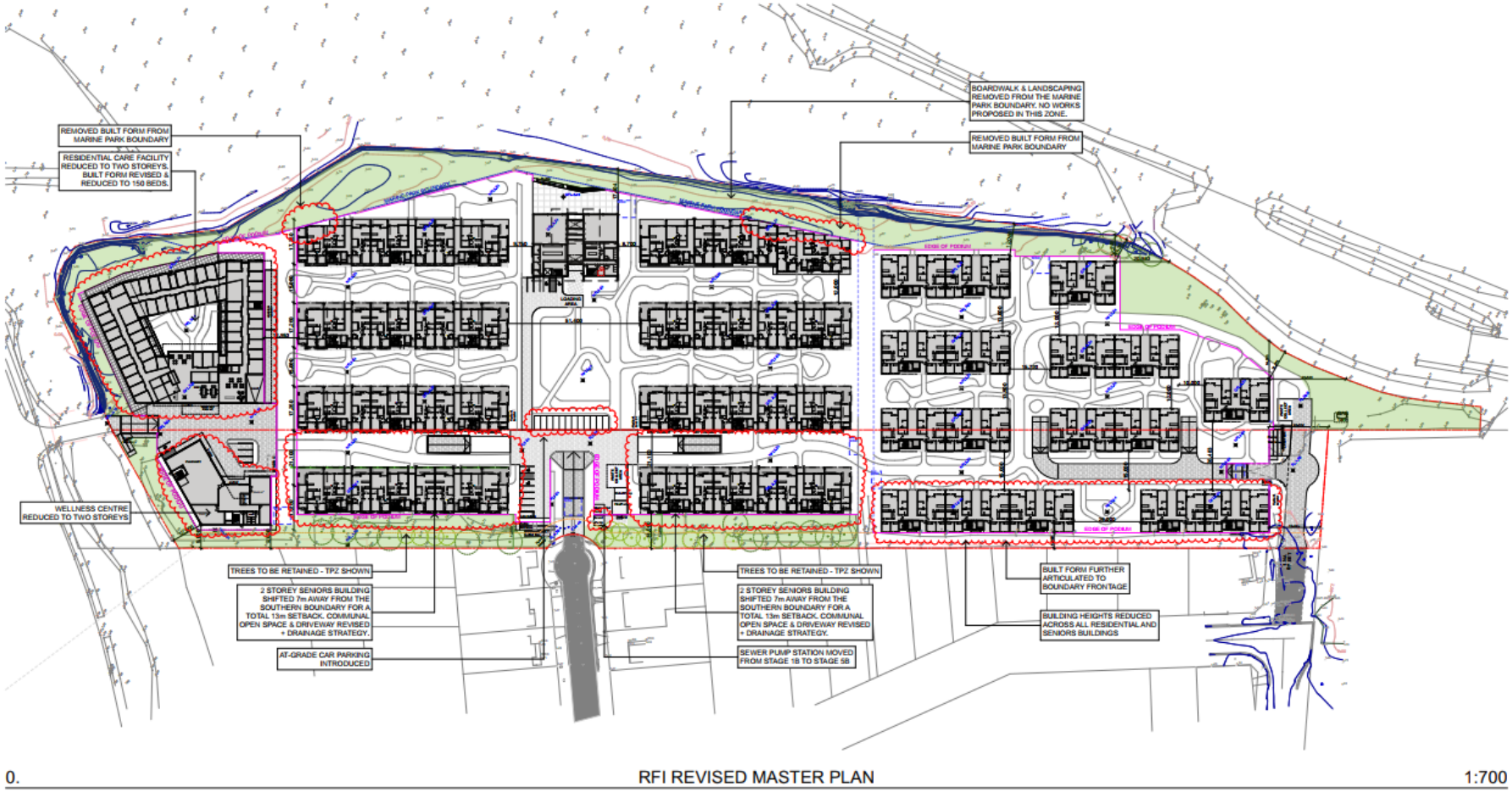



**Figure 3 Proposed Development Plan (Provided 19 February 2019 by BHI Architects)**

## 1.4 Legislation

The key Commonwealth and NSW legislation relevant to this ecological assessment are listed in **Table 1.1.**

**Table 1.1 Key legislation**

| Legislation | Relevant Objectives | How it applies to this Proposed Development |
|---|---|---|
| **Commonwealth Acts** | | |
| *Environment Protection and Biodiversity Conservation Act 1999* | To provide for the protection of the environment, particularly, Matters of National Environmental Significance (MNES) which include nationally listed threatened species and ecological communities, and migratory species. | Impacts to MNES and migratory species listed under the EPBC Act with the potential to occur in the Project Area have been assessed in this report. |
| **State Acts** | | |
| *Environmental Planning and Assessment Act 1979* | To encourage the proper management, development and conservation of natural and artificial resources for the purpose of promoting the social and economic welfare of the community and a better environment. | This Act is the principal planning instrument in NSW and as such dictates the assessment approach for the proposed development, including ecological impact assessment and consideration of other Acts and planning policies. The proposed development is permissible with consent and this report considers impact on ecological values.<br>A Development Application (DA) for the proposed works is being submitted to Council under Part 4 of the EP&A Act. |

| Legislation | Relevant Objectives | How it applies to this Proposed Development |
|---|---|---|
| *Biodiversity Conservation Act 2016* | Provides for the conservation of threatened species, populations and ecological communities and sets out a number of specific objectives relating to the conservation of biological diversity and the promotion of ecologically sustainable development. | The BC Act establishes that a person must not, by an act or an omission, do anything that causes damage to any threatened species, the habitat of a threatened species, an endangered population or an endangered ecological community.<br>The BC Act specifies the following thresholds for entry into the Biodiversity Offsets Scheme (BOS) for Part 4 developments:<br>• whether the impacts occur on an area mapped on the Biodiversity Values map published by the Minister for the Environment<br>• whether the amount of native vegetation being cleared exceeds the threshold applicable to the relevant minimum lot size and<br>• whether significant impacts on threatened species or ecological communities are likely to occur.<br>This report confirms that the BOS is not triggered by the proposed development on the following basis:<br>• The Project Area supports less than 0.5 hectares of native vegetation, and less than 0.5 hectares of native vegetation would be cleared (**Sections 3.2** and **4.1**)<br>• The Project Area does not cover any areas identified on the Biodiversity Values Map (OEH 2019; accessed 20 February 2019)<br>• No significant impacts on NSW BC Act threatened species or ecological communities are anticipated (**Section 4.0**). |
| *Biosecurity Act 2015* | Describes how the NSW Government will manage the biosecurity risks and impacts posed by weeds to the economy, environment and community of NSW. | All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.<br>Any person must comply with prohibitions and regional recommended measures for weed species identified on site. Specifically, any works must comply with relevant regional protected measures. |

| Legislation | Relevant Objectives | How it applies to this Proposed Development |
|---|---|---|
| **State Environmental Planning Policies** | | |
| *Coastal Management Act 2018* | Manages the development in a coastal zone and protecting the environmental assets of the coast. | The Project Area is within the coastal area. Development consent must not be granted to the development on land that is within the coast use area unless the consent authority are satisfied that adverse impacts have been avoided, minimise or mitigated.<br>This report does not address planning and approval requirements under the *Coastal Management Act* 2018. |
| *Marine Estate Management Act 2014* | To provide the management of marine estates across NSW to be consistent with the principles of ecological sustainable development. | The adjacent mangroves, tidal flats and land reclamation area are part of the Batemans Marine Park (Batemans Bay Special Area).<br>This report does not address planning and approval requirements under *the Marine Estate Management Act* 2014. |
| *Water Management Act 2000* | To provide sustainable and integrated management of water sources in NSW to benefit present and future generations. | The proposed works include works undertaken on waterfront land alongside Hanging Rock Creek and the associated estuarine inter-tidal mudflats and would be defined as a controlled activity.<br>A controlled activity approval would be required under the *Water Management Act 2000* to authorise the carrying out of a controlled activity, unless exemptions apply. This report does not address requirements under the *Water Management Act 2000*. |
| Koala Habitat Protection (SEPP 44) | Management of areas of natural vegetation that provide habitat for koalas. | Eurobodalla is within the local government areas identified under SEPP 44 for koala habitat protection. |

# 2.0 Methodology

## 2.1 Desktop Assessment

A review of the following relevant biodiversity databases and documentation was conducted:

- The Biodiversity Values Map and Threshold Tool (OEH 2019a)
- A 10 x 10 kilometre (km) area search for flora and fauna records from the Office of Environment and Heritage (OEH) Atlas of NSW Wildlife, BioNet (OEH 2019b) centred on the study area
- A 10 km radius search of Department of Environment and Energy's Protected Matters Database (PMST) (DoEE 2019). The PMST was accessed to determine those Commonwealth listed threatened species or communities known to occur or with potential to occur in the locality
- OEH Threatened Species Profiles Database (OEH 2019c)
- Native Vegetation of the southeast NSW a revised classification and map for the coast and eastern tablelands (Tozer et al. 2010) and
- Endangered Ecological Communities Survey and Mapping in Eurobodalla Shire (ngh environmental 2007).

Aerial imagery of the Project Area and surrounding locality were reviewed to gain an appreciation of the extent of vegetation communities within and adjacent to the Project Area. A review of the following available relevant documentation was also conducted:

## 2.2 Field Inspection

The Project Area was inspected on three occasions. A threatened shorebird assessment was conducted on the 25 October 2018 and vegetation and habitat features were mapped by a BAM accredited assessor throughout the Project Area on 9 January 2019. The site was subsequently inspected with OEH on 7 February 2018 to discuss impact avoidance and mitigation measures.

For the purposes of this report, quadrats and targeted searches were not undertaken. A random meander transect was conducted throughout the Project Area and rapid vegetation assessments were recorded within and adjacent to potential impact areas to identify plant community types, structure, and the condition of the vegetation, and to identify threatened flora habitat or individuals. Only commonly-occurring or threatened flora were recorded. All vascular plants recorded were identified using keys and nomenclature provided in Harden (1992; 1993; 2000; 2002). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from PlantNET (PlantNET 2019).

Fauna habitat in the Project Area identified and mapped, and opportunistic fauna observations were recorded during the field inspection.

## 2.3 Limitations

Conditions at the time of the site assessment of Project Area were appropriate for the enable identification of most plants to species level. However, some plant species are only detectable or flower at particular times of the year and may not be identifiable without flowering materials. Accordingly, an assessment of the likelihood of occurrence of all threatened flora species identified as potentially occurring within the Project Area was undertaken to supplement the flora survey.

# 3.0 Results

## 3.1 Desktop Assessment

The Project Area does not include any areas identified as native vegetation in previous mapping, or identified on the Biodiversity Values Map (OEH 2019a).

A total of 94 threatened fauna species and 57 migratory species listed under the BC Act and/or the EPBC Act were identified in the PMST or the BioNet search as occurring or having the potential to occur within 10 km of the Project Area. The potential for threatened species to occur is addressed further in **Section 3.2.2**.

Six threatened ecological communities listed under the Commonwealth EPBC Act were identified as occurring or having the potential to occur within 10 km of the Project Area:

- *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland* endangered ecological community (EEC)
- *Illawarra and south coast lowland forest and woodland* critically endangered ecological community (CEEC)
- *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (CEEC)*
- *Lowland Grassy Woodland in the South East Corner Bioregion (CEEC)*
- *Natural Temperate Grassland of the South Eastern Highlands (CEEC) and*
- *Subtropical and Temperate Coastal Saltmarsh* vulnerable ecological community.

Eurobodalla Shire Council EEC mapping (PlantNET 2019) does not identify any validated or potential EECs on or adjacent to the site. The BC Act listed Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregion endangered ecological community has been identified in the landscape south of the Project Area.

The potential for Commonwealth and NSW listed threatened ecological communities to occur on site is addressed further in **Section 3.3.3**.

## 3.2 Site Inspection

### 3.2.1 Vegetation Assessment

Vegetation zones identified in the Project Area during the field inspection on the 9 January 2019 are mapped in **Figure 4** and described in **Table 3.1.** The majority of the Project Area supported exotic vegetation, bare ground and residential development, and there is evidence that much of the Project Area has been drained and filled during development.

The majority of the vegetation within the Project Area has been cleared and developed or replanted with local and non-local vegetation. Based on the presence of a small patches of regenerating swamp oak (*Casuarina glauca*) and a patch of PCT1232 - *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion* adjacent to the Project Area (**Figure 4**), and the presence of evidence of fill

and drainage, it has been assumed that the majority of the Project Area is likely to have supported PCT1232 - *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion* prior to development. Beachfront areas may also have supported coastal dune vegetation such as PCT711 *Coast Banksia - Coast Tea-tree low moist forest on coastal sands and headlands, Sydney Basin Bioregion and South East Corner Bioregion* or PCT 1204 *Spinifex beach strand grassland, Sydney Basin Bioregion and South East Corner Bioregion* however no traces of these communities are present.

A total 4,765 square metres of native vegetation is present in the Project Area. Native vegetation in the Project Area is highly modified, and primarily constitutes local and non-local plantings which did not have characteristics of any Plant Community Type (PCT). Two native PCTs were identified in the Project Area:

- PCT1232 - *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion* was identified within the potential impact area. Small patches of regenerating swamp oak and two mature trees adjacent to the south eastern boundary were considered to be PCT1232 - *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion.*

- *PCT920 – Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion* was identified inside the Project Area but outside the impact area on the northern boundary of the Project Area.

Intertidal mud flats and sand banks were present in a narrow (~0.5 metre wide) strip along the northern boundary of the Project Area and are present to the north of Project Area **(Figure 4** and **Figure 2).**

**Table 3.1 Vegetation descriptions for the Project Area**

| Component | Description |
|---|---|
| **1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (regenerative)** | |
| Structure | Coastal Swamp Forest |
| Description | Regenerating young swamp oak (*Casuarina glauca*) along an existing drainage channel within the Project Area. Mature swamp oak is adjacent to an intact patch of coastal swamp forest in the eastern area adjacent to the Project Area. |
| Overstorey | Regenerating swamp oak. |
| Mid Stratum | Absent |
| Ground Stratum | Exotic species represent a high proportion of the groundcover including kikuyu (*Pennisetum clandestinum*), perennial ryegrass (*Lolium perenne*) and caterpillar grass (*Paspalum dilatatum*). Native grasses were sparse with only Couch (*Cynodon dactylon*) occurring in small patches. No native forbs were observed. Exotic forbs dominated the area, which include catsear (*Hypochaeris radicata*), narrow-leaf clover (*Trifolium angustifolium*), hare's foot clover (*Trifolium arvense*) and dandelion (*Taraxacum officinale*). |
| PCT common name | 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (regenerative) |
| Condition | Low |

| Component | Description |
|---|---|
| Conservation status | Not a threatened ecological community |
| Area in Project Area | 451 square metres |
| Area in Impact Footprint | 419 square metres |
| **Mixed local and non-local plantings** | |
| Structure | Woodland |
| Description | Planted native and non-local native trees, in cleared disturbed context. Planted trees used as a landscape feature. Groundcover beneath trees comprise of planted native and non-native shrubs. Exotic pasture species and weeds dominate the grassy groundcover. |
| Overstorey | Non-local native species include southern blue gum (*Eucalyptus bicostata*), Sydney blue gum (*Eucalyptus saligna*), lemon scented gum (*Corymbia citriodora*), argyle apple (*Eucalyptus cinerea*), mugga mugga ironbark (*Eucalyptus sideroxylon*), weeping bottlebrush (*Callistemon viminalis*), weeping myrtle (*Agonis flexuosa*) and narrow-leaved black peppermint (*Eucalyptus nicholii*).<br>Local native species include Bangalay (*Eucalyptus botryoides*), forest red gum (*Eucalyptus tereticornis*), coastal banksia (*Banksia integrifolia*) and swamp oak. These species have been planted in the Tennis court, BBQ area and in the kids play area.<br>Planted Sydney blue gum and southern blue gum occurred along the southern boundary within the Project Area.<br>Planted southern blue gum occurred in the open space area. |
| Mid Stratum | Planted native species such as weeping bottlebrush (*Callistemon viminalis*) and sweet pittosporum (*Pittosporum undulatum*) occurred within the boundary screen and within the tennis court and BBQ Area.<br>Bracelet Honey-myrtle (M*elaleuca armillaris*) has been planted at the boat ramp boundary. |
| Ground Stratum | Exotic perennial grasses such as kikuyu and perennial ryegrass dominate the ground cover. Patches of couch occurs throughout the area. Native forbs are sparse with only caustic creeper (*Euphorbia drummondii)* occur along the footpath within the Project Area. Exotic forbs dominate the area, which include catsear, narrow-leaf clover, hare's foot clover and dandelion. |
| PCT common name | No PCT allocated. Under BAM requirements this vegetation would nominally be categorised as 1232 *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion* for purposes of vegetation integrity assessment on the basis that planted vegetation should be allocated to the likely original PCT present. |
| Condition | Low |

| Component | Description |
|---|---|
| Conservation status | Not a threatened ecological community |
| Area in Project Area | 4145 square metres |
| Area in Impact Footprint | 3525 square metres |
| **Estuarine mangrove forest** | |
| Structure | Estuarine mangrove forest |
| Description | Present along the northern boundary within the Project Area. Young mangrove with pneumatophores present. Mudflats exposed to daily tidal inundation. |
| Overstorey | Grey mangrove (*Avicennia marina)* present along Hanging Rock Creek. |
| Mid Stratum | Absent |
| Ground Stratum | Absent |
| PCT common name | 920 Mangrove Forest in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion |
| Condition | Moderate |
| Conservation status | Not a threatened ecological community |
| Area in Project Area | 100 square metres |
| Area in Impact Footprint | 0 square metres |
| **Exotic Vegetation** | |
| Structure | Grassland and planted exotic trees |
| Description | The vegetation has been highly disturbed and modified because of vegetation clearance and the introduction of exotic species. Exotic pasture grasses and weeds dominated the groundcover. Exotic planted trees and shrubs have been planted for landscaping purposes. |
| Overstorey | Planted cocos palm (*Syagrus romanzoffiana*), date palms (*Phoenix carnariensis*), Mexican fan palms (*Washingtonia robusta*) and large leaf privet (*Ligustrum lucidum*). |
| Mid Stratum | Planted dwarf date palms (*Phoenix roebelenii*). |

| Component | Description |
|---|---|
| Ground Stratum | Planted ornamental groundcover include exotic species such as dwarf white (*Agapanthus praecox*) and English ivy (*Hedera helix*) and non-local native species such as fishbone (*Nephrolepis cordifolia).*<br><br>Dominated by exotic perennial grasses including Kikuyu, perennial ryegrass and caterpillar grass. Native grasses were sparse with only Couch (*Cynodon dactylon*) occurred on the edge of the driveways. Exotic forbs include fleabane (*Conyza bonariensis*), cudweed (*Gamochaeta calviceps*), catear, mouse-eared chickweed (*Cerastium* sp.), clover and dandelion. |
| PCT common name | Not applicable – Predominantly Exotic Vegetation |
| Condition | Predominantly Exotic |
| Area in Project Area | 19041 square metres |
| Area in Impact Footprint | 19041 square metres |
| **Estuarine Mud Flats** | |
| Structure | Intertidal Mud Flats |
| Description | Non-vegetated intertidal saline mud flats along the northern boundary of the Project Area. The Project Area extends approximately 50 cm beyond the existing rock wall into the intertidal mud flats. |
| Overstorey | Absent |
| Mid Stratum | Absent |
| Ground Stratum | Absent |
| PCT common name | N/A |
| Condition | N/A |
| Conservation status | N/A |
| Area in Project Area | 67 square metres |
| Area in Impact Footprint | 0 square metres |
| **Developed Land** | |
| Structure | Developed Land |
| Description | Tourist cabins with associated facilities and roads. Exotic planted trees and shrubs have been planted for landscaping purposes. |
| Overstorey | Planted cocos palm, date palms, Mexican fan palms and large leaf privet. |

| Component | Description |
|---|---|
| Mid Stratum | Planted dwarf date palms |
| Ground Stratum | Bare, sealed or dominated by kikuyu. |
| PCT common name | N/A |
| Condition | N/A |
| Conservation status | N/A |
| Area in Project Area | 38,447 square metres |
| Area in Impact Footprint | Up to 38,447 square metres |
| **Bare Sand** | |
| Structure | Cleared vegetation, Bare |
| Description | Disturbed sand with no vegetation that occurs adjacent to the mudflats along the northeast boundary of the Project Area. |
| Overstorey | N/A |
| Mid Stratum | N/A |
| Ground Stratum | N/A |
| PCT common name | N/A |
| Condition | N/A |
| Area in Project Area | 259 square metres |
| Area in Impact Footprint | 0 square metres |


## Legend

- Project Area
- Indicative Development Footprint
- Rapid Vegetation Assessment Points
- Bare Sand
- Estuarine Mud Flat
- Developed Land
- Exotic Vegetation
- Mixed Local and Non-Local Plantings

**Plant Community Type**

- 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (Regenerative)
- 920 Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion

Image Source: Nearmap 15 July 2018; Data source: NSW LPI DCDB

FIGURE 4

# Plant Community Types

### 3.2.2 Fauna and Fauna Habitat

Due to past disturbance, habitat features in the Project Area suitable for supporting threatened terrestrial fauna were limited. No hollow bearing trees or stick nests were observed at or immediately adjacent to the Project Area. No woody debris, or rock outcrops were present.

Marginal foraging habitat for threatened birds was present in the form of planted mature eucalypts and swamp oaks. Fruit bearing palm trees provide potential foraging resources for grey-headed flying fox, which are known to roost within 2 kilometres of the Project Area at Batemans Bay Golf Course.

A sand bank adjacent to the Hanging Rock Creek mouth immediately north-west of the Project Area is a known nesting location for pied oystercatcher (*Haematopus longirostris*), listed as endangered under the BC Act. Four adult pied oystercatchers were observed in the adjacent to mudflats adjacent of the Project Area on 25 October 2018. Identification of pied oystercatcher habitat areas is presented in **Figure 5.** Further assessment of the pied oystercatcher is provided in **Section 4.2.2.3**. The intertidal mudflats north of the Project Area also provide foraging and roosting habitat for other threatened shorebirds listed under the Commonwealth EPBC Act and the NSW BC Act.

## 3.3 Threatened Species Assessment

### 3.3.1 Threatened Flora

A meandering traverse survey for threatened flora species was undertaken across the entire Project Area. Due to the high level of disturbance in the Project Area, no suitable natural habitat for locally occurring threatened flora was present, and none were observed during the survey.

One non-local threatened species, the EPBC Act and BC Act listed vulnerable species narrow-leaved black peppermint (*Eucalyptus nicholii)* was recorded in the Project Area during the Project Area visit on 9 January 2019. One planted individual tree was recorded adjacent to the tennis court facilities. No evidence of regeneration was observed.

The potential for threatened flora to occur in the Project Area is addressed further in **Appendix B.** No threatened flora was considered likely to occur in the Project Area.

### 3.3.2 Threatened Fauna

The potential for threatened Fauna to occur in the Project Area is addressed further in **Appendix B.** The following 23 threatened fauna species were identified as having a moderate to high probability of occurrence in the Project Area, or are shorebirds likely to utilise habitat within adjacent mudflats:

- Eastern osprey (*Pandion cristatus*)
- White-bellied sea-eagle (*Haliaeetus leucogaster*)
- Square-tailed kite (*Lophoictinia isura*)
- Rufous fantail (*Rhipidura rufifrons*)
- Black-faced monarch (*Monarcha melanopsis*)
- Satin flycatcher (*Miagra cyanoleuca*)

- Gang gang cockatoo (*Callocephalon fimbriatum*)
- Glossy black cockatoo (*Calyptorhynchus lathami*)
- Little lorikeet (*Glossopsitta pusilla*) and
- Grey-headed flying fox (*Pteropus poliocephalus*).

The following shorebirds were identified as having a moderate to high probability of occurrence in the adjacent intertidal mud flats:

- Common sandpiper (*Actitis hypoleucos*)
- Sharp-tailed sandpiper (*Calidris acuminata*)
- Curlew sandpiper (*Calidris ferruginea*)
- Red knot (*Calidris canutus*)
- Double banded plover (*Charadrius bicinctus*)
- Bar-tailed godwit (*Limosa lapponica*)
- Eastern curlew (*Numenius madagascariensis*)
- Whimbrel (*Numenius phaeopus*)
- Common greenshank (*Tringa nebularia*)
- Great egret (*Ardea alba*)
- Pied oystercatcher (*Haematopus longirostris*) and
- Sooty oystercatcher (*Haematopus fuliginosus*).

Only shorebirds were considered when assessing the likelihood of occurrence of fauna species on the intertidal mudflats adjacent to the Project Area.

### 3.3.3 Threatened Ecological Communities

#### 3.3.3.1 Commonwealth EPBC Act listed ecological communities

No vegetation potentially meeting diagnostic criteria for the following EPBC Act listed threatened ecological communities is present in the Project Area:

- *Illawarra and south coast lowland forest and woodland*
- *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia*
- *Lowland Grassy Woodland in the South East Corner Bioregion*
- *Natural Temperate Grassland of the South Eastern Highlands and*
- *Subtropical and Temperate Coastal Saltmarsh.*

Patches of regenerating swamp oak identified in and adjacent to the Project Area do not fit the criteria to the EPBC listed endangered ecological community *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland.* The patch is less than the minimum threshold of 0.5 hectares.

#### 3.3.3.2 NSW BC Act listed ecological communities

Patches of regenerating swamp oak within the Project Area does conform to the BC Act listed threatened ecological community *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion* due to the absence of a native mid-storey or understorey.

The patch of regenerating swamp oak identified adjacent to the south-east corner of the Project Area potentially conforms to the BC Act listed ecological community *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion* (**Figure 3**). The patch is dominated by swamp oak and includes groundcover species associated with the ecological community.

No other threatened ecological communities under the BC Act were identified within the Project Area.


## Legend

- Project Area
- Indicative Development Footprint
- Mudflat Area Adjacent to Project Area

**Threatened Shorebird Habitat Assessment**

- Foraging Habitat
- Pied Oystercatcher Nesting Habitat

**Umwelt Field Observations**

- Eastern Curlew
- Pied Oystercatcher
- Pied Oystercatcher nest

FIGURE 5

# Threatened Shorebird Habitat Assessment

Image Source: Nearmap 15 July 2018; Data source: NSW LPI DCDB


## Legend

- Project Area
- Indicative Development Footprint
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion adjacent to Project Area

FIGURE 6

# NSW BC Act Threatened Ecological Communities

Image Source: Nearmap 15 July 2018; Data source: NSW LPI DCDB

## 3.4 Other Matters of National Environmental Significance

The PMST did not identify any other matters of National Environmental Significance listed under the Commonwealth EPBC Act within 10 kilometres of the Project Area.

## 3.5 Weed Species

No listed weed species were identified in the Project Area. One Weed of National Significance, blackberry was identified adjacent to the Project Area. Two species listed as priority weeds under the NSW *Biosecurity Act 2015* for the Eurobodalla Shore Council , blackberry and ground asparagus were observed in the swamp oak forest patch adjacent to the Project Area.

## 3.6 Koala Habitat Protection (SEPP 44)

The Project Area is within the Eurobodalla local government area. A single planted forest red gum (*Eucalyptus tereticornis),* a primary koala feed species was present in the Project area. Fourteen Sydney blue gum (*Eucalyptus saligna*) planted secondary koala feed species were present in the Project Area.

The Project Area was likely to have been the PCT1232 - *Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion* prior to vegetation clearance and urban development. Koalas are not known to have occurred in this PCT due to the lack of suitable feed species. Previous mapping have shown the probability of koala has been present within the Project Area is non-existent (Coastwatchers, date unknown).

The current context of the Project Area is highly urban and potential movement corridors for koalas to access the Project Area are absent. The potential for the urban plantings in the Project Area to provide potential koala habitat is highly unlikely due to the urban context of the Project Area and the lack of connectivity. Further assessment of koala habitat is not warranted and was not undertaken.

# 4.0 Impact Assessment

## 4.1 Impact Area

**Table 4.1** provides a summary of clearing impacts of the proposed works. The minimum extent of clearing of native vegetation is based on the indicative Development Footprint (**Figure 4**), while the maximum extent of vegetation clearing is based on an assumption that all native vegetation could be cleared, with the exception of areas of mangrove forest, similarly it has been assumed that areas of intertidal mud flat and Bare Sand would not be cleared. For the purposes of this assessment it has been assumed that all of the developed land and exotic vegetation within the Project Area may be disturbed, regardless of whether it is within the Indicative Development Footprint.

Minor works to upgrade the existing stormwater outlet infrastructure within and adjacent to the Batemans Marine Park are unlikely to have a significant impact on native vegetation or the Batemans Marine Park. A restricted area of predominantly exotic pasture is likely to be disturbed at each of the three proposed stormwater outlet sites, two of which lie within the Batemans Marine Park. The proposed on-site detention strategy to be implemented in the Project Area will reduce the post-development runoff to the pre-development levels. The proposed stormwater outlets will not increase the peak runoff volumes currently entering Hanging Rock Creek and the Batemans Marine Park (MI Engineers 2018).

The maximum area of native vegetation to be cleared would be 4,596 square metres which is under the BOS threshold for clearing of native vegetation applicable to the Project Area.

**Table 4.1 Clearing impacts in the Development Footprint**

| Zone | Approximate Impact Area (square metres) |
|---|---|
| 232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (regenerative) | 419 - 451 |
| Mixed Local and Non-local Plantings | 3,525 – 4,145 |
| 920 Mangrove Forest in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion | 0 |
| **Total Native Vegetation Clearing** | **3,944 – 4,596** |
| Exotic vegetation | 19,041 (maximum) |
| Bare Sand | 0 |
| Intertidal Mud Flat | 0 |
| Developed Land | 38,447 (maximum) |
| **Total Clearing Footprint** | **61,432 – 62,084** |

## 4.2 Impacts on Threatened Flora and Fauna

### 4.2.1 Threatened Flora Impacts

One threatened flora species was detected in the Project Area during the site assessment. Narrow-leaved black peppermint, a species that is listed as vulnerable under the Commonwealth EPBC Act and vulnerable under the NSW BC Act, has been planted in the Project Area. The proposed development is unlikely to have a significant adverse impact on this species. The likelihood of occurrence of any other threatened plants species occurring in the Project Area is low (**Appendix B**) due in part to the high degree of disturbance across the majority of the Project Area.

Assessments of significance for narrow-leaved black-peppermint are presented for the Commonwealth EPBC Act in **Appendix C** and the NSW BC Act in **Appendix D.** The proposed development is unlikely to have any significant adverse impacts on threatened flora, including the narrow-leaved black peppermint, under either the Commonwealth EPBC Act or the NSW BC Act.

### 4.2.2 Threatened Fauna Impacts

A total of 23 fauna species listed as threatened or migratory under the Commonwealth EPBC Act or listed as threatened under the BC Act were identified as having a moderate or high likelihood of occurring in the Project Area or, were threatened or migratory shorebirds with potential to utilise habitat on the intertidal mudflats immediately adjacent to the Project Area (**Appendix B**).

#### 4.2.2.1 Commonwealth EPBC Act Listed Fauna

Assessments of significance of matters listed as vulnerable, endangered or critically endangered under the Commonwealth EPBC Act are presented in **Appendix C**.

Three species listed as migratory under the Commonwealth EPBC Act are likely to occur in the Project Area whilst a further 12 migratory listed species are likely to occur on the intertidal mudflats immediately adjacent to the Project Area. Two species that are listed as threatened under the Commonwealth EPBC Act are likely to occur in the Project Area whilst a further four species listed as threatened are likely to occur on the intertidal mudflats immediately adjacent to the Project Area.

Based on the significance assessments presented in **Appendix C**, the proposed development is unlikely to have any significant adverse impacts on threatened or migratory fauna listed under the Commonwealth EPBC Act. The proposed development is unlikely to substantially increase human disturbance to Commonwealth EPBC Act listed shorebirds foraging and/or roosting on the intertidal mudflats adjacent to the Project Area if the mitigation measures outlined in **Section 4.3.1** are employed**.**

#### 4.2.2.2 NSW BC Act Listed Fauna

Assessments of significance of matters listed as vulnerable, endangered or critically endangered under the NSW BC Act are presented in **Appendix D**.

Five species listed as threatened under the NSW BC Act are likely to occur in the Project Area. A further five species listed as threatened under the NSW BC Act are likely to occur on the intertidal mudflats immediately adjacent to the Project Area. Due to the presence of known pied oystercatcher nesting habitat, additional impact assessment has been provided in **Section 4.2.2.3**.

The proposed development is unlikely to have any significant adverse impacts on threatened fauna listed under the NSW BC Act.

#### 4.2.2.3 Pied Oystercatcher Impact Assessment

A brief ecological assessment of pied oystercatcher adjacent to the Project Area has previously been undertaken by Umwelt (2018). The design of the proposed development has since been revised. Specifically, the planned construction of a boardwalk and landscaping of a rock batter has been removed from the planned works. A synthesis of direct and indirect impacts in light of recent modifications to the proposed development is provided below and recommended mitigation measures are outlined in **Section 4.3.4.**

**Direct Impacts**

Construction associated with the proposed development of units within the Project Area would not result in direct impacts or the loss of foraging or breeding habitat in or adjacent to the Project Area. Construction works would be restricted to the project area.

**Indirect Impacts**

Given the close proximity of the Project Area to a known nesting site, the most likely impact of the proposed development is increased disturbance to breeding individuals resulting from construction or subsequent operational activities during the breeding season resulting in relocation of breeding pairs to less favourable sites or failure of breeding attempts at this site.

Sources of disturbance which may, or are likely to affect breeding pied oystercatcher at this location during the construction phase include:

**Noise and visual impacts associated with the construction of infrastructure in zones b and c.** The active pied oystercatcher nest is located approximately 66 m from the proposed residential development footprint at its nearest point. Given the duration of such works noise and visual disturbance may affect pied oystercatcher over a prolonged period. While it is unlikely that construction can be timed to avoid the pied oystercatcher breeding season, timing the commencement of construction to avoid critical breeding periods may assist in reducing impacts on the species.

Sources of disturbance which may, or are likely to affect breeding pied oystercatcher at this location during the ongoing operational phase include:

**Ongoing noise and visual impacts associated with use of the interface between the mudflat and elevated area of reclaimed land.** Any future increase in recreational access to the interface between the mudflat and elevated area of reclaimed land or total human activity in the area of reclaimed land may result in increased disturbance to breeding pied oystercatcher by people and domestic dogs.

Pied oystercatchers nesting adjacent to the Project Area may be sensitive to the presence of people on the area of reclaimed land adjacent to the nest site. The impact that such activity may have on pied oystercatcher breeding success will likely depend on the susceptibility of breeding individuals to such noise and visual impacts in the first instance and the degree to which they may or may not come to tolerate such activities. Given that a pair of pied oystercatcher successfully fledged three young at this location during the 2017/18 breeding season despite considerable disturbance resulting from construction land reclamation and construction of a wall less than 50 m from the nest indicates a high degree of tolerance to disturbance. The primary threat to pied oystercatcher breeding at the site resulting from increased use may be increased access by dogs to the mudflat and the nesting area and this should be avoided through design and management measures. Recommended mitigation measures to manage levels of disturbance to nesting pied oystercatcher are outlined in **Section 4.3.4**.

### 4.2.3 Threatened Ecological Communities Impacts

No threatened ecological communities listed under either the Commonwealth EPBC Act or the NSW BC Act are present within the Project Area. One NSW BC Act listed endangered ecological community (*Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion)* is present adjacent to the Project Area. Mitigation measures to reduce potential adverse impacts on adjacent *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion* re outlined in **Section 4.3.3**.

The proposed development is unlikely to have a significant adverse impact on *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion*.

## 4.3 Mitigation Measures

### 4.3.1 Pied Oystercatcher Disturbance Mitigation

The primary measure recommended to minimise potential indirect impacts on pied oystercatchers would be to ensure that no access is permitted from the Project Area to the adjacent mud flats by either pedestrians or domestic animals. This would be best achieved through establishment of a barrier adjacent to the waters edge. Due to restrictions resulting from the Bateman's Marine Park, it is unlikely to be possible for such a mechanism to be installed during construction.

The following measures are recommended to minimise impacts on pied oystercatcher.

- Design
    - Include physical measures to restrict access by people and dogs to mudflat areas from the proposed coastal walk. Potential measures would include fencing or maintaining a steep or impassable batter between the top of the embankment and the mudflat.
    - Installation of approximately 15 - 20 metres of solid fencing forming a low visual barrier on the top of the embankment immediately adjacent to the nesting areas to reduce visual and acoustic disturbance resulting from pedestrians, dogs and vehicles within 60 metres of the nesting area.
    - Obtain approval from DPI for suitable access restrictions from DPI for works within Bateman's Marine Park.
- Construction phase
    - Close access points from the reclaimed land to the mud flats.
    - Construction of the residential care facility in zone c and the retirement village in zone b to commence immediately after the pied oystercatcher breeding season to minimise impact on nesting birds the following breeding season.
- Operational phase
    - Close access points from the reclaimed land to the mud flats.
    - Dog restrictions comprising on-leash and no-go zones to be established to minimise disturbance to pied oystercatcher. Establishment of a no-go zone which encompasses all areas of mudflat adjacent

to the Project Area would reduce disturbance to breeding and non-breeding pied oystercatcher and other threatened shorebirds at the site.

- The establishment of an on-leash zone encompassing the area of reclaimed land in which dogs must always be kept on a leash. This would be operational until adequate fencing is erected on the edge of the area of reclaimed land to prevent canine or pedestrian access to the mudflat. Establishing this restriction would reduce the risk of dogs approaching the pied oystercatcher nesting site, thereby minimising the risk of disturbance to breeding adults, juveniles and nest sites.

### 4.3.2 Swamp Oak Floodplain Forest Mitigation

Mitigation measures available to reduce impacts on swamp oak floodplain forest located adjacent to the south-east section of the Project Area include:

- The use of perimeter fencing around swamp oak floodplain forest during construction and operation to exclude access by vehicles, people or domestic animals.

- Maintain the quantity surface runoff draining from the Project Area into the adjacent swamp oak floodplain forest by ensuring that the catchment surface area draining into the Swamp Oak floodplain forest remains consistent from the pre-construction to the post-construction phase. Based on the site inspection, it is recommended that a minimum distance of 10 metres adjacent to the swamp oak floodplain forest should drain into the swamp oak floodplain forest.

- Using erosion control measures such as sediment barriers to prevent increased sedimentation of the adjacent swamp oak floodplain forest during construction.

### 4.3.3 Weed Management

It is recommended that appropriate weed management measures, compliant with Council strategy and the *Biosecurity Act 2015* be implemented with the Impact Footprint to prevent outbreaks or propagation of weed species during clearing, development and operational activities associated with the proposed development. Specifically, vehicle hygiene measures will need to be implemented prior to and following any earthworks to manage the risk of introduction of weeds or dispersal to the swamp oak forest adjacent to the Project Area and adjacent mangrove forests.

### 4.3.4 Bushfire Management

The proposed development is non-residential in nature. Based on advice from the client, no asset protection zones are required for the proposed development. In the event that additional clearing is required for the establishment of asset protection zones, the impact area calculations would need to be revised and the total extent of native vegetation clearing assessed against the BOS thresholds.

# 5.0 Conclusion

This Ecological Assessment documents mapping of native vegetation extent and significance assessments under the NSW *Biodiversity Conservation Act* 2016 (*BC Act*) and the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) for a proposed age-care facility at 49 Beach Road, Batemans Bay.

The majority of the Project Area supports exotic vegetation and developed areas (**Figure 4**). A total of 4,675 square metres of native vegetation was present in the Project Area. The majority of native vegetation constituted mixed local and non-local tree plantings which did not correspond to any native PCT. Two native PCTs, *PCT1232 - Swamp Oak floodplain forest, Sydney Basin Bioregion and South East Corner Bioregion* and *PCT920 - Mangrove Forest in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion* , were identified in the Project Area (**Figure 4**).

Important habitat for threatened flora and fauna, such as hollow bearing trees, hollow logs and rock outcrops is absent from the Project Area due to past disturbance. Foraging habitat for the majority of threatened species is absent from the site. Areas of intertidal mudflat immediately adjacent to the project area were identified as being potential habitat for a range of threatened and migratory shorebirds, and a known long term nesting site for pied oystercatcher was confirmed to the north-east of the site. As a consequence significance assessments were assessed as moderately likely to occur, despite habitat not being present in the Project Area.

Applicable significance assessments under the Commonwealth EPBC Act and or the NSW BC Act were conducted for one non-local threatened flora species (narrow-leaved black peppermint) identified on site and for 23 threatened or migratory fauna species have a moderate or high probability of occurring in the Project Area or on the intertidal mudflats adjacent to the Project Area. While no vegetation within the Project Area met criteria for classification as any Commonwealth EPBC Act and or NSW BC Act listed threatened ecological communities, a patch of swamp oak floodplain forest located adjacent to the Project Area to the south-east was determined to meet criteria for classification as the NSW BC Act listed *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion* endangered ecological communities.

Assessment of significance tests conducted in accordance with the Significant Impact Guidelines 1.1 - Matters of National Environmental Significance and Part 7.3 of the BC Act test of significance guidelines indicate that the proposed development is unlikely to have any significant adverse impacts on any matters listed under the Commonwealth EPBC Act and/or the NSW BC Act.

While significant impacts were considered unlikely, mitigation measures are recommended to avoid impacts on pied oystercatcher breeding habitat and the avoid adverse impacts on hydrology affecting the adjacent NSW BC Act listed *Swamp Oak Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion* endangered ecological community.

This report confirms that the Biodiversity Offsets Scheme (BOS) under the NSW BC Act is not triggered for this proposal as:

- the extent of native vegetation to be cleared is less than the applicable clearance threshold
- the Project Area's does not impact areas identified on the Biodiversity Values Map and
- no significant impacts to threatened flora and fauna listed under the BC Act are anticipated.

# 6.0 References


Australian Government. 2013. *Matters of National Environmental Significance, Significant Impact Guidelines 1.1*, *Environment Protection and Biodiversity Conservation Act 1999*. Department of Environment, Canberra.

Coastwatchers. Date unknown, *Eurobodalla Koala Recovery Strategy – 2014 to 2026*. Available at: http://www.coastwatchers.org.au/wp-content/uploads/2017/06/Final-Eurobodalla-Koala-Recovery-Strategy.pdf. Accessed 19 February 2019.

Commonwealth of Australia. 2013. *Matters of National Environmental Significance – Significant impact guidelines 1.1*. Commonwealth of Australia 2013.

Commonwealth of Australia. 2017. E*PBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*, Commonwealth of Australia 2017

Department of the Environment. 2015. *Conservation Advice* Calidris ferruginea *curlew sandpiper*. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/856-conservation-advice.pdf. In effect under the EPBC Act from 26-May-2015.

Department of the Environment and Energy. 2019. *EPBC ACT Protected Matters Report (PMST)*. Available at: http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf. Accessed 12 February 2019.

Glover, H. K., Weston, M. A., and Maguire, G. S. 2011. *Towards ecologically meaningful and socially acceptable buffers: Response distances of shorebirds in Victoria, Australia, to human disturbance*. Landscape and Urban Planning 103, 326-334.

Hansen, B.D., Fuller, R.A., Watkins, D., Rogers, D.I., Clemens, R.S., Newman, M., Woehler, E.J. and Weller, D.R. 2016. *Revision of the East Asian-Australasian Flyway Population Estimates for 37 listed Migratory Shorebird Species*. Unpublished report for the Department of the Environment. BirdLife Australia, Melbourne.

Harden, G, J, ed. 1992. *Flora of New South Wales. Volume 3*. Royal Botanic Gardens Sydney & New South Wales University Press, Sydney.

Harden, G, J, editor. 1993. *Flora of New South Wales. Volume 4*. Royal Botanic Gardens Sydney & New South Wales University Press, Sydney.

Harden, G, J, editor. 2000. *Flora of New South Wales. Volume 1*. 2nd edition. New South Wales University Press and Royal Botanic Gardens, Sydney.

Harden, G, J, editor. 2002. *Flora of New South Wales. Volume 2*. Revised edition. Royal Botanic Gardens Sydney & New South Wales University Press, Sydney.

MI Engineers. 2018. *Stormwater drainage and flooding assessment*. Proposed Seniors Living Development. 49 Beach Road, Batemans Bay. Prepared for Global Lifestyle Developments Pty Ltd.

Murray N.J., Clemens R.S., Phinn S.R., Possingham H.P. and Fuller R.A. 2014. *Tracking the rapid loss of tidal wetlands in the Yellow Sea*. Frontiers in Ecology and the Environment, 12, 267-272.

Ngh environmental. 2007. Endangered Ecological Communities Survey and Mapping in Eurobodalla Shire. ngh environmental, Bega.

Office of Environment and Heritage (OEH). 2019a. Biodiversity Values Map and Threshold Tool. Available at https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap. Accessed 12 February 2019.

Office of Environment and Heritage (OEH). 2019b. *Atlas of NSW Wildlife Database*. Available at: https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx. Accessed 12 February 2019.

Office of Environment and Heritage (OEH). 2019c. *Threatened Species Profiles Database*.

https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species. Accessed 12 February 2019.

Piersma, T., Lok, T., Chen, Y., Hassell, C.J., Yang, H-Y., Boyle, A., Slaymaker, M., Chan, Y-C., Melville, D.S., Zhang, Z-W., Ma, Z. 2016. *Simultaneous declines in summer survival of three shorebird species signals a flyway at risk*. Journal of Applied Ecology, 53, 479–490

PlantNET (The NSW Plant Information Network System). 2019. Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au. Accessed 12 February 2019.

Priest, B., Straw, P., & Weston, M. A. 2002. Shorebird conservation in Australia. Supplement to Wingspan, 12, 1–15.

South Coast Shorebird Recovery Program. 2006, *Shorebird Recovery Newsletter – South Coast 2005/06,* South Coast Shorebird Recovery Program.

South Coast Shorebird Recovery Program. 2014, *Shorebird Recovery Newsletter – South Coast 2013/14,* South Coast Shorebird Recovery Program.

South Coast Shorebird Recovery Program. 2015, *Shorebird Recovery Newsletter – South Coast 2014/15,* South Coast Shorebird Recovery Program.

South Coast Shorebird Recovery Program. 2016, *Shorebird Recovery Newsletter – South Coast 2015/16,* South Coast Shorebird Recovery Program.

South Coast Shorebird Recovery Program 2017, *Shorebird Recovery Newsletter – South Coast 2016/17,* South Coast Shorebird Recovery Program.

South Coast Shorebird Recovery Program 2018, *Shorebird Recovery Newsletter – South Coast 2017/18,* South Coast Shorebird Recovery Program.

Taylor, I.R., Newman, O.M.G., Park, P., Hansen, B., Minton, C.D.T., Harrison, A. & Jessop, R. 2014. *Conservation assessment of the Australian Pied Oystercatcher* Haematopus longirostris. International Wader Studies 20: 116–128

Tozer, M.G., Turner, K., Keith, D.A., Tindall, D., Pennay, C., Simpson, C., MacKenzie, B., Beukers, P. & Cox, S. 2010. *Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands*. Cunninghamiana 11 (3): 359-406

Umwelt. 2018. *Pied oystercatcher ecological assessment – 49 Beach Road, Batemans Bay*. Brief letter to Global Lifestyles Communities.

Wauchope, H.S., Shaw, J.D., Varpe, Ø., Lappo, E.G., Boertmann, D., Lanctot, R.B., and, Fuller, R.A. 2016. *Rapid climate-driven loss of breeding habitat for Arctic migratory birds*. Global Change Biology. doi:10.1111/gcb.13404

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# APPENDIX A

**Project Area Photographs**

**Plate 1** Swamp oak floodplain forest adjacent to the south-east corner of the Project Area.

**Plate 2** Mangrove forest adjacent to the north-west corner of the Project Area.

**Plate 3** Exotic pasture on the northern boundary of the Project Area.

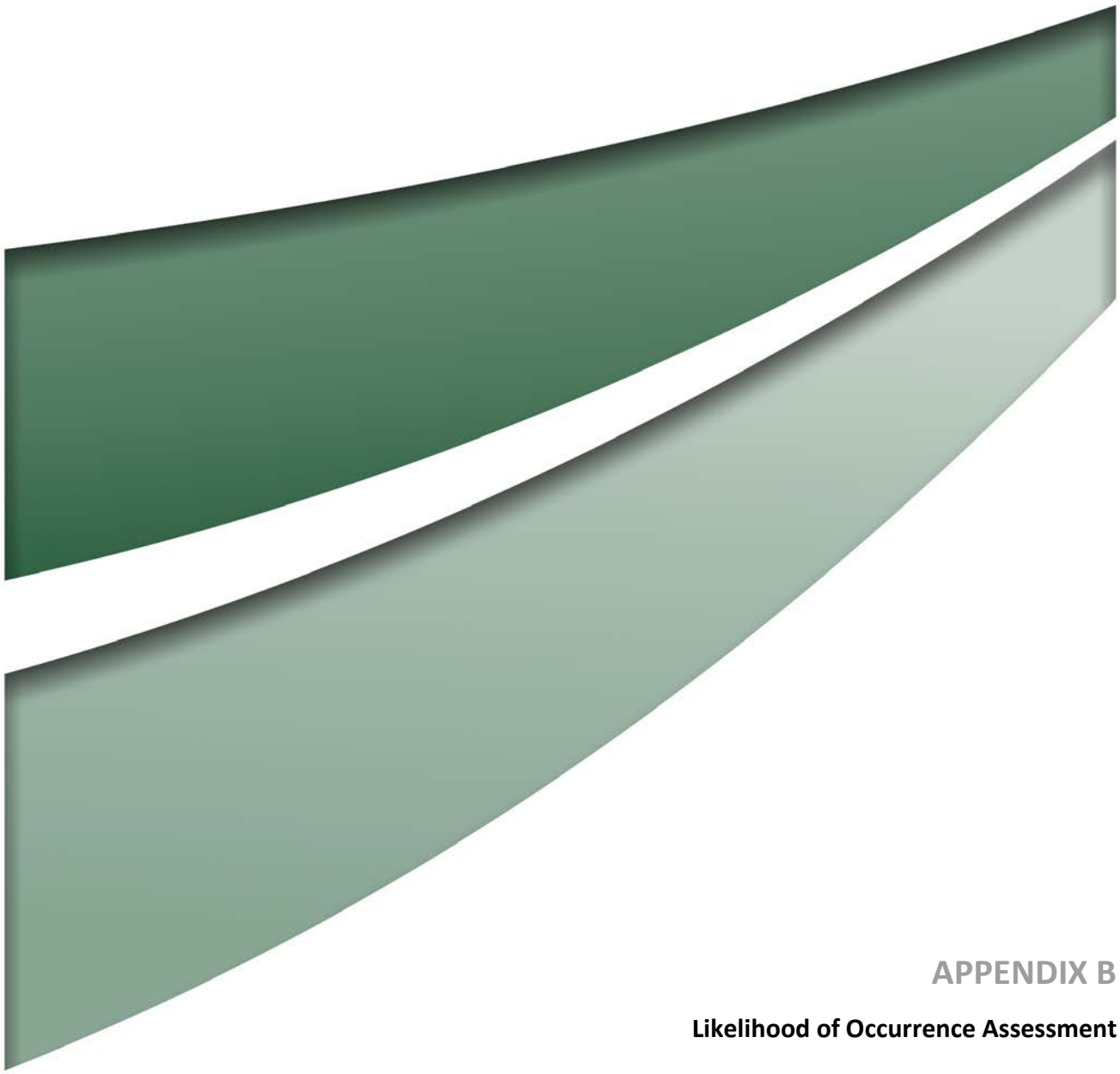
**Plate 4** Kids play area

**Plate 5** Tennis and BBQ area

**Plate 6** Open space area and vegetated south-eastern boundary of the Project Area

**Plate 7** Tourist accommodation facilities

**Plate 8** Coachhouse reception



# APPENDIX B

## Likelihood of Occurrence Assessment

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (NSW BC Act)<br>Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (EPBC Act) | | EEC | E | | | High (NSW BC Act)<br>Nil (Commonwealth EPBC Act) | The site is likely to have originally supported swamp oak floodplain forest. |
| Illawarra and South Coast lowland forest and woodland ecological community | | EEC | CE | | The typical form of the ecological community is a woodland with a tall shrub layer and/or a grassy ground cover. Eucalyptus tereticornis (forest red gum) is present and often dominant in the mature tree canopy. Other co-occurring tree species include: Angophora floribunda (rough barked apple); *E. bosistoana* (coast grey box); and *E. eugenioides* (thin-leaved stringybark), *E. botryoides* (bangalay), *E. globoidea* (white stringy bark) and *E. longifolia* (woollybutt) and *E.quadrangulata* (coastal white box). | Nil | Does not occur in the Batemans Bay area. Nearest known sites are at Bawley Point and Moruya. No vegetation that meets the classification requirements of this community is present in the Project Area. |
| Littoral Rainforest and Coastal Vine Thickets of Eastern Australia | | EEC | CE | | Littoral Rainforest and Coastal Vine Thickets of Eastern Australia typically occurs close to the coast from northern Queensland southwards to eastern Victoria and on offshore islands. The Littoral Rainforest and Coastal Vine Thickets of Eastern Australia typically has tall trees as part of the canopy, but not always. The height of the canopy plants | Nil | No vegetation that meets the classification requirements of this community is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | varies depending on the degree of exposure and can range from one to 25 metres. Emergent trees may be present above the canopy, for example species from the genera Araucaria (Bunya and Hoop pines in the northern bioregions only), Banksia or Eucalyptus. The ground layer of the vegetation typically is sparse. | | |
| A Lowland Grassy Woodland in the South East Corner Bioregion | | EEC | CE | | Lowland Grassy Woodland communities in the South East Corner bioregion are located in rainshadow areas receiving less rainfall than more elevated terrain that partially surrounds them, with mean annual rainfall typically in the range of 700-1100 mm. Contemporary tree-dominated stands of the community are largely relics or regrowth of originally taller forests and woodlands, which are likely to have had scattered shrubs and a largely continuous grassy groundcover. At some sites, mature trees may exceed 40 m, although regrowth stands may be shorter than 10 m. | Nil | No vegetation that meets the classification requirements of this community is present in the Project Area. |
| Natural Temperate Grassland of the South Eastern Highlands | | EEC | CE | | The ecological community occurs at altitudes up to around 1200 m, and as low as 250 m in some parts of its distribution. It occurs on a wide range of topographic positions and on soils derived from a variety of substrates, including granites, basalts, sediments, colluvium and | Nil | Does not occur in the Batemans Bay area. No vegetation that meets the classification requirements of this community is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | alluvium. It is a naturally treeless or sparsely treed community (less than 10% projective foliage cover from woody plants), which is characterised by native tussock grasses that are typically up to 1.0 m in height. | | |
| Subtropical and Temperate Coastal Saltmarsh | | EEC | V | | Coastal saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands. Characteristic plants include *Baumea juncea*, sea rush (*Juncus krausii* subsp. *australiensis*), Samphire (*Sarcocornia quinqueflora* subsp. *quinqueflora*), marine couch (*Sporobolus virginicus*), streaked arrowgrass (*Triglochin striata*), knobby club-rush (*Ficinia nodosa*), creeping brookweed (*Samolus repens*), swamp weed (*Selliera radicans*), seablite (*Suaeda australis*) and prickly couch (*Zoysia macrantha*). Occasionally mangroves are scattered through the saltmarsh. | Nil | No vegetation that meets the classification requirements of this community is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| **Plants** | | | | | | | |
| *Caladenia tessellata* | Thick-lipped Spider-orchid, daddy long-legs | E | V | | Requires low, dry sclerophyll woodland with a heathy or sometimes grassy understorey on clay loams or sandy soils, specifically in dry, low brittle gum (*Eucalyptus mannifera*), inland scribbly gum (*E. rossii*) and Allocasuarina spp. woodland with a sparse understorey and stony soil. | Low | No suitable habitat is present in the Project Area. |
| *Correa baeuerlenii* | chef's cap correa | V | V | 1 | Occurs in riparian sites within forests of various eucalypts, including silvertop ash (*Eucalyptus sieberi*), yellow stringybark (*E. muelleriana*), blue-leafed stringybark (*E. agglomerata*) and spotted gum (*Corymbia maculata*), or she-oak woodland. It may also be found in near-coastal rocky sites. | Low | No suitable habitat is present in the Project Area. Nearest known populations at Deep Creek Dam and Nelligen. |
| *Cryptostylis hunteriana* | leafless tongue-orchid | V | V | 2 | The leafless tongue-orchid has been reported to occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, Xanthorrheoa spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests (grassy sub-formation). Soils are generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils. | Low | No suitable habitat is present in the Project Area. Known from several sites between Nowra and Batemans Bay. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Eucalyptus nicholli* | Narrow-leaved black peppermint | V | V | | Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. | Known | Several planted individuals are present in the Project Area. |
| *Galium australe* | tangled bedstraw | E | | 1 | In NSW (and ACT Territory in Jervis Bay), tangled bedstraw has been recorded in turpentine forest and coastal Acacia shrubland. | Low | No suitable habitat is present in the Project Area. Occurs just north of the Project Area at Cullendulla Creek Nature Reserve. |
| *Genoplesium vernale* | East Lynne midge-orchid | V | V | | The East Lynne midge orchid grows in dry sclerophyll woodland and forest extending from close to the coast to the adjoining coastal ranges. The East Lynne midge orchid is currently known from only a narrow belt, approximately 12 km wide, of predominantly dry sclerophyll Forest from 17 km south of Batemans Bay to 24 km north of Ulladulla. | Low | No suitable habitat is present in the Project Area. Occurs in dry sclerophyll forest in the greater Batemans Bay area. |
| *Haloragis exalata subsp. exalata* | Wingless raspwort | V | V | | Square raspwort appears to require protected and shaded damp situations in riparian habitats. Square raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. | Low | A restricted area of potential habitat is present in the Project Area. Recorded at Tomakin and Durrass Lake. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Persicaria elatior* | tall knotweed | V | V | 1 | Tall knotweed normally grows in damp places, especially beside streams and lakes. It occasionally occurs in swamp forest or associated with disturbance. | Low-Moderate | A restricted area of potential habitat is present in the Project Area. Recorded at Batehaven and Tomakin. |
| *Pomaderris Bodalla* | Bodalla pomaderris | V | | 1 | Bodalla pomaderris is currently known to occur on the south coast between Bodalla and Merimbula, and in the upper Hunter Valley near Muswellbrook. On the south coast Bodalla pomaderris occurs in moist open forest along sheltered gullies or along stream banks. | Low | No suitable habitat is present in the Project Area. The nearest records are from near Deep Creek Dam and Bimbimbie. |
| *Thesium australe* | Austral toadflax | V | V | | Austral toadflax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. | Low | No suitable habitat is present in the Project Area. No records nearby the Project Area. |
| *Zieria tuberculata* | Warty zieria | V | V | | Warty zieria grows in the Mt Dromedary and Tilba Tilba area. A total of 13 sites are currently known and the total population (all age classes) is about 3,000 plants. The Warty Zieria grows in heath amongst rocky outcrops on rain forest edges and in tall forest and shrubland. | Low | No suitable habitat is present in the Project Area. No records nearby the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| **Amphibians** | | | | | | | |
| *Heleioporus australiacus* | giant burrowing frog | V | V | | Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. | Low | No suitable habitat is present in the Project Area. No records nearby the Project Area. |
| *Litoria aurea* | green and golden bell frog | E1 | V | 1 | Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast. It Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.) | Low | No suitable habitat is present in the Project Area. Nearest records from Runnyford and Cullendulla Creek. |
| *Litoria littlejohni* | Littlejohn's tree frog | V | V | | Restricted to sandstone woodland and heath communities at mid to high altitude. It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks, leaf litter and low vegetation in heath based forests and woodland. It is not known from coastal habitats. | Low | No suitable habitat is present in the Project Area. No records nearby the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| **Birds** | | | | | | | |
| *Actitis hypoleucos* | common sandpiper | | Mi | | The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. | Project Area (Low)<br>Intertidal mudflat adjacent Project Area (Moderate) | Suitable roosting and/or foraging habitat in the form of rocky shores and intertidal mudflats is present adjacent to the Project Area. Nearest records from Cullendulla Creek and Malua Bay. |
| *Anthochaera phrygia* | regent honeyeater | CE | CE | | Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. NSW the distribution is very patchy and mainly confined to the two main breeding areas at Capertee Valley and the Bundarra-Barraba region and surrounding fragmented woodlands. Birds are also found in drier coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. These habitats have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Nectar and fruit from the mistletoes are also eaten during the breeding season. | Low | A restricted area of potential foraging habitat is present in the Project Area however given its status in the Batemans Bay area it is considered a very unlikely visitor. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Apus pacificus* | pacific swift | | Mi, Ma | | The pacific swift leaves its breeding grounds in Siberia from August–September. They usually arrive in Australia around October. In NSW, the pacific swift is recorded in all regions. They mostly occur over inland plains but sometimes above foothills or in coastal areas. They prefer dry, open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. The pacific swift is an aerial eater, flying anywhere from 1 m to 300 m above the ground to forage. | Low | Likely to occasionally occur in airspace above the Project Area. Recorded at Surf Beach and the Eurobodalla Regional Botanic Gardens. No assessment of significance required as this species is unlikely to utilise the Project Area itself. |
| *Ardea alba* | eastern great egret | | Mi, Ma | | The eastern great egret has a widespread distribution in Australia and occurs in a wide range of wetland habitats including inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small and natural and artificial wetlands. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Known | Suitable foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. This species has been recorded on the intertidal mudflat adjacent to the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Ardea ibis* | cattle egret | | Mi, Ma | | The cattle egret has a widespread distribution in Australia and occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. Cattle egret often forage away from water on low lying grasslands, improved pastures and croplands. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Low | No suitable habitat is present in the Project Area. Recorded nearby at Water Garden Town Park, Nelligen and Mogo. |
| *Ardenna carneipes* | flesh-footed shearwater | V | Mi, Ma | 1 | The flesh-footed shearwater is a locally common visitor to waters of the continental shelf and continental slope off southern Australia (south-western Western Australia to south-eastern Queensland) and around Lord Howe Island. | Low | No suitable habitat is present in the Project Area. |
| *Ardenna grisea* | sooty shearwater | | Mi, Ma | | In Australia, the sooty shearwater occurs in coastal waters breeds on islands off new south Wales (NSW) and Tasmania. | Low | No suitable habitat is present in the Project Area. |
| *Ardenna pacifica* | wedge-tailed shearwater | | Mi, Ma | | The wedge-tailed shearwater breeds on the east and west coasts of Australia and on off-shore islands. The species is common in the Indian Ocean, the Coral Sea and the Tasman Sea. | Low | No suitable habitat is present in the Project Area. |
| *Ardenna tenuirostris* | short-tailed shearwater | | Mi, Ma | | The short-tailed shearwater occurs in coastal waters when in australia.in summer months, the short-tailed shearwater is the most common shearwater along the south and south-east coasts of Australia. | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Artamus cyanopterus cyanopterus* | dusky woodswallow | V | | 1 | The dusky woodswallow occurs in southern and eastern Australia in dry, open eucalypt forests and woodlands, including mallee associations and in farmland, shrubland and heathland. | Low | No suitable habitat is present in the Project Area though may occasionally utilise the airspace above the Project Area. |
| *Botaurus poiciloptilus* | Australasian bittern | E1 | E | | Inhabits temperate freshwater wetlands and occasionally estuarine reedbeds, with a preference for permanent waterbodies with tall dense vegetation. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds. Freshwater is generally preferred, although dense saltmarsh vegetation in estuaries and flooded grasslands are also used by the species. | Low | No suitable habitat is present in the Project Area. |
| *Calidris acuminata* | sharp-tailed sandpiper | | Mi | | In Australasia, the sharp-tailed sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: High | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. Nearest record from South Durras. |
| *Calidris canutus* | red knot | | E, Mi | | In Australasia the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Moderate | Potential roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. Nearest record from South Durras. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Calidris ferruginea* | curlew sandpiper | E1 | CE, Mi | | The curlew sandpiper mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Moderate | Potential roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. Has not been recorded in the Batemans Bay area. |
| *Calidris melanotos* | pectoral sandpiper | | Mi | | In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Low | Potential roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. Has not been recorded in the Batemans Bay area. |
| *Calidris ruficollis* | red-necked stint | | Mi | | In Australia, red-necked stints are found on the coast, in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. They may also be seen in saltworks, sewage farms, saltmarsh, shallow wetlands including lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats, flooded paddocks or damp grasslands. | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Moderate | Potential roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Callocephalon fimbriatum* | gang-gang cockatoo | V | | 12 | In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. | Moderate | No suitable breeding habitat is present in the Project Area. Marginal foraging habitat present. Likely to occasionally occur in Project Area. Has been recorded at several locations in Batemans Bay. |
| *Calyptorhynchus lathami* | glossy black-cockatoo | V | E | 78 | Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Dependent on large hollow-bearing eucalypts for nest sites. | Moderate | No suitable breeding habitat is present in the Project Area. A restricted area of suitable foraging habitat is present in the Project Area. Likely to occasionally occur in Project Area. Has been recorded at several locations in the Batemans Bay area. |
| *Catharacta skua* | great skua | | Ma | | Pelagic in south-eastern Australia. | Low | No suitable habitat is present in the Project Area. |
| *Charadrius bicinctus* | double-banded plover | | Mi | | The double-banded plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. The species is sometimes associated with coastal lagoons, inland saltlakes and | Project Area: Low<br>Intertidal mudflat adjacent Project Area: Moderate | Potential roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. Nearest records from Broulee and South Durras. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | saltworks. | | |
| *Climacteris picumnus victoriae* | brown treecreeper | V | | 2 | Found in eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and river red gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. | Low | No suitable habitat is present in the Project Area. Very few records from the NSW south coast. |
| *Cuculus optatus* | oriental cuckoo | | Mi | | The oriental cuckoo is a regular though uncommon migrant to Australia, where it spends the non-breeding season (Sept-May) in coastal regions across northern and eastern Australia as well as offshore islands. The oriental cuckoo occurs in monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. | Low | Marginal habitat is present in the Project Area. Very few records from the NSW south coast. |

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|---|---|---|---|---|---|---|---|
| *Daphoenositta chrysoptera* | varied sittella | V | | 5 | Inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. | Low | No suitable habitat is present in the Project Area. Has been recorded at several locations in the Batemans Bay area. |
| *Diomedea antipodensis* | antipodean albatross | | V, Mi, Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Diomedea epomophora* | southern royal albatross | | V, Mi, Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Diomedea exulans* | wandering albatross | | V, Mi, Ma | | Pelagic. Wandering albatross are found right across the Southern Ocean, including Antarctic, subantarctic and subtropical waters. Wandering albatross breed on subantarctic and Antarctic islands between 46° and 56°S such as Iles Kerguelen, South Georgia and Macquarie Island. | Low | No suitable habitat is present in the Project Area. |
| *Diomedea gibsoni* | gibson's albatross | | V, Ma | | Pelagic. Gibson's albatross breeds only in the subantarctic Auckland Islands archipelago of New Zealand. Breeding females feed mainly in the Tasman Sea, while the males forage further south in the sub Australian or mid Pacific sectors of the Southern Ocean between latitudes of 30° and 50° S, especially the Roaring Forties where the weather systems assist their foraging. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Diomedea sanfordi* | northern royal albatross | | E, Mi, Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Gallinago hardwickii* | Latham's snipe | | Mi | | In Australia, Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) | Low | No suitable habitat is present in the Project Area. Recorded at several wetland sites in the Batemans Bay area. |
| *Gallinago megala* | Swinhoe's snipe | | Mi, Ma | | Non-breeding habitat: shallow freshwater wetlands of various kinds including paddy fields and sewage farms, with bare mud or shallow water for feeding, with nearby vegetation cover. Records in Australia mainly from the Top End of the Northern Territory and from north-western Western Australia. | Low | No suitable habitat is present in the Project Area. |
| *Gallinago stenura* | pin-tailed snipe | | Mi, Ma | | During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species distribution within Australia is not well understood. There are confirmed records from NSW, south-west Western Australia, Pilbara and the Top End. | Low | No suitable habitat is present in the Project Area. |
| *Glossopsitta pusilla* | little lorikeet | V | | 19 | Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests | Moderate | A restricted area supporting suitable foraging tress is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| | | | | | in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Nest in small hollows (entrance approx. 3 cm) of Eucalyptus spp. | | Recorded at several sites in the Batemans Bay area. |
| *Haematopus fuliginosus* | sooty oystercatcher | V | | 32 | Occurs on rocky shorelines and headlands, stony beaches, offshore islands and exposed reefs and only occasionally on sandy beaches. | High | Suitable roosting and foraging habitat in the form of intertidal mudflats and rocky areas is present immediately adjacent to the Project Area. |
| *Haematopus longirostris* | pied oystercatcher | E | | 45 | Inhabits marine littoral habitats, including islands. It occupies muddy, sandy, stony or rocky estuaries, inlets and beaches, particularly intertidal mudflats and sandbanks in large marine bays. | Known | Suitable breeding, roosting and foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |
| *Haliaeetus leucogaster* | white-bellied sea-eagle | V | Ma | 14 | This species inhabits coastal and inland riverine areas with large areas of open water. Breeding habitat is located near water and predominantly within tall open forest and woodland. The nest is a large structure made of sticks. Foraging habitat is large areas of open water as well as open terrestrial habitats such as grasslands. They forage either from a perch or whilst in flight. | High | Suitable foraging habitat is present adjacent to the Project Area. Likely to occur in airspace above but unlikely to utilise Project Area itself. Hence, |
| *Hieraaetus morphnoides* | little eagle | V | | 1 | Distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| | | | | | within open eucalypt forest, woodland or open woodland. Requires tall living trees for building a large stick nest and preys on birds, reptiles and mammals and occasionally carrion. | | |
| *Hirundapus caudacutus* | white-throated needletail | | Mi | | This species is predominantly aerial within Australia, however they have been recorded roosting in trees in both forests and woodlands within dense foliage either in the canopy or within hollows. This species breeds in northern Asia. And migrates south between September-October. | High | Likely to occasionally occur in airspace above the Project Area however no assessment of significance required as this species is unlikely to utilise the Project Area itself. |
| *Lathamus discolor* | swift parrot | E1 | CE | 2 | In NSW mostly occurs on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood, Mugga Ironbark and White Box. | Low | No suitable habitat is present in the Project Area. |
| *Limosa lapponica baueri* | bar-tailed godwit | | Mi, V | | The bar-tailed godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. | Moderate | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Limosa lapponica menzbieri* | bar-tailed godwit | | Mi, CE | | The bar-tailed godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. | Low | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. In Australia *Limosa lapponica menzbieri* generally occurs in north-west W.A and is considered an unlikely visitor to the Project Area. |
| *Lophoictinia isura* | square-tailed kite | V | | 13 | Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. | Moderate | Suitable foraging habitat is present in the Project Area. Recorded at several sites in the Batemans Bay area. |
| *Macronectes giganteus* | southern giant petrel | | E | | Ocean. The range of this bird is quite large as it ranges from Antarctica to the subtropics of Chile, Africa, and Australia, and has an occurrence range of 36,000,000 km2 (14,000,000 sq mi). It breeds on numerous islands throughout the southern oceans. | Low | No suitable habitat is present in the Project Area. |
| *Macronectes halli* | northern giant petrel | | V | | Pelagic. Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer. | Low | No suitable habitat is present in the Project Area. |
| *Merops ornatus* | rainbow bee-eater | | Ma | | Occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Monarcha melanopsis* | black-faced monarch | | Mi | | The black-faced monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. | Moderate | A restricted area of suitable habitat possibly utilised during migration is present in the Project Area. |
| *Monarcha melanopsis* | spectacled monarch | | Mi | | Occurs in the understorey of rainforest, well-timbered gullies, and waterside vegetation in eastern Australia. | Low | No suitable habitat is present in the Project Area. |
| *Myiagra cyanoleuca* | satin flycatcher | | Mi | | Summer breeding range from Qld to Tas, winter migration to NE Qld. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands often near wetlands or watercourses, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. | Moderate | A restricted area of suitable habitat likely used during migration is present in the Project Area. |
| *Neophema chrysogaster* | orange-bellied parrot | | CE | | Orange-bellied parrots occur almost exclusively in coastal and sub-coastal areas, preferring peninsulas and islands. Saltmarshes, littoral (shore) heathlands and low scrublands are preferred habitats as well as grassy areas. | Low | No suitable habitat is present in the Project Area. |
| *Ninox strenua* | powerful owl | V | | 11 | Is endemic to eastern and south-eastern Australia, being widely distributed throughout the eastern forests from the | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | coast inland to tablelands, with scattered, mostly historical records on the western slopes and plains in NSW. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. They require large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. Powerful Owls nest in large tree hollows (at least 0.5m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. | | |
| *Numenius madagascariensis* | Far eastern curlew | | CE, Mi | | The far eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. | Known | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |
| *Numenius minutus* | little curlew | | Mi | | The little curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Numenius phaeopus* | whimbrel | | Mi | | The whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. | High | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |
| *Pachycephala olivacea* | olive whistler | V | | 1 | The olive whistler inhabits the wet forests on the ranges of the east coast. It has a disjunct distribution in NSW chiefly occupying the beech forests around Barrington Tops and the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. | Low | No suitable habitat is present in the Project Area. |
| *Pachyptila turtur* | fairy prion | | Ma | | Pelagic and near-shore. | Low | No suitable habitat is present in the Project Area. |
| *Pandion cristatus* | eastern osprey | V | | 4 | Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. | Moderate | A restricted area of suitable foraging habitat is present in the north-west section of the Project Area. |
| *Pelagodroma marina* | white-faced storm-petrel | | | | Pelagic and near-shore. | Low | Breeds nearby on Tollgate Islands however no suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Phoebetria fusca* | sooty albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Pluvialis fulva* | Pacific golden plover | | Mi | | The pacific golden plover is found on muddy, rocky and sandy wetlands, shores, paddocks, saltmarsh, coastal golf courses, estuaries and lagoons | Moderate | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |
| *Pterodroma solandri* | providence petrel | V | | 1 | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Puffinus assimilis* | little shearwater | V | | 1 | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Rhipidura rufifrons* | rufous fantail | | Mi | | This species is a summer breeding migrant to SE Australia. They occur in the undergrowth of rainforests/wetter Eucalypt forests/gullies. Preference for deep shade, and is often seen close to the ground. The rufous fantail feeds on insects, in the middle and lower levels of the canopy. Constructs a small compact cup nest, suspended from a tree fork about 5 m from the ground. | Moderate | A restricted area of suitable habitat likely used during migration is present in the Project Area. |
| *Rostratula australis* | Australian painted snipe | | E, Mi | | Inhabits shallow inland wetlands, either freshwater or brackish water bodies. nests on the ground amongst tall reed-like vegetation near water, and feeds near the water's edge and on mudflats. | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Sternula albifrons* | little tern | E1 | Mi | | Almost exclusively coastal, preferring sheltered environments; however, may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. | Low | Potential roosting and/or foraging habitat in the form of intertidal mudflats and open shallow water is present adjacent to the Project Area. |
| *Thalassarche bulleri* | Buller's albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche cauta* | Tasmanian shy albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche eremita* | Chatham albatross | | E | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche impavida* | Campbell albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche melanophris* | black-browed albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche salvini* | Salvin's albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thalassarche steadi* | white-capped albatross | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Thiniornis rubricollis* | hooded plover | E | V | 4 | In south-eastern Australia hooded plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much | Low | Potential roosting and/or foraging habitat in the form of intertidal mudflats is |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally hooded plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs | | present in the Project Area. |
| *Tringa nebularia* | common greenshank | | Mi | | The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. | Moderate | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |
| *Tringa stagnatilis* | marsh sandpiper | | Mi | | Marsh sandpiper occur in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. In sheltered coastal habitats, they typically forage at sites containing mudflats, saltmarsh, mangroves or seagrass. | Low | Suitable roosting and/or foraging habitat in the form of intertidal mudflats is present immediately adjacent to the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Tyto novaehollandiae* | masked owl | V | | 6 | Occurs throughout NSW, roosting and nesting in heavy forest. Hunts over open woodland and farmland, with a home range of 500 - 1000 ha. The main requirements are tall trees with suitable large hollows for nesting and roosting and adjacent areas for foraging. Feeds on small mammals. | Low | No suitable habitat is present in the Project Area. |
| *Tyto tenebricosa* | sooty owl | V | | 11 | Inhabits subtropical and warm temperate rainforest, and moist or dry eucalypt forest with a well-developed mid-storey of trees or shrubs. Roost and nest sites for the species occur in gullies. Utilise large hollows for nesting and prey on other hollow dependent species. Roost in hollows or dense vegetation. | Low | No suitable habitat is present in the Project Area. |
| **Mammals** | | | | | | | |
| *Arctocephalus forsteri* | long-nosed fur-seal | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Arctocephalus pusillus doriferus* | Australian fur-seal | V | | 2 | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Balaenoptera acutorostrata* | minke whale | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Balaenoptera edeni* | Bryde's Whale | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Balaenoptera musculus* | blue whale | | E | | Pelagic. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Caperea marginate* | pygmy right whale | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Chalinolobus dwyeri* | large-eared pied bat | V | V | | Roosts in disused mine shafts, caves, overhangs and disused fairy martin nests for shelter and to raise young. Also potentially roost in tree hollows. Occurs in low to mid-elevation dry open forest and woodlands, preferably with extensive cliffs, caves or gullies. Is largely restricted to the interface of sandstone escarpment (for roost habitat) and relatively fertile valleys (for foraging habitat). | Low | No suitable habitat is present in the Project Area. The Project Area is located south of the known distribution range. |
| *Dasyurus maculatus* | spotted-tailed quoll | V | E | 2 | Utilises a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. | Low | No suitable habitat is present in the Project Area. |
| *Delphinus delphis* | common dolphin | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Eubalaena australis* | southern right whale | | E | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Falsistrellus tasmaniensis* | eastern false pipistrelle | V | | 3 | Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. | Low | A restricted area of potential foraging habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Grampus griseus* | Risso's dolphin | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Isoodon obesulus obesulus* | southern brown bandicoot | | E | | NSW distribution almost exclusively restricted to coastal fringe. Habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types. Within these vegetation communities they typically inhabit areas of dense ground cover. | Low | No suitable habitat is present in the Project Area. |
| *Lagenorhynchus obscurus* | dusky dolphin | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Megaptera novaeangliae* | humpback whale | | V | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Miniopterus schreibersii oceanensis* | eastern bentwing-bat | V | | 10 | Eastern bentwing bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops. Cumberland dry sclerophyll forests are identified as a potential vegetation type used by this species. | Low | A restricted area of potential foraging habitat is present in the Project Area. This species has been recorded at a number of locations in the Batemans Bay area. |

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|---|---|---|---|---|---|---|---|
| *Mormopterus norfolkensis* | eastern freetail-bat | V | | 19 | Inhabits dry eucalypt forest and coastal woodlands, along with riparian zones in rainforest and wet sclerophyll forest. Forages above the forest canopy or at forest edges. Known to roost in tree hollows but occasionally found in buildings. | Low | A restricted area of potential foraging habitat is present in the Project Area. |
| *Myotis macropus* | southern myotis | V | | 10 | Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools. | Low | No suitable habitat is present in the Project Area. |
| *Orcinus orca* | orca | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| *Phascogale tapoatafa* | brush-tailed phascogale | V | | 1 | Occurs in drier forests and woodland usually with a sparse groundcover; shelters in tree hollows by day. | Low | No suitable habitat is present in the Project Area. |
| *Phascolarctos cinereus* | koala | V | V | 1 | Inhabits a range of eucalypt forest and woodland communities. Adequate floristic diversity, availability of feed trees (primarily Eucalyptus tereticornis and E. viminalis) and presence of mature trees very important. Preferred food tree species vary with locality and there are quite distinct regional preferences. They are able to persist in fragmented habitats, and even survive in isolated trees across a predominantly agricultural landscape. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Petaurus australis* | yellow-bellied glider | | | 144 | Typically occurs in tall, mature eucalypt forest in regions of high rainfall, but is also known to occur in drier areas. Preference for resource rich forests where mature trees provide nesting hollows and tree species composition with adequate food resources, including winter-flowering Eucalypts and sap-rich trees. | Low | No suitable habitat is present in the Project Area. |
| *Petaurus norfolkensis* | squirrel glider | | | 1 | The squirrel glider inhabits dry sclerophyll forest and woodland. In NSW, potential habitat includes Box-Ironbark forests and woodlands in the west, the river red gum forests of the Murray Valley and the eucalypt forests of the northeast. Individuals have also been recorded in a diverse range of vegetation communities, including blackbutt, forest red gum and red bloodwood forests, coastal banksia heathland and grey gum/spotted gum/grey ironbark dry hardwood forests of the central NSW coast. The squirrel glider is nocturnal and shelters in tree hollows. This species is capable of gliding up to 50m. | Low | No suitable habitat is present in the Project Area. |
| *Petauroides volans* | greater glider population in the Eurobodalla local government | E | V | 34 | Eucalypt forests and woodlands, preferring mature forest with numerous large tree hollows. Folivorous, usually selecting habitats with a diversity of Eucalypt species. Sensitive to habitat fragmentation, restricted to gliding | Low | No suitable habitat is present in the Project Area. |

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| | area | | | | locomotion and reluctant to disperse through non-native habitat. | | |
| *Petrogale penicillata* | brush-tailed rock-wallaby | | V | | This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges, isolated rock stacks and tree limbs. Preference for north-facing slopes and cliff lines. A range of vegetation types are associated with brush-tailed rock-wallaby habitat, including dense rainforest, wet sclerophyll forest, vine thicket, dry sclerophyll forest, and open forest. | Low | No suitable habitat is present in the Project Area. |
| *Potorous tridactylus tridactylus* | long-nosed potoroo | | V | | Inhabits coastal heaths and dry and wet sclerophyll forests, with sandy loam soils. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. Require dense vegetation for shelter and access to fungi. It is mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours. | Low | No suitable habitat is present in the Project Area. No records in the Batemans Bay area. |
| *Pseudomys novaehollandiae* | New Holland mouse | | V | | Inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Nest in burrows and have a preference for deeper top soils and softer substrates to aid digging. Spends considerable time foraging above- | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| | | | | | ground for food in areas of high floristic diversity. | | |
| *Pteropus poliocephalus* | grey-headed flying-fox | V | V | 23 | Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. They travel up to 50 km to forage, on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. | Moderate | A restricted area of potential foraging habitat is present in the Project Area. This species is common in Batemans Bay and is likely to occur in the Project Area. |
| *Saccolaimus flaviventris* | yellow-bellied sheathtail-bat | V | | 4 | Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Availability of tree hollows is important for access to roosting sites. | Low | No suitable roosting habitat is located in the Project Area. This species has been recorded at a number of locations in the Batemans Bay area. |
| *Scoteanax rueppellii* | greater broad-nosed bat | V | | 5 | Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. | Low | A restricted area of potential foraging habitat is present in the Project Area. This species has been recorded at a number of locations in the Batemans Bay area. |
| *Tursiops aduncus* | Indian ocean bottlenose dolphin | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Tursiops truncatus s. str.* | bottlenose dolphin | | Ma | | Pelagic. | Low | No suitable habitat is present in the Project Area. |
| **Reptiles** | | | | | | | |
| *Caretta caretta* | loggerhead turtle | E | E, Ma, Mi | 0 | Marine species; coming on land only to nest on beaches | Low | No suitable habitat is present in the Project Area. |
| *Chelonia mydas* | green turtle | V | V, Ma, Mi | 0 | Marine species; coming on land only to nest on beaches | Low | No suitable habitat is present in the Project Area. |
| *Dermochelys coriacea* | leatherback turtle, leathery turtle | E | E, Ma, Mi | 0 | Marine species; coming on land only to nest on beaches | Low | No suitable habitat is present in the Project Area. |
| *Eretmochelys imbricata* | hawksbill turtle | | V, Ma, Mi | 0 | Marine species; coming on land only to nest on beaches | Low | No suitable habitat is present in the Project Area. |
| *Natator depressus* | flatback turtle | | V, Ma, Mi | 0 | Marine species; coming on land only to nest on beaches | Low | No suitable habitat is present in the Project Area. |
| **Fish** | | | | | | | |
| *Acentronura tentaculata* | shortpouch pygmy pipehorse | | Ma | | Known from the tropical Indo-West Pacific, from East Africa, Madagascar, the Red Sea, Persian Gulf to Torres Strait and the northern Great Barrier Reef, Australia. The Shortpouch Pygmy Pipehorse lives near reefs, in shallow protected coastal areas. It is usually found in sandy or silty areas among sparse seagrass beds and algae covered rocks at 1-20 m. | Low | No suitable habitat is present in the Project Area. |
| *Cosmocampus howensis* | Lord Howe pipefish | | Ma | | Lord Howe Island and Middleton Reef in the Tasman Sea, and from Southport in | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| | | | | | southern Queensland to Jervis Bay, New South Wales. Elsewhere, the species occurs in subtropical and temperate waters of the southwest-central Pacific (Kermadec Islands, New Zealand to Easter Island). Inhabits inshore reefs. | | |
| *Heraldia nocturna* | upside-down pipefish | | Ma | | Endemic to temperate waters of southern and southeastern Australia, from about Seal Rocks, New South Wales, around the southern half of Australia to Geographe Bay, Western Australia, and to Port Davey on the west coast of Tasmania. Upside-down Pipefish inhabit sheltered inshore reefs in harbours, bays and coves where they are usually seen beneath ledges, in holes, crevices and small caves at depths of 2-30 m. | Low | No suitable habitat is present in the Project Area. |
| *Hippocampus abdominalis* | big-belly seahorse | | Ma | | Known from temperate waters of New Zealand and southern Australia, where it occurs from about South West Rocks, New South Wales, southwards to the northern Great Australian Bight, South Australia, and south to the Derwent Estuary, Tasmania. Bigbelly seahorses live in a range of habitats from intertidal rockpools, low rocky reefs in shallow estuaries, to deep tidal channels and deeper coastal reefs to 100m. They cling to seagrasses, sponges, macroalgae such as kelp holdfasts, rocky outcrops and man- | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| | | | | | made structure. Individuals have also been found clinging to floating seagrass rafts. | | |
| *Hippocampus breviceps* | short-head seahorse | | Ma | | Endemic to temperate southern Australian waters from Port Welshpool, Victoria, and eastern Tasmania, to at least Venus Bay, South Australia, and possibly to Denial Bay in the Great Australian Bight, South Australia. Usually inhabits shallow seagrass beds and macro-algae (*Cystophora* and *Sargassum* spp.) in bays, estuaries and on sheltered coastal reefs. Individuals occasionally occur on deeper sponge gardens. The species is most common in Port Phillip where it aggregates in algal weed patches near sandy areas. | Low | No suitable habitat is present in the Project Area. |
| *Histiogamphelus briggsii* | crested pipefish | | Ma | | Endemic to temperate waters of south-eastern Australia, from New South Wales, south to Victoria and Tasmania, and westwards to Gulf St Vincent. Crested Pipefish inhabit inshore sandy areas, singly or in small aggregations, often amongst detached seaweed or along the margins of Posidonia seagrass beds and in open sandy areas at 3–20 m; most common in Bass Strait. | Low | No suitable habitat is present in the Project Area. |

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|---|---|---|---|---|---|---|---|
| *Kimblaeus bassensis* | trawl pipefish | | Ma | | Endemic to temperate waters of Southern Australia, from off Nowra, NSW and eastern Tasmania to Port Lincoln, South Australia. Inhabits rubble and shelly substrates on the continental shelf at 10-204 m. | Low | No suitable habitat is present in the Project Area. |
| *Lissocampus runa* | javelin pipefish | | Ma | | Endemic to temperate waters of southern and eastern Australia; known from northern New South Wales southwards to Port Arthur, Tasmania, and west to about Perth, Western Australia. Inhabits tidepools, estuaries and bays, usually sheltering amongst seagrass (usually *Zostera* spp.) in depths to about 20 m. | Low | No suitable habitat is present in the Project Area. |
| *Maroubra perserrata* | sawtooth pipefish | | Ma | | Endemic to temperate southern Australian waters from southern Queensland to Rottnest Island, Western Australia. Inhabits coastal reefs at depths of 3-25m, sheltering beneath ledges and in caves during day. | Low | No suitable habitat is present in the Project Area. |
| *Notiocampus ruber* | red pipefish | | Ma | | Endemic to temperate waters of southern and south-eastern Australia from Sydney Harbour, New South Wales, south and west to Flinders Island in Bass Strait, Tasmania, Victoria, South Australia and the Recherche Archipelago, Western Australia; usually inhabits rocky reefs, often in crevices, in association with sponges and encrusting and filamentous | Low | No suitable habitat is present in the Project Area. |

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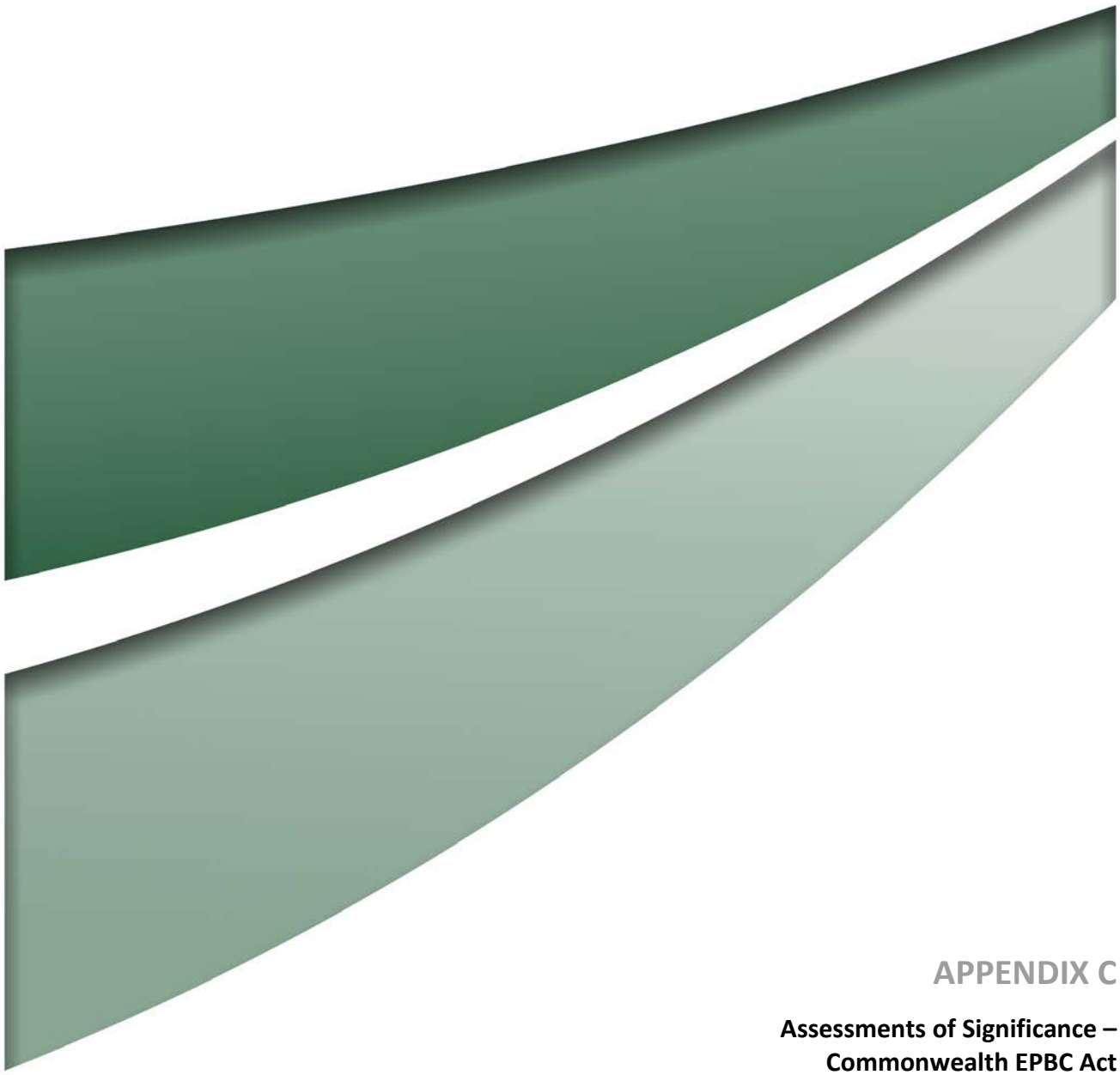
|---|---|---|---|---|---|---|---|
| | | | | | red algae at 5–20 m. | | |
| *Phyllopteryx taeniolatus* | common seadragon | | Ma | | Endemic to temperate coastal waters of southern Australia, from about Newcastle (New South Wales) south to Actaeon Island (Tasmania) and across southern Australia to about Geraldton (Western Australia). Common seadragons inhabit shallow estuaries to deeper offshore reefs, living seagrass beds and on rocky reefs covered in macroalgae, especially kelp beds, in depths of 1-50 m. Individuals usually remain within a broad home range. | Low | No suitable habitat is present in the Project Area. |
| *Solegnathus spinosissimus* | spiny pipehorse | | Ma | | Known from temperate waters of Australia and New Zealand. In Australian waters, Spiny pipehorses have been recorded from off Caloundra, southern Queensland, to southern Tasmania, throughout Bass Strait to south of Cape Otway, Victoria. In the southern part of their range, Spiny pipehorses inhabit relatively shallow waters, and are occasionally seen by divers in the Derwent Estuary (Tasmania). Specimens have been collected from muddy, silty, shelly and rubble substrates, and rocky reefs, and may be washed ashore after storms. Spiny Pipehorses use their prehensile tails to cling to macroalgae and sessile invertebrates on the substrate. | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Solenostomus cyanopterus* | robust ghostpipefish | | Ma | | Widespread in the tropical Indo-west Pacific, from East Africa and the Red Sea, eastwards to Fiji and southern Japan, and south to Australia. Known in Australian waters from the Shark Bay region, Western Australia, around the tropical north and southwards to at least Sydney Harbour, New South Wales. Robust Ghostpipefish live in protected coastal and lagoon reefs, deeper coastal reefs and deep, clear estuaries with seagrass or macro-algae in 15-25m. | Low | No suitable habitat is present in the Project Area. |
| *Stigmatopora argus* | spotted pipefish | | Ma | | Occurs from the Hawkesbury River, NSW (33º30´S) to Shark Bay, WA (25º25´S). | Low | No suitable habitat is present in the Project Area. |
| *Stigmatopora nigra* | widebody pipefish | | Ma | | Occurs from Mooloolaba, Queensland, to Shark Bay, Western Australia, and around Tasmania. Elsewhere the species occurs in New Zealand. Commonly inhabits sheltered seagrass and algal beds from the intertidal to depths of 35 m. | Low | No suitable habitat is present in the Project Area. |
| *Syngnathoides biaculeatus* | double-end pipehorse | | Ma | | In Australian waters, known from Geraldton to Shark Bay, and north to Ashmore and Cartier Reefs, Western Australia, and from the Timor Sea, the Northern Territory, eastwards to Queensland and south to Batemans Bay (New South Wales). Elsewhere, widespread in the tropical Indo-West-Central Pacific from the Red Sea and East | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| | | | | | Africa, across the Indian Ocean to Samoa and Tonga. Inhabits shallow, protected waters of bays, lagoons and estuaries including mangrove areas, in association with seagrass beds and macroalgae in depths at 0-10 m. Juveniles sometimes found clinging to floating algae and plant debris including Sargassum rafts. | | |
| *Urocampus carinirostris* | hairy pipefish | | Ma | | Tropical and temperate South Pacific, Australia and Trobriand Is, Papua New Guinea. In Australia, known from the Shoalwater Bay region (Queensland) to northern Tasmania, Victoria, and to the Ceduna region of South Australia, and in southwestern Australia where it reaches the Perth region. Rare in South Australia. Inhabits the lower reaches of rivers, sheltered estuaries and shallow reefs in seagrass and algal beds a 0-6 m. Hairy Pipefish are one of the most common estuarine pipefishes in eastern Australia, occurring year-round in seagrass beds in Western Port (Victoria), and abundant in seagrass beds in Moreton Bay (Queensland). In Western Port, Hairy Pipefish are most abundant between January and June, when young recruit to the population. | Low | No suitable habitat is present in the Project Area. |

| Species Name | Common Name | Status (NSW BC Act) | Status (EPBC Act) | Number of records (<10 km of site) (Bionet database) | Habitat requirements | Likelihood of occurrence | Comment |
|---|---|---|---|---|---|---|---|
| *Vanacampus margaritifer* | mother-of-pearl pipefish | | Ma | | Endemic to sub-tropical and temperate Australia, from North Stradbroke Island, QLD, southwards to Jurien Bay, WA, absent from Tasmania. Inhabits shallow estuarine and coastal waters where it occurs in seagrass beds (including Heterozostera, Zostera, Posidonia and Halophila), macroalgae (Ecklonia and other brown algae), rocky reef, boulder, rubble, sandy and muddy habitats between 2–15 m. | Low | No suitable habitat is present in the Project Area. |
| *Vanacampus phillipi* | Port Phillip pipefish | | Ma | | Endemic to temperate waters of southern Australia, from about Jervis Bay, New South Wales, south to Tasmania and Victoria and across to Perth, Western Australia. Commonly inhabits seagrass beds (including Halophila, Heterozostera, Posidonia, Ruppia and Zostera) and macroalgae in shallow estuaries and protected bays to 25 m. | Low | No suitable habitat is present in the Project Area. |



# APPENDIX C

**Assessments of Significance – Commonwealth EPBC Act**

# Migratory shorebirds

For the purposes of this assessment of significance all shorebirds listed as migratory under the Commonwealth EPBC Act which are likely to occur on the intertidal mudflat immediately adjacent to the Project Area are considered. The following ten migratory shorebirds have either been recorded at or are deemed to have a moderate or high chance of occurring at the intertidal mudflat immediately adjacent the Project Area:

Common sandpiper (*Actitis hypoleucos)*, red knot (C*alidris canutus*), curlew sandpiper (*Calidris ferruginea),* sharp-tailed sandpiper (*Calidris melanotos),* red-necked stint (*Calidris ruficollis),* double-banded plover *(Charadrius bicinctus),* bar-tailed godwit *(Limosa lapponica),* far eastern curlew *(Numenius madagascariensis),* Pacific golden plover (*Pluvialis fulva)*, common greenshank *(Tringa nebularia)*

**Key threats**

These shorebird species (barring the double-banded plover) migrate along the East Asian-Australasian Flyway and consequently face threats in their breeding range in the Northern Hemisphere, along their migration pathway, and in their foraging habitat and roosting sites in Australia. Key threats to these shorebirds include habitat loss and degradation at staging areas in East Asia (Murray *et al*. 2014, Piersma *et al*. 2016), hunting in East Asia, disturbance and habitat degradation in their non-breeding habitat (i.e. from recreational activities such as fishing, boating, walking dogs, night lighting) (Priest *et al.* 2002, Glover *et al.* 2011), and global warming (Wauchope *et al*. 2016).

**Shorebird habitat**

Migratory shorebirds occur at a range of inland, near coastal and coastal wetland habitat types including coastal lagoons, estuaries, bays, beaches, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Some such as bar-tailed godwit, far eastern curlew, red knot and whimbrel tend to occur in sheltered coastal and near-coastal habitats whilst others such as curlew sandpiper and sharp-tailed sandpiper often occur at inland waterbodies.

**Important shorebird habitat criteria**

Habitat for migratory shorebirds listed under the Commonwealth EPBC Act is considered nationally important according to the EPBC Act Policy Statement 3.21 (Commonwealth of Australia 2017) if it regularly supports either:

- 0.1 per cent of the flyway population of a single species of migratory shorebird,

  *Available data suggest that the intertidal mudflat adjacent to the Project Area does not regularly support 0.1% of any of the nine EAAF shorebirds' populations. The number of individual birds that corresponds to an ecologically significant proportion (0.1%) of the total population of each of the nine EAAF shorebirds included in this assessment in accordance with the latest population estimates (Hansen et al. 2016) is as follows:*

  *Common sandpiper (190); red knot (110); curlew sandpiper (90); sharp-tailed sandpiper (85); red-necked stint (475); bar-tailed godwit (325); far eastern curlew (35); Pacific golden plover (120); common greenshank (110) (Hansen et al. 2016).*

- 2000 migratory shorebirds or

  *Available data suggest that the study area does not regularly support 2000 migratory shorebirds.*

- 15 migratory shorebird species

*Available data suggest that the study area does not regularly support 15 migratory shorebird species.*

Shorebird habitat for migratory shorebirds listed under the Commonwealth EPBC Act is considered internationally important according to the EPBC Act Policy Statement 3.21 (Commonwealth of Australia 2017) if it regularly supports:

- 1 per cent of the individuals in a population of one species or subspecies of waterbird or

*Available data suggest that the study area does not regularly support 1% of any of the nine shorebirds' populations.*

- a total abundance of at least 20 000 waterbirds.

*Available data suggest that the study area does not regularly support at least 20,000 waterbirds.*

Hence, the intertidal mudflat adjacent to the Project Area does not meet the important shorebird habitat criteria according to the EPBC Act Policy Statement 3.21 (Commonwealth of Australia 2017).

| **Test** | **An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:** |
|---|---|
| Criteria | **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** |
| Response | The proposed development is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important common sandpiper, red knot, curlew sandpiper, sharp-tailed sandpiper, red-necked stint, double-banded plover, bar-tailed godwit, far eastern curlew, pacific golden plover or common greenshank habitat given that no such habitat areas are present in the Project Area. The intertidal mudflat adjacent to the Project Area does not meet the classification of important shorebird habitat. |
| Criteria | **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** |
| Response | The proposed development is unlikely to result in an invasive species that is harmful to common sandpiper, red knot, curlew sandpiper, sharp-tailed sandpiper, red-necked stint, double-banded plover, bar-tailed godwit, far eastern curlew, pacific golden plover or common greenshank becoming established in an area of important common sandpiper, red knot, curlew sandpiper, sharp-tailed sandpiper, red-necked stint, double-banded plover, bar-tailed godwit, far eastern curlew, pacific golden plover or common greenshank habitat. Introduced predators which may pose a risk to these shorebirds such as red fox (*Vulpes vulpes*) and feral cat (*Felis catus*) likely occur in the Project Area. |
| Criteria | **c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.** |
| Response | The proposed development is unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of common sandpiper, red knot, curlew sandpiper, sharp-tailed sandpiper, red-necked stint, double-banded plover, bar-tailed godwit, far eastern curlew, pacific golden plover or common greenshank due to the nature of the proposed development and because the Project Area does not support an ecologically significant proportion of any of these species. |

| Test | An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: |
|---|---|
| Conclusion | The proposed development is unlikely to have a significant adverse impact on common sandpiper, red knot, curlew sandpiper, sharp-tailed sandpiper, red-necked stint, double-banded plover, bar-tailed godwit, far eastern curlew, pacific golden plover or common greenshank. None of these species are likely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers on a regular basis. Individuals that do utilise this intertidal mudflat are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development. Mitigation measures to reduce disturbance to shorebirds using the intertidal mudflats adjacent to the Project Area are discussed in **Section 4.2.2.** |

## Curlew sandpiper *(Calidris ferruginea)*

The curlew sandpiper is listed as critically endangered and migratory under the Commonwealth EPBC Act and endangered under the NSW BC Act. It occurs across a wide range of inland wetlands and sheltered coastal habitat types. It typically occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, or on swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. The curlew sandpiper's EAAF population is estimated to comprise 90,000 individuals and is in steep decline (Department of Environment 2015, Hansen *et al*. 2016). On the NSW south coast curlew sandpiper are most regularly recorded at sheltered intertidal sites such as Lake Wollumboola, Wallagoot Lake and Shoalhaven Heads. Although curlew sandpiper have not been recorded on the intertidal mudflats adjacent to the Project Area they may occasionally occur at this location in low numbers.

| Test | An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease of a population** |
| Response | The proposed development is unlikely to lead to a long-term decrease in the curlew sandpiper's population size given that no suitable habitat will be removed. |
| Criteria | **b) reduce the area of occupancy of the species** |
| Response | The proposed development is unlikely to reduce the area of occupancy of the curlew sandpiper given that no suitable habitat will be removed. |
| Criteria | **c) fragment an existing population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing curlew sandpiper population into two or more populations given that no suitable habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of a population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of a population of curlew sandpiper. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to an endangered or critically endangered species becoming established in the endangered or critically endangered species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the curlew sandpiper becoming established in curlew sandpiper habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the curlew sandpiper to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that no suitable habitat is likely to be removed and any potential indirect impacts are unlikely to have an adverse impact on this species. |

| Test | An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will: |
|---|---|
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on curlew sandpiper. The curlew sandpiper is unlikely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers and individuals that may occasionally utilise this habitat are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development.** |

## Red knot (*Calidris canutus*)

The red knot is listed as endangered and migratory under the Commonwealth EPBC Act. In Australia the red knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours. The red knot's EAAF population is estimated to comprise 110,000 individuals (Hansen *et al*. 2016). On the NSW south coast red knot are most regularly recorded at large sheltered intertidal areas such as Lake Wollumboola, Walgonga Inlet and Merimbula Lake. Although red knot have not been recorded on the intertidal mudflats adjacent to the Project Area they may occasionally occur at this location in low numbers.

| Test | An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease of a population** |
| Response | Given that no suitable habitat is likely to be removed it is unlikely that the proposed development will lead to a long-term decrease in the red knot's population size. |
| Criteria | **b) reduce the area of occupancy of the species** |
| Response | The proposed development is unlikely to reduce the area of occupancy of the red knot given that no suitable habitat will be removed. |
| Criteria | **c) fragment an existing population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing red knot population into two or more populations given that no suitable habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of a population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of a population of red knot. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to an endangered or critically endangered species becoming established in the endangered or critically endangered species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the red knot becoming established in red knot habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the red knot to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that no suitable habitat is likely to be removed, and any potential indirect impacts are unlikely to have an adverse impact on this species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the red knot. The red knot is unlikely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers. Individuals that may occasionally occur at this location are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development.** |

## Bar-tailed godwit (*Limosa lapponica baueri*)

The bar-tailed godwit is listed as vulnerable and migratory under the Commonwealth EPBC Act. It predominately inhabits coastal habitats such as sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit and are only occasionally found on inland freshwater or saline lakes, swamps or bore-overflows. The bar-tailed godwit's EAAF population of 325,000 individuals comprises two subspecies, namely *Limosa lapponica baueri* and *Limosa lapponica menzbieri* of which the former occurs in south-eastern NSW. On the NSW south coast bar-tailed godwit are most regularly recorded at sheltered intertidal sites such as Lake Wollumboola, Wagonga Inlet, Tuross Lake, Wallaga Lake and Shoalhaven Heads. Bar-tailed godwit have been recorded on the intertidal mudflats adjacent to the Project Area.

| Test | An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease in the size of an important population** |
| Response | Given that no suitable habitat is likely to be removed it is unlikely that the proposed development will lead to a long-term decrease in the size of an important population of bar-tailed godwit. |
| Criteria | **b) reduce the area of occupancy of an important population** |
| Response | The proposed development is unlikely to reduce the area of occupancy of an important population of bar-tailed godwit given that no suitable habitat will be removed. |
| Criteria | **c) fragment an existing important population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing important bar-tailed godwit population into two or more populations given that no suitable habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of an important population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of an important population of bar-tailed godwit. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the bar-tailed godwit becoming established in bar-tailed godwit habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the bar-tailed godwit to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that no suitable habitat is likely to be removed, and any potential indirect impacts are unlikely to have an adverse impact on this species. |

| Test | An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will: |
|---|---|
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the bar-tailed godwit. The bar-tailed godwit is unlikely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers. Individuals that utilise this habitat are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development.** |

## Far eastern curlew (*Numenius madagascariensis*)

The far eastern curlew is listed as critically endangered and migratory under the Commonwealth EPBC Act. It occurs on sheltered sections of coastline, especially estuaries, bays, harbours, inlets and coastal lagoons, with intertidal mudflats or sandflats. The far eastern curlew's EAAF population is estimated to comprise 35,000 individuals (Hansen *et al*. 2016). On the NSW south coast bar-tailed godwit are most regularly recorded at sheltered intertidal sites including both large inlets such as Wagonga Inlet and small estuaries supporting comparatively restricted areas of intertidal mudflat. This species has been recorded on the intertidal mudflat adjacent to the Project Area.

| Test | An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease of a population** |
| Response | Given that no suitable habitat is likely to be removed it is unlikely that the proposed development will lead to a long-term decrease in the far eastern curlew's population size. |
| Criteria | **b) reduce the area of occupancy of the species** |
| Response | The proposed development is unlikely to reduce the area of occupancy of the far eastern curlew given that no suitable habitat will be removed. |
| Criteria | **c) fragment an existing population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing far eastern curlew population into two or more populations given that no suitable habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of a population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of a population of far eastern curlew. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat. |
| Criteria | **g) result in invasive species that are harmful to an endangered or critically endangered species becoming established in the endangered or critically endangered species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the far eastern curlew becoming established in far eastern curlew habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the far eastern curlew to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that no suitable habitat is likely to be removed, and any potential indirect impacts are unlikely to have an adverse impact on this species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on far eastern curlew. The far eastern curlew may, but is unlikely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers. Individuals that occur at this site are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development.** |

## Eastern great egret (*Ardea alba*)

The eastern great egret is listed as migratory under the Commonwealth EPBC Act. It has a widespread distribution in Australia and occurs in a broad range of wetland habitats including inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small and natural and artificial wetlands. This species has been recorded on the intertidal mudflat adjacent to the Project Area.

The Project Area is unlikely to support important eastern great egret habitat given that none of the following important habitat requirements are likely to be met:

a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of a species, and/or

b) habitat that is of critical importance to the species at particular life-cycle stages, and/or

c) habitat utilised by a migratory species which is at the limit of the species' range, and/or

d) habitat within an area where the species is declining.

| **Test** | **An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:** |
|---|---|
| Criteria | **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** |
| Response | The proposed development is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important eastern great egret habitat given that no such habitat areas are present in the Project Area. |
| Criteria | **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** |
| Response | The proposed development is unlikely to result in an invasive species that is harmful to eastern great egret becoming established in an area of important eastern great egret habitat. Introduced predators which may pose a risk to the eastern great egret such as red fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are likely present in the Project Area. |
| Criteria | **c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.** |
| Response | The proposed development is unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of eastern great egret as the Project Area does not support an ecologically significant proportion of this species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the eastern great egret.** |

## Eastern osprey (*Pandion cristatus*)

The eastern osprey is listed as migratory under the Commonwealth EPBC Act and vulnerable under the NSW BC Act. The eastern osprey's Australian distribution encompasses much of the mainland's coastline barring the Nullarbor Plain. Eastern osprey primarily occur in coastal areas where they inhabit inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes but are known to occasionally travels inland along major rivers. Their chief threat in Australia is loss, degradation or alteration of habitat for urban development. Other threats include ingestion of prey items containing pollutants such as pesticides, heavy metals or fishing tackle and competition for food with commercial and recreational fisheries. Eastern osprey have been recorded at several locations in Batemans Bay.

The Project Area is unlikely to support important eastern osprey habitat given that none of the following important habitat requirements are likely to be met:

a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of a species, and/or

b) habitat that is of critical importance to the species at particular life-cycle stages, and/or

c) habitat utilised by a migratory species which is at the limit of the species' range, and/or

d) habitat within an area where the species is declining.

| Test | An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **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** |
| Response | The proposed development is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important eastern osprey habitat given that no such habitat areas are present in the Project Area. |
| Criteria | **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** |
| Response | The proposed development is unlikely to result in an invasive species that is harmful to eastern great egret becoming established in an area of important eastern osprey habitat. Introduced predators which may pose a risk to these shorebirds such as red fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are likely present in the Project Area. |
| Criteria | **c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.** |
| Response | The proposed development is unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of eastern osprey as the Project Area does not support an ecologically significant proportion of this species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the eastern osprey. No suitable foraging or breeding habitat will be removed as a result of the construction of the proposed development.** |

## Glossy black-cockatoo (*Calyptorhynchus lathami*)

The glossy black-cockatoo is listed as vulnerable under the NSW BC Act and endangered under the Commonwealth EPBC Act. It inhabits coastal woodlands and dry forests, open inland woodlands, or timbered watercourses which contain key *Allocasuarina* spp. in south east Australia including Kangaroo Island, South Australia. The key threat to glossy black-cockatoo is the loss and degradation of foraging and breeding habitat. The glossy black-cockatoo is an uncommon resident in the Batemans Bay area and is most regularly recorded in forested areas containing sheoak. It has been recorded near but not in the Project Area and is likely to only rarely utilise the restricted area of potential foraging habitat present in this area.

| Test | An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease of a population** |
| Response | Given that less than 0.5 hectares of potential glossy black-cockatoo foraging habitat is likely to be removed it is unlikely that the proposed development will lead to a long-term decrease in the glossy black-cockatoo's population size. |
| Criteria | **b) reduce the area of occupancy of the species** |
| Response | The proposed development is unlikely to reduce the area of occupancy of the glossy black-cockatoo given that less than 0.5 hectares of potential glossy black-cockatoo foraging habitat will be removed. |
| Criteria | **c) fragment an existing population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing glossy black-cockatoo population into two or more populations given that less than 0.5 hectares of potential glossy black-cockatoo foraging habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of a population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of a population of glossy black-cockatoo as no nesting habitat is likely to be impacted. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the glossy black-cockatoo is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to an endangered or critically endangered species becoming established in the endangered or critically endangered species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the glossy black-cockatoo becoming established in glossy black-cockatoo habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the glossy black-cockatoo to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that less than 0.5 hectares of potential glossy black-cockatoo foraging habitat will be removed. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the glossy black-cockatoo.** |

## Migratory passerines: Black-faced monarch (*Monarcha melanopsis)*, satin flycatcher (*Myiagra cyanoleuca)*, rufous fantail (*Rhipidura rufifrons)*

The black-faced monarch is a small insectivorous migrant which breeds in eastern coastal Australia during summer and migrates to spend the non-breeding winter period in New Guinea. The black-faced monarch is a wet forest specialist which primarily occurs in riparian vegetation and tropical, sub-tropical and temperate rainforest in eastern Australia. In wet sclerophyll forest, the species mostly frequents sheltered gullies and slopes with a dense understorey of ferns and/or shrubs. Black-face monarch have been recorded at several locations in Batemans Bay but not in the Project Area.

The satin flycatcher occurs along the Great Dividing Range on the eastern and south-eastern seaboard of Australia from Cape York to Tasmania and south-eastern South Australia. It is a breeding summer migrant to the south-east and Tasmania. After breeding, satin flycatchers leave southern Australia in February - April. It winters in northern Queensland, New Guinea and the Bismarck Archipelago. The satin flycatcher inhabits wet and dry sclerophyll forests and tall woodlands in eastern Australia, particularly heavily vegetated gullies. During migration, the satin flycatcher occurs across a wide range of wooded habitats including coastal forests, woodlands and mangroves. Satin flycatcher have been recorded at several locations in the Batemans Bay area but not in the Project Area.

The rufous fantail nominate subspecies *R. r. rufifrons* occurs in south-eastern mainland Australia, from approximately Brisbane, through NSW and Victoria and across to the eastern side of the Adelaide Hills. This sub-species primarily breeds in forests within 300 km of the coast, and migrates northwards during non-breeding periods. The rufous fantail occurs in moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense shrubby understory in eastern Australia. Rufous fantail have been recorded at several locations in Batemans Bay but not in the Project Area.

The Project Area is unlikely to support important black-faced monarch, satin flycatcher or rufous fantail habitat as none of the following four important habitat requirements are likely to be met:

a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of a species, and/or

b) habitat that is of critical importance to the species at particular life-cycle stages, and/or

c) habitat utilised by a migratory species which is at the limit of the species' range, and/or

d) habitat within an area where the species is declining.

| Test | An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **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** |
| Response | The proposed development is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important black-faced monarch, satin flycatcher or rufous fantail habitat given that no such habitat areas are present in the Project Area. |
| Criteria | **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** |

| Test | An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: |
|---|---|
| Response | The proposed development is unlikely to result in an invasive species that is harmful to eastern great egret becoming established in an area of important black-faced monarch, satin flycatcher or rufous fantail habitat. Introduced predators which may pose a risk to these shorebirds such as red fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are likely present in the Project Area. |
| Criteria | **c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.** |
| Response | The proposed development is unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of black-faced monarch, satin flycatcher or rufous fantail because the Project Area does not support an ecologically significant proportion of these species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the black-faced monarch, satin flycatcher or rufous fantail. Less than <0.5 hectares of potential or suitable habitat likely to be utilised briefly during migratory movements will be removed.** |

## Grey-headed flying-fox (*Pteropus poliocephalus)*

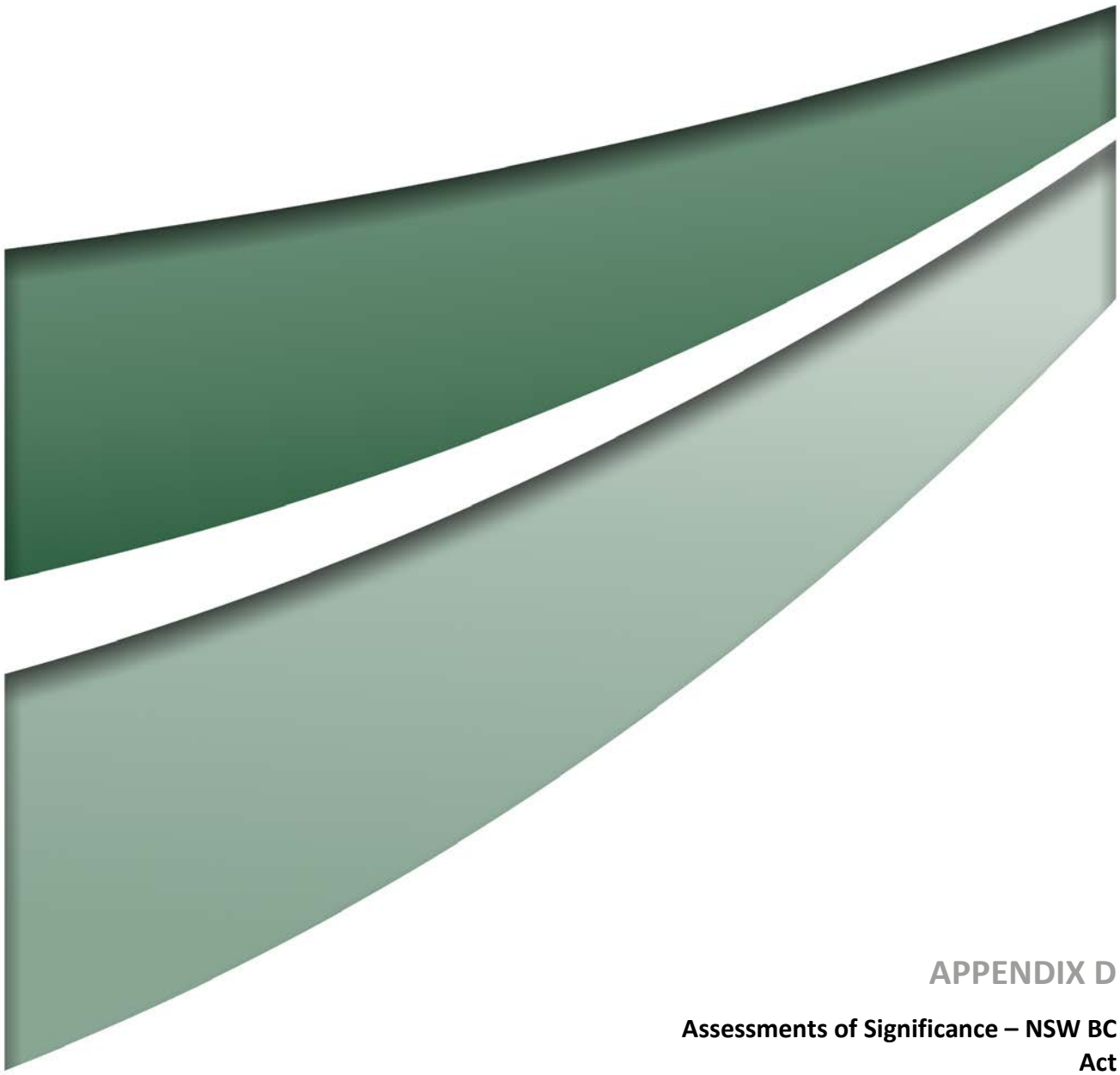
The Grey-headed Flying-fox is listed as vulnerable under the NSW BC Act and the Commonwealth EPBC Act. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. Grey-headed flying-fox travel up to 50 km to forage on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. Grey-headed flying-fox are regularly recorded in the Batemans Bay area as there is a camp located at the Batemans Bay Water Garden (which is approximately 1.2 kilometres from the Project Area). Though there are no records of this species in the Project Area it is likely that individuals either pass through or alight in the Project Area whilst foraging.

| Test | An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease in the size of an important population** |
| Response | Given that less than 0.5 hectares of potential foraging habitat is likely to be removed it is unlikely that the proposed development will lead to a long-term decrease in the size of an important population of grey-headed flying-fox. |
| Criteria | **b) reduce the area of occupancy of an important population** |
| Response | The proposed development is unlikely to reduce the area of occupancy of the grey-headed flying-fox given that less than 0.5 hectares of potential foraging habitat will be removed. |
| Criteria | **c) fragment an existing important population into two or more populations** |
| Response | The proposed development is unlikely to fragment an existing grey-headed flying-fox population given that less than 0.5 hectares of potential foraging habitat will be removed. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of an important population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of an important population of grey-headed flying-fox. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the grey-headed flying-fox is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the grey-headed flying-fox becoming established in grey-headed flying-fox habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the grey-headed flying-fox to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that less than 0.5 hectares of potential foraging habitat will be removed. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the grey-headed flying-fox.** |

## Narrow-leaved black peppermint (*Eucalyptus nicholii*)

The narrow-leaved black peppermint is listed as vulnerable under both the NSW BC Act and the EPBC Act 1999. It is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in the central portions of its range. It typically grows in dry grassy woodland, on shallow soils of slopes and ridges and occurs primarily on infertile soils derived from granite or metasedimentary rock. This species is planted as urban trees, windbreaks and corridors elsewhere in NSW. Several individuals have been planted in the Project Area.

| Test | An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will: |
|---|---|
| Criteria | **a) lead to a long-term decrease in the size of an important population** |
| Response | No important population of narrow-leaved black peppermint is present in the Project Area. |
| Criteria | **b) reduce the area of occupancy of an important population** |
| Response | No important population of narrow-leaved black peppermint is present in the Project Area. |
| Criteria | **c) fragment an existing important population into two or more populations** |
| Response | No important population of narrow-leaved black peppermint is present in the Project Area. |
| Criteria | **d) adversely affect habitat critical to the survival of a species** |
| Response | No critical habitat has been declared for this species. |
| Criteria | **e) disrupt the breeding cycle of an important population** |
| Response | The proposed development is unlikely to disrupt the breeding cycle of an important population of narrow-leaved black peppermint. |
| Criteria | **f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** |
| Response | The proposed development is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that narrow-leaved black peppermint is likely to decline. |
| Criteria | **g) result in invasive species that are harmful to vulnerable species becoming established in the vulnerable species' habitat** |
| Response | The proposed development is unlikely to result in invasive species that are harmful to the narrow-leaved black peppermint becoming established in narrow-leaved black peppermint habitat. |
| Criteria | **h) introduce disease that may cause the species to decline** |
| Response | The proposed development is unlikely to introduce disease that may cause the narrow-leaved black peppermint to decline. |
| Criteria | **i) interfere substantially with the recovery of the species** |
| Response | The proposed development is unlikely to substantially interfere with the recovery of the species given that no suitable habitat is likely to be removed, and any potential indirect impacts are unlikely to have an adverse impact on this species. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on the narrow-leaved black peppermint. Individuals planted in the Project Area do not represent an important population of this species.** |



# APPENDIX D

**Assessments of Significance – NSW BC Act**

## Curlew sandpiper (*Calidris ferruginea*)

The curlew sandpiper is listed as critically endangered and migratory under the Commonwealth EPBC Act and endangered under the NSW BC Act. It occurs across a wide range of inland wetlands and sheltered coastal habitat types. It typically occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, or on swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. The curlew sandpiper's EAAF population is estimated to comprise 90,000 individuals and is in steep decline (Department of Environment 2015, Hansen *et al*. 2016). On the NSW south coast curlew sandpiper are most regularly recorded at sheltered intertidal sites such as Lake Wollumboola, Wallagoot Lake and Shoalhaven Heads. Although curlew sandpiper have not been recorded on the intertidal mudflats adjacent to the Project Area they may occasionally occur at this location in low numbers.

| **Test** | |
|---|---|
| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the curlew sandpiper such that a viable local population of the species is likely to be placed at risk of extinction as no suitable habitat is likely to be removed and indirect impacts are likely to be negligible. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**a. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>b. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**a. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**b. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>c. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) No suitable foraging habitat is located in the Project Area.<br>(ii) The proposed development is unlikely to lead to the fragmentation or isolation of curlew sandpiper habitat.<br>(iii) No suitable habitat will be removed, modified, fragmented or isolated as a result of the proposed development. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development does not constitute a key threatening process known to impact the curlew sandpiper. |

| Test | |
|---|---|
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on curlew sandpiper. The curlew sandpiper is unlikely to occur at the intertidal mudflat adjacent the site in ecologically significant numbers and individuals that may occasionally utilise this habitat are unlikely to be subject to any adverse indirect impacts resulting from the construction of the proposed development.** |

## Sooty oystercatcher (*Haematopus fuliginosus*)

The sooty oystercatcher is a large wader listed as vulnerable under the NSW BC Act which typically occurs on rocky shorelines and headlands, stony beaches, offshore islands and exposed reefs and occasionally occurs on sandy beaches, intertidal mudflats and short pastures. Sooty oystercatcher breed in spring and summer on offshore islands and on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed. Disturbance by beachgoers, dogs, fishermen and boats landing on offshore islands and predation of eggs and chicks by introduced and native predators such as rats and raptors are thought to be the main threat to this species. Approximately 400 mature individuals occur in NSW. Sooty oystercatcher are regularly recorded in suitable habitat along the coastline of the Batemans Bay area, are known to breed on the Tollgate Islands and have been observed on the intertidal mudflats adjacent to the Project Area.

| Test | |
|---|---|
| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the sooty oystercatcher such that a viable local population of the species is likely to be placed at risk of extinction as no suitable habitat is likely to be removed and indirect impacts associated with the proposed development are likely to have a negligible impact on this species. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**a. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>b. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**a. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**b. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>c. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) No suitable foraging habitat is located in the Project Area.<br>(ii) The proposed development is unlikely to lead to the fragmentation or isolation of sooty oystercatcher habitat.<br>(iii) No suitable habitat will be removed, modified, fragmented or isolated as a result of the proposed development. The intertidal mudflat adjacent to the Project Area is unlikely to be important for the long-term survival of the local population of sooty oystercatcher. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |

| Test | |
|---|---|
| Response | The proposed development does not constitute a key threatening process known to impact the sooty oystercatcher. |
| Conclusion | **The proposed development is unlikely to have a significant adverse impact on sooty oystercatcher. Any indirect impacts that the proposed development may have on sooty oystercatcher using the intertidal mudflat adjacent to the Project Area are likely to be negligible.** |

## Pied oystercatcher (*Haematopus longirostris)*

The pied oystercatcher is a large wader listed as endangered under the NSW BC Act which forages on mudflats, inlets, beaches and rock platforms and typically nests above the tideline on sand islands and estuarine and ocean beaches along the coastline of the Australian mainland and Tasmania. Approximately 200 pairs occur in NSW of which an average of between 25-30 pairs breed on the Gerroa – Batemans Bay section of the NSW South Coast each year (OEH 2018).

Key threats to pied oystercatcher include nest predation, human disturbance and habitat loss (Taylor *et al.* 2014). Predation by the European red fox (*Vulpes vulpes*), one of the chief causes of nest failure on the NSW South Coast, is a key threatening process listed under the Schedules of the *Biodiversity Conservation Act 2016*. As a ground nester which typically breeds in sparsely vegetated locations, pied oystercatcher eggs and young are particularly vulnerable to not only predation and human disturbance, but also inundation and trampling (Taylor *et al.* 2014).

Pied oystercatcher have been recorded breeding in the vicinity of the Batemans Bay Marina north of 49 Beach Road since the 2005/06 breeding season (South Coast Shorebird Recovery Program 2006) and are regularly observed on the intertidal mudflat adjacent to the Project Area. Observations of pied oystercatcher breeding behaviour in the vicinity of the Batemans Bay marina during the past five seasons indicates that their preferred nesting location has varied between years however since the 2015/16 breeding season all nesting attempts have been restricted to a location containing mangrove seedlings adjacent to Hanging Rock Creek (South Coast Shorebird Recovery Program 2014, 2015, 2016, 2017, 2018).

| **Test** | |
|---|---|
| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | Due to the small number of active breeding sites between Bawley Point and Moruya the breeding site adjacent to the Project Area represents an important and significant component of the local pied oystercatcher population when examined at this scale (South Coast Shorebird Recovery Program 2018). Temporary reduction in breeding success of a single breeding pair may occur as a result of disturbance associated with construction activities reducing brooding of eggs or protecting young. In the event that disturbance cause pied oystercatcher to abandon this breeding site in the long-term it may be significant for the local population but due to the localised extent of impacts in isolation is unlikely to place the local population of pied oystercatcher at risk of extinction. During the operational phase increased public access along the board walk, including potential off-lease walking of dogs, may also increase disturbance to the species and reduce breeding success. Abandonment of the site is considered by Umwelt to be unlikely as demonstrated by the successful breeding event in 2017 when land reclamation works and construction of the embankment on the edge of the Project Area was undertaken and the confirmed return of a breeding pair for the 2018 breeding season.<br>Given that the breeding pair have demonstrated breeding success, and returned to the site, concurrent with land reclamation works conducted in late 2016, and that the proposed development would have localised impacts on a single breeding pair, the proposed development is unlikely to have an adverse effect on the life cycle of the pied oystercatcher such that a viable local population is likely to be placed at risk of extinction. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |

| Test | |
|---|---|
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) No breeding habitat will be removed or modified as a result of the proposed development.<br>(ii) The proposed works would occur adjacent to areas of suitable habitat and would not result in the fragmentation or isolation of habitat.<br>(iii) While indirect impacts on breeding habitat may occur, breeding habitat would not be permanently removed, modified, fragmented or isolated as a result of the works associated with the proposed development. Increased ongoing disturbance to breeding habitat due to increased public access in adjacent areas may result in reduction in the suitability of the breeding habitat however this would impact a single breeding pair and is unlikely to impact the long term survival of the species. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | Key threats to pied oystercatcher are associated with the life history which makes the species vulnerable to specific threats, particularly nest inundation and predation, that occur throughout their range and impact breeding success. The proposed development does not constitute, nor is it a part of, any key threatening process. It is unlikely that the proposed development will increase the impact of a key threatening process. |
| Conclusion | The impact on pied oystercatcher is not likely to be significant under the definition of Part 7.3 of the NSW BC Act. Potential adverse impacts should be minimised though measures outlined in Section 4.2.2.1. |

## Raptors: White-bellied sea-eagle (*Haliaeetus leucogaster)*, eastern osprey (*Pandion cristatus*), square-tailed kite (*Lophoictinia isura*)

The white-bellied sea-eagle is listed as vulnerable under the NSW BC Act. The white-bellied sea-eagle occurs in coastal habitats and terrestrial wetlands which contain large bodies of water such as lakes, rivers and the sea throughout Australia excluding the interior. It is a relatively common breeding resident in the Batemans Bay area.

The eastern osprey is listed as migratory under the Commonwealth EPBC Act and vulnerable under the NSW BC Act. The eastern osprey's Australian distribution encompasses much of the mainland's coastline barring the Nullarbor Plain. Eastern osprey primarily occur in coastal areas where they inhabit inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes but are known to occasionally travels inland along major rivers. Eastern osprey have been recorded at several locations in Batemans Bay including on the Clyde River adjacent to the Project Area.

The square-tailed kite is listed as vulnerable under the NSW BC Act. It is a generally uncommon species throughout much of its range which encompasses much of eastern, northern and south-western Australia and parts of central Australia. The square-tailed kite prefers tall woodlands and open eucalypt forest particularly near watercourses. It is a relatively uncommon, scarce species on the NSW south coast which is most frequently recorded in the Batemans Bay area between October and February. The square-tailed kite has not been recorded in the Project Area.

The chief threat to these raptors is loss, degradation or alteration of breeding and foraging habitat for urban development. Other threats to the white-bellied sea-eagle and eastern osprey include ingestion of prey items containing pollutants such as pesticides, heavy metals or fishing tackle and competition for food with commercial and recreational fisheries.

| Test | |
|---|---|
| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the white-bellied sea-eagle, eastern osprey or square-tailed kite such that a viable local population of any of these species is likely to be placed at risk of extinction given that no white-bellied sea-eagle, eastern osprey or square-tailed kite breeding habitat will be removed and only an insignificant amount (<0.5 hectares) of suitable square-tailed kite foraging habitat will be removed. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |

| Test | |
|---|---|
| Response | (i) No white-bellied sea-eagle, eastern osprey or square-tailed kite breeding habitat will be removed or modified as a result of the proposed development. Less than <0.5 hectares of suitable square-tailed kite foraging habitat will be removed.<br>(ii) Removal of vegetation in the Project Area is unlikely to fragment or isolate any suitable square-tailed kite habitat given the high mobility of this species combined with the restricted extent of vegetation loss.<br>(iii) The removal of vegetation in the Project Area is unlikely to have any bearing on the long-term survival of the white-bellied sea-eagle, eastern osprey or square-tailed kite in the locality given that none of these species depend on the Project Area for either breeding or foraging. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development constitutes a key threatening process (clearing of native vegetation) which is known to threaten white-bellied sea-eagle, eastern osprey or square-tailed kite but is only applicable to square-tailed kite in this case as no suitable white-bellied sea-eagle or eastern osprey habitat is present in the Project Area. |
| Conclusion | The proposed development is unlikely to have an adverse impact on a local population of white-bellied sea-eagle, eastern osprey or square-tailed kite. The loss of <0.5 hectares of square-tailed kite foraging habitat is likely to have a negligible impact on this species at the local scale. |

## Glossy black-cockatoo (*Calyptorhynchus lathami)*, gang-gang cockatoo (*Callocephalon fimbriatum)*, little lorikeet (*Glossopsitta pusilla)*

The gang-gang cockatoo is listed as vulnerable under the NSW BC Act. It occurs in sub-alpine woodlands, tall mountain forests, open eucalypt forests and woodlands particularly in areas which support hollow-bearing trees in south-eastern Australia. The little lorikeet is listed as vulnerable under the NSW BC Act. It primarily inhabits woodland and open and closed forest containing hollow-bearing *Eucalypts* on fertile flats in eastern and south-eastern Australia. The glossy black-cockatoo is listed as vulnerable under the NSW BC Act and endangered under the Commonwealth EPBC Act. It inhabits coastal woodlands and dry forests, open inland woodlands, or timbered watercourses which contain key *Allocasuarina* spp. in south east Australia including Kangaroo Island, South Australia.

The glossy black-cockatoo, gang-gang cockatoo and little lorikeet are uncommon in the Batemans Bay area and are most frequently recorded in areas of mature forest or woodland. Each have been recorded near but not in the Project Area and may only rarely utilise the restricted area of potential foraging habitat present.

The key threat to these hollow-nesters is the loss and degradation of foraging and breeding habitat. The gang-gang cockatoo is particularly threatened by the loss and degradation of habitat from major bushfire events, inappropriate fire regimes and sub-urban and rural development. The little lorikeet is particularly threatened by the historic and ongoing loss of mature Eucalypts, a key breeding and foraging resource from the fertile lower slopes and plains throughout their range in eastern Australia. Habitat clearance for development and agriculture or habitat degradation (particularly of areas containing sheoak) as a result of frequent bushfires are major threats to the glossy black-cockatoo.

| **Test** | |
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| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the glossy black-cockatoo, gang-gang cockatoo or little lorikeet such that a viable local population of any of these species is likely to be placed at risk of extinction given that no suitable glossy black-cockatoo, gang-gang cockatoo or little lorikeet breeding habitat will be removed and only a restricted area (<0.5 hectares) of potential glossy black-cockatoo, gang-gang cockatoo and little lorikeet foraging habitat currently in a highly modified state within an urban area will be removed. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |

| Test | |
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| Response | (i) No glossy black-cockatoo, gang-gang cockatoo or little lorikeet breeding habitat will be removed or modified as a result of the proposed development. Less than <0.5 hectares of potential glossy black-cockatoo, gang-gang cockatoo and little lorikeet foraging habitat will be removed.<br>(ii) Vegetation removal in the Project Area is unlikely to fragment or isolate any suitable glossy black-cockatoo, gang-gang cockatoo or little lorikeet habitat given the high mobility of these species combined with the restricted extent of forecast vegetation loss.<br>(iii) The removal of vegetation in the Project Area is unlikely to have a significant impact on the long-term survival of the glossy black-cockatoo, gang-gang cockatoo or little lorikeet in the locality given that none of these species are likely to depend on the Project Area for either breeding or foraging. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development constitutes a key threatening process (clearing of native vegetation) which is known to threaten glossy black-cockatoo, gang-gang cockatoo and little lorikeet. |
| Conclusion | The proposed development is unlikely to have an adverse impact on a local population of white-bellied sea-eagle, eastern osprey or square-tailed kite. The loss of <0.5 hectares of potential foraging habitat is unlikely to have an adverse impact on these species at the local scale. |

## Grey-headed flying-fox (*Pteropus poliocephalus)*

The Grey-headed Flying-fox is listed as vulnerable under the NSW BC Act and the Commonwealth EPBC Act. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. Grey-headed flying-fox travel up to 50 km to forage on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. Grey-headed flying-fox are regularly recorded in the Batemans Bay area as there is a camp located at the Batemans Bay Water Garden (which is approximately 1.2 kilometres from the Project Area). Though there are no records of this species in the Project Area it is likely that individuals either pass through or alight in the Project Area whilst foraging.

| **Test** | |
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| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the grey-headed flying-fox such that a viable local population of this species is likely to be placed at risk of extinction. No vegetation supporting any current grey-headed flying-fox camp will be removed and only a restricted area (<0.5 hectares) of planted and high modified strips of native vegetation likely containing seasonal grey-headed flying-fox foraging resources will be removed. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) No vegetation currently utilised by camping grey-headed flying-foxes will be removed or modified as a result of the proposed development. Less than <0.5 hectares of potential grey-headed flying-fox foraging habitat will be removed.<br>(ii) Vegetation removal in the Project Area is unlikely to fragment or isolate any suitable grey-headed flying-fox habitat given the high mobility of this species combined with the restricted extent of forecast vegetation loss.<br>(iii) The removal of vegetation in the Project Area is unlikely to have a significant impact on the long-term survival of the grey-headed flying-fox in the locality given that a local population of this species is unlikely to depend on the Project Area for either breeding or foraging. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |

| Test | |
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| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development constitutes a key threatening process (clearing of native vegetation) which is known to threaten grey-headed flying-fox. |
| Conclusion | The proposed development is unlikely to have an adverse impact on a local population of grey-headed flying-fox. The loss of <0.5 hectares of potential foraging habitat is unlikely to have an adverse impact on this species at the local scale. |

## Narrow-leaved black peppermint (*Eucalyptus nicholii*)

The narrow-leaved black peppermint is listed as vulnerable under both the NSW BC Act and the EPBC Act1999. It is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in the central portions of its range. It typically grows in dry grassy woodland, on shallow soils of slopes and ridges and occurs primarily on infertile soils derived from granite or metasedimentary rock. This species is planted as urban trees, windbreaks and corridors elsewhere in NSW. Several individuals have been planted in the Project Area.

| Test | |
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| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | The proposed development is unlikely to have an adverse effect on the life cycle of the narrow-leaved black peppermint such that a viable local population of this species is likely to be placed at risk of extinction. The planted individuals in the Project Area do not represent a viable local population. |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | NA |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) Planted individuals in the Project Area are likely to be removed as a result of the construction of the proposed development.<br>(ii) Vegetation removal in the Project Area is unlikely to fragment or isolate any areas of suitable habitat as no areas of suitable habitat are present in or adjacent to the Project Area.<br>(iii) The planted individuals in the Project Area that will be removed are not of importance for the long-term survival of the species in the locality. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development constitutes a key threatening process (clearing of native vegetation) which is known to threaten narrow-leaved black peppermint. |
| Conclusion | The proposed development is unlikely to have an adverse impact on narrow-leaved black peppermint. |

## Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Swamp oak floodplain forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is listed as an endangered ecological community under the NSW BC Act. This community occurs on the coastal floodplains of NSW and is associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. It has a dense to sparse tree layer in which swamp oak (*Casuarina glauca*) is the dominant species northwards from Bermagui. Other trees including lilly pilly (*Acmena smithii*), cheese trees (*Glochidion* spp) and paperbarks (*Melaleuca* spp) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. Tree diversity decreases with latitude, and *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter.

The current extent of swamp oak floodplain forest is likely to represent less than 30% of its original distribution range. Major occurrences include less than 350 ha on the Tweed lowlands; less than 650 ha on the lower Clarence floodplain; less than 400 ha on the lower Macleay floodplain; less than 3,200 ha in the lower Hunter - central Hunter region; less than 5,200 ha in the Sydney - South Coast region; and less than 1,000 ha in the Eden region.

No vegetation meeting criteria for classification as Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is present in the Project Area. A small (0.1 hectare) patch of Swamp Oak meeting criteria for the Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is located adjacent to the project area, and there is consequently potential for indirect impacts as a result of changes to hydrology.

| **Test** | |
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| Criteria | **a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
| Response | N/A |
| Criteria | **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction** |
| Response | (i) the proposed development is unlikely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction as no swamp oak floodplain forest will be removed. Indirect impacts may arise as a result of changes to the site hydrology, and consequently mitigation measures including fencing and maintenance of surface water flows are recommended to be employed to protect patches of this community immediately adjacent to and downslope of the south-east corner of the Project Area. These mitigation measures are outlined in Section 4.3.3.<br>(ii) the proposed development is unlikely to substantially and adversely modify the composition of the swamp oak floodplain forest in or adjacent to the Project Area such that its local occurrence is likely to be placed at risk of local extinction. No swamp oak floodplain forest will be removed, and due to past disturbance, the condition and extent of the remaining patch means that it is unlikely to be important for maintaining the local occurrence of the |

| Test | |
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| | community. Mitigation measures including fencing and surface water maintenance are to be employed to protect patches of this community immediately adjacent to and downslope of the south-east corner of the Project Area. These mitigation measures are outlined in Section 4.3.3. |
| Criteria | **c) in relation to the habitat of a threatened species or ecological community:**<br>**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and:**<br>**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**<br>**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| Response | (i) No swamp oak floodplain forest will be removed as a result of the proposed development. Potential impacts on swamp oak floodplain forest located immediately adjacent to the Project Area will be controlled via mitigation measures outline in Section 4.3.3.<br>(ii) No area of swamp oak floodplain forest is likely to become fragmented or isolated from another patch of habitat as a result of the proposed development as no vegetation which meets the criteria for classification under the NSW BC Act will be cleared.<br>(iii) No swamp oak floodplain forest will be removed as a result of the proposed development. |
| Criteria | **d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)** |
| Response | No declared areas of outstanding biodiversity value are present at or adjacent to the Project Area. |
| Criteria | **e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process** |
| Response | The proposed development constitutes a key threatening process (clearing of native vegetation) which however this would have no impacts on swamp oak floodplain forest. |
| Conclusion | The proposed development is unlikely to have an adverse impact on swamp oak floodplain forest. |

umwelt
Environmental & Social Consultants

**Newcastle**
75 York Street
Teralba NSW 2284

**Perth**
First Floor
12 Prowse Street
West Perth WA 6005
PO Box 783
West Perth WA 6872

**Canberra**
2/99 Northbourne Avenue
Turner ACT 2612
PO Box 6135
O'Connor ACT 2602

**Sydney**
50 York Street
Sydney NSW 2000

**Brisbane**
Level 13
500 Queen Street
Brisbane QLD 4000

**Orange**
Office 1
3 Hampden Street
Orange NSW 2800

T| 1300 793 267 E| info@umwelt.com.au www.umwelt.com.au