

# White Patch Esplanade - EPBC Act Self-Assessment

Moreton Bay Regional Council



Client

Red Fox Advisory / Moreton Bay  
Regional Council

Reference

J0210

**BASE/**

## Document Control

<b>Title</b>	White Patch Esplanade - EPBC Act Self-Assessment
<b>Address</b>	White Patch Esplanade – Bribie Island
<b>Job Number</b>	J0210
<b>Client</b>	Moreton Bay Regional Council

## Document Issue

<b>Issue</b>	<b>Date</b>	<b>Prepared By</b>	<b>Reviewed By</b>
REV 1	28/07/2022	JE/IW	MD

# Table of Contents

<b>1.0</b>	<b>Introduction</b>	<b>3</b>
1.1	Project Background	3
1.2	Purpose of this report	3
<b>2.0</b>	<b>Project Description</b>	<b>6</b>
<b>3.0</b>	<b>Matters of National Environmental Significance</b>	<b>7</b>
3.1	Overview	7
3.2	Desktop Assessment	7
3.2.1	Wetlands of International Importance (listed under the Ramsar Convention)	8
3.2.2	Threatened Ecological Communities	9
3.2.3	Conservation Significant Species	9
3.2.4	Listed Migratory Species	9
3.3	Field Assessment	13
3.3.1	Threatened Ecological Communities	13
3.3.2	Conservation Significant Flora	13
3.3.3	Observed Fauna Habitat	13
3.3.4	Conservation Significant Fauna - Likely to occur	13
3.3.5	Conservation Significant Fauna Which May Occur	13
3.3.6	Migratory Species	14
<b>4.0</b>	<b>Potential Impacts</b>	<b>20</b>
<b>5.0</b>	<b>MNES Impact Assessment</b>	<b>22</b>
5.1	Criteria	22
5.2	Wetlands of International Importance	23
5.3	Listed Threatened Species – Likely to Occur	25
5.4	Listed Threatened Species – May Occur	32
5.5	Migratory Species	50
<b>6.0</b>	<b>Conclusion</b>	<b>60</b>
<b>7.0</b>	<b>References</b>	<b>62</b>
<b>Appendix A</b>		<b>A</b>
	Option Design Layout	A
<b>Appendix B</b>		<b>B</b>
	Protected Matters Search	B
<b>Appendix C</b>		<b>C</b>
	Likelihood of Occurrence Assessment	C

## 1.0 Introduction

### 1.1 Project Background

The project is located on western side of Bribie Island at White Patch Esplanade approximately four kilometres north of the Bribie Island bridge. The road crosses Wrights Creek and acts as the solitary link between the community of White Patch to the north and the remainder of Bribie Island to the south. Bribie Island National Park adjoins the road to the northeast of the crossing. Pumicestone Passage is located to the west of the project and forms part of the greater Moreton Bay area. Refer to Figure 1 below.

Prior to the flood event in February 2022 the crossing consisted of a causeway with a series of steel pipes which allowed continuous tidal flow through to Wrights Creek. The flood event saw the washout of these pipes under the road along with the surrounding rock material and public utility services. A temporary road crossing was established in the same location composed of pipes with a combination of concrete and rock fill. The temporary crossing is currently in operation and open to traffic until the permanent structure is built.

An Ecological Assessment Report (EAR) and Review of Environmental Factors (REF) have previously been completed for the project.

### 1.2 Purpose of this report

Base Consulting Group (Base) was commissioned by Moreton Bay Regional Council through Red Fox Advisory to undertake a review the White Patch Esplanade Project against the requirements of the EPBC Act. Under the provisions of the EPBC Act, if a development proposal involves an action that is likely to result in a 'significant impact' on any MNES, the proposal must be referred to the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW). DCCEEW will then determine if the proposed action is 'a controlled action / not a controlled action' and further assessment and approval is required.

A significant impact under the EPBC Act (per the EPBC Act Matters of National Environmental Significance Significant Impact Guidelines 1.1) is defined as '*an impact which is important, notable, or of consequence, having regard to its context or intensity, whether or not an action is likely to have a significant impact depends upon the sensitivity value and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts*'.

The purpose of this report is to undertake an assessment of the project and its potential risks in accordance with the EPBC Act Matters of National Environmental Significance Significant Impact Guidelines 1.1.



**Figure 1: Site Context**

- Project Area
- State Controlled Roads
- Roads
- Railway Network
- Waterways and Drainage Features
- Local Government Areas
- Protected Nature Refuges Areas
- Protected Areas of Queensland
- State Route
- National Route

0 250 500 750 1,000 m

Scale @ A3: 1 : 30000  
 Date: 01/07/2022  
 Job: J0210  
 Drawn: Jack Caleo



DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources) 2022;  
 Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS,  
 AEX, Gainsmapping, Aerogrid, IGN, IGP, swisstopo, and the  
 GIS User Community, DATSP










**Figure 2: Project Area**



Scale @ A3: 1 : 1200  
 Date: 01/07/2022  
 Job: J0210  
 Drawn: Jack Caleo



DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources) 2022;  
 Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS,  
 AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the  
 GIS User Community, DATSP

-  Project Area
-  Roads
-  VM watercourse/drainage - 1:25 000
-  DCDB
-  Easement



## 2.0 Project Description

The project will see the design and construction of a new crossing structure across Wrights Creek. Options identified by the design team for the permanent structure include:

- Construction of a new causeway with larger culverts on the existing alignment of the road;
- Construction of a bridge on the existing alignment of the road;
- Construction of a new causeway with culverts on an off line alignment immediately to the west of the existing road; or
- Construction of a bridge structure on an off line alignment immediately to the west of the existing road.

Following an options analysis undertaken by the project team the offline bridge option has been deemed as the preferred structure. The project footprint (herein the "Project Area") for the purposes of this assessment relates to this option. For the offline option, the bridge will be constructed to the west of the existing crossing, with the existing causeway structure removed once the structure is complete. Although detailed design is yet to be completed, the footprint of the project in terms of footprint is well defined and unlikely to change significantly.

The concept design for the offline bridge structure is shown in Appendix A: Reference Design Layout.

## 3.0 Matters of National Environmental Significance

### 3.1 Overview

The EPBC Act protects the environment in relation to Matters of National Environmental Significance (MNES). Under the EPBC Act, if a development proposal involves an action that is likely to result in a significant impact on an MNES, the proposal must be referred to the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) (an EPBC controlled action Referral).

Under the EPBC Act, MNES are defined as:

- World Heritage properties.
- National Heritage places.
- Wetlands of International Importance (listed under the Ramsar Convention).
- Listed Threatened Species and Ecological Communities.
- Migratory Species protected under international agreements.
- Commonwealth Marine Environment.
- The Great Barrier Reef Marine Park.
- Nuclear Actions.
- a water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act also covers actions on, or impacting on, Commonwealth land or actions by Commonwealth agencies. It also covers Commonwealth heritage places outside Australia.

The MNES Significant Impact Guidelines 1.1 outlines the 'self-assessment' process, including detailed criteria, to assist persons in deciding whether or not referral may be required.

The following sections provide a summary description of the MNES values which were identified across the Project Area. This information was compiled following desktop and field verifying assessments which has been documented in Appendix B and Appendix C allowing this data to be utilised to inform the assessment against the various EPBC Act guidelines in section 5.0 of this report.

### 3.2 Desktop Assessment

A protected matters search was conducted over the subject property and surrounding 5 km radius (Appendix B) to identify the potential for MNES. Table 1 lists the outcomes of this search:

*Table 1 White Patch Esplanade EPBC Act Protected Matters Search Summary*

Matter of National Environmental Significance	Summary
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance	1
Great Barrier Reef Marine Park	None
Commonwealth Marine Land	None
Listed Threatened Ecological Communities	4
Listed Threatened Species	83
Listed Migratory Species	80



### **3.2.1 Wetlands of International Importance (listed under the Ramsar Convention)**

The EPBC Act Protected Matters Search Tool listed one (1) Wetland of International Importance (Ramsar) as potentially occurring within proximity of the site, being Moreton Bay. The Moreton Bay Ramsar Wetland is located adjacent to the Project Area and includes a section of Wrights Creek to the east (

Figure 3-1).

### 3.2.2 Threatened Ecological Communities

The EPBC Act Protected Matters Search Tool results listed four (4) Threatened Ecological Communities (TECs) as potentially occurring within the vicinity of the proposed project. These TECs are:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.
- Lowland Rainforest of Subtropical Australia.
- Subtropical and Temperate Coastal Saltmarsh.

### 3.2.3 Conservation Significant Species

The EPBC Act Protected Matters Search Tool (PMST) results listed 83 conservation significant flora and fauna species as potentially occurring within the vicinity of the proposed crossing structure at Wrights Creek. The results of the PMST were cross checked against data from the Queensland Wildlife Online data base. Furthermore, a likelihood of occurrence assessment was undertaken to determine which species were considered “likely to occur” or “may occur” within the Project Area; these species are listed below in Table 2. A full species likelihood assessment is outlined in Appendix C.

Table 2 Likelihood of Occurrence Summary

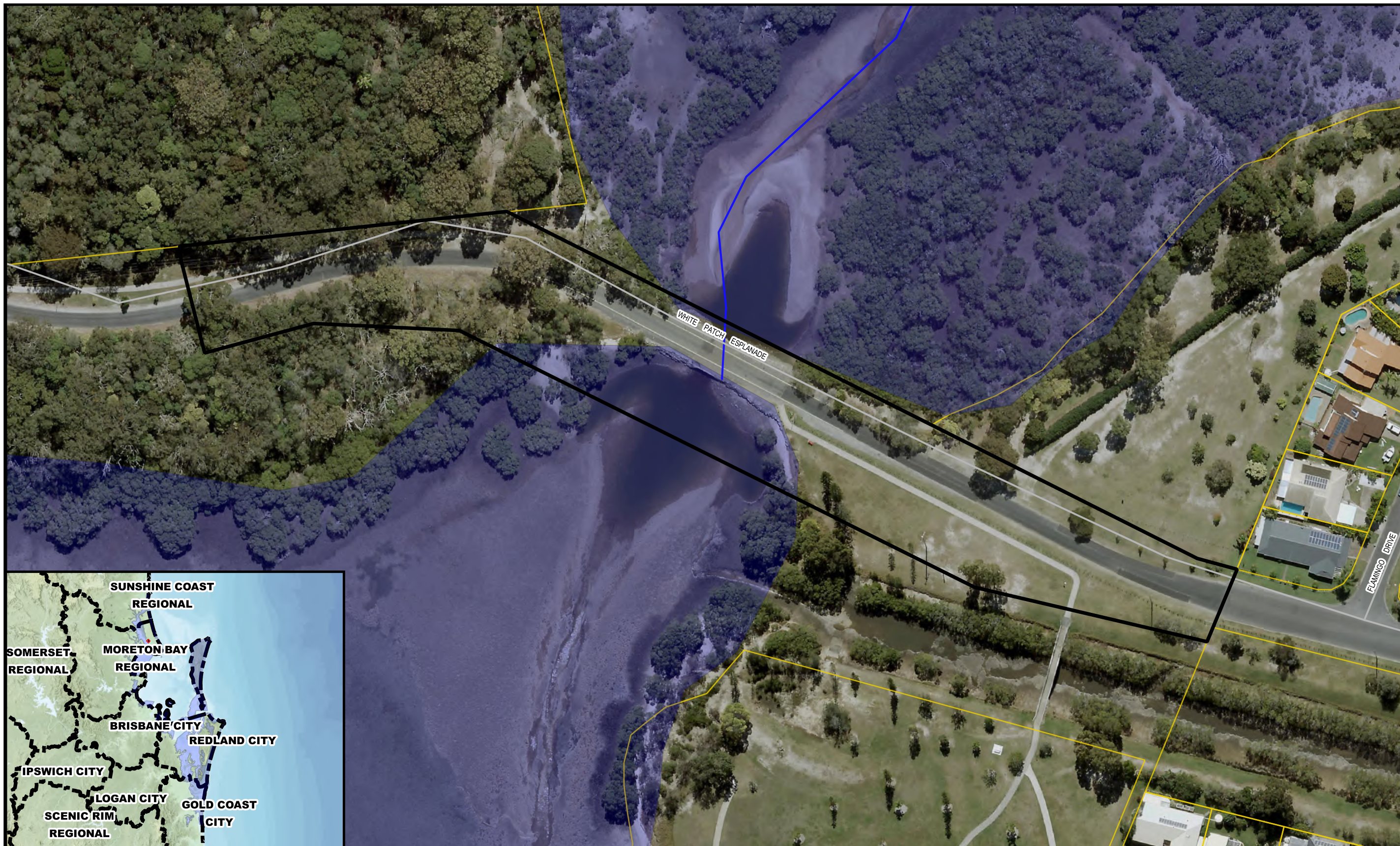
Value	Likelihood of Occurrence	
	Likely to Occur	May Occur
Conservation significant species	<ul style="list-style-type: none"> <li>• <i>Hirundapus caudacutus</i> (white-throated needletail) Vulnerable</li> <li>• <i>Numenius madagascariensis</i> (eastern curlew) Critically Endangered</li> <li>• <i>Pteropus poliocephalus</i> (grey-headed flying-fox) Vulnerable</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Calidris canutus</i> (red knot) Endangered</li> <li>• <i>Calidris ferruginea</i> (curlew sandpiper) Critically Endangered</li> <li>• <i>Calidris tenuirostris</i> (great knot) Endangered</li> <li>• <i>Charadrius leschenaultia</i> (greater sand plover) Vulnerable</li> <li>• <i>Charadrius mongolus</i> (lesser sand plover) Endangered</li> <li>• <i>Limosa lapponica baueri</i> (western Alaskan bar-tailed godwit) Vulnerable</li> <li>• <i>Phascolarctos cinereus</i> (koala) Endangered</li> <li>• <i>Xeromys myoides</i> (water mouse) Vulnerable</li> </ul>

### 3.2.4 Listed Migratory Species

A total of 80 Commonwealth listed migratory species are predicted to occur within a 5 km radius of the site, with 29 species listed as threatened. Of the 80 listed species six (6) are considered "likely to occur" at the site due to local suitable habitat, and a further eighteen (18) are considered to "may occur". These species have been categorised further into wetland and terrestrial migration enabling a significant residual impact assessment to be completed for each wetland migratory, marine migratory and terrestrial migratory (*Table 3*). A full species likelihood assessment is outlined in Appendix C.

Table 3 Likelihood of occurrence summary for migratory species

Likelihood of Occurrence					
Likely to Occur (marine)	Likely to Occur (terrestrial)	Likely to Occur (wetland)	May Occur (marine)	May Occur (terrestrial)	May Occur (wetland)
<ul style="list-style-type: none"> <li><i>Apus pacificus</i> (fork-tailed swift)</li> </ul>	<ul style="list-style-type: none"> <li><i>Cuculus optatus</i> (oriental cuckoo)</li> <li><i>Rhipidura rufifrons</i> (rufous fantail)</li> </ul>	<ul style="list-style-type: none"> <li><i>Limosa lapponica</i> (bar-tailed godwit)</li> <li><i>Numenius phaeopus</i> (whimbrel)</li> <li><i>Pluvialis fulva</i> (pacific golden plover)</li> </ul>	<ul style="list-style-type: none"> <li><i>Sternula albifrons</i> (little tern)</li> </ul>	<ul style="list-style-type: none"> <li><i>Monarcha melanopsis</i> (black-faced monarch)</li> <li><i>Monarcha trivirgatus</i> (spectacled monarch)</li> <li><i>Myiagra cyanoleuca</i> (satin flycatcher)</li> </ul>	<ul style="list-style-type: none"> <li><i>Calidris acuminata</i> (sharp-tailed sandpiper)</li> <li><i>Calidris falcinellus</i> (broad-billed sandpiper)</li> <li><i>Calidris ruficollis</i> (red-necked stint)</li> <li><i>Charadrius bicinctus</i> (double-banded plover)</li> <li><i>Charadrius veredus</i> (oriental plover)</li> <li><i>Limnodromus semipalmatus</i> (Asian dowitcher)</li> <li><i>Limosa limosa</i> (black-tailed godwit)</li> <li><i>Numenius minutus</i> (little curlew)</li> <li><i>Pandion haliaetus</i> (osprey)</li> <li><i>Pluvialis squatarola</i> (Grey Plover)</li> <li><i>Tringa brevipes</i> (grey-tailed tattler)</li> <li><i>Tringa nebularia</i> (common greenshank)</li> <li><i>Tringa stagnatilis</i> (marsh sandpiper)</li> <li><i>Xenus cinereus</i> (terek sandpiper)</li> </ul>



**Figure 3: RAMSAR Moreton Bay Wetland**

0 10 20 30 40 m

Scale @ A3: 1 : 1200  
 Date: 01/07/2022  
 Job: J0210  
 Drawn: Jack Caleo



DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources) 2022;  
 Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS,  
 AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the  
 GIS User Community, DATSP

- Project Area
- Roads
- VM watercourse/drainage - 1:25 000
- DCDB
- Easement
- Local Government Areas
- RAMSAR Moreton Bay Internationally Important Wetland

**BASE/**

### 3.3 Field Assessment

#### 3.3.1 Threatened Ecological Communities

A review of the Queensland *Vegetation Management Act 1999* Vegetation Management report found that no vegetation which match the TECs are mapped over the site. Field surveys confirmed that there were no listed TECs present within the surveyed area.

#### 3.3.2 Conservation Significant Flora

Flora surveys were conducted throughout the entirety of the Project Area; however, no conservation significant flora species were observed during the assessments. There was no suitable habitat identified within or around the Project Area for these species during field surveys.

#### 3.3.3 Observed Fauna Habitat

Field assessments identified four (4) unique fauna habitat types within the surveyed area (Figure 3-2). These habitat types will be referenced in the following sections of the report to ascertain the likelihood of significant residual impacts to fauna species. These habitat types are as follows:

- Eucalypt and Corymbia dominated open forest or woodland on sandy soils (0.18 ha)
- Grey mangrove low closed forest to shrubland (< 0.1 ha)
- Intertidal mudflats (0.12 ha)
- Non-remnant regrowth vegetation and mown park (0.93 ha)

#### 3.3.4 Conservation Significant Fauna - Likely to occur

##### *Hirundapus caudacutus* (white-throated needletail)

Records of the white-throated needletail exist within the surveyed area (Figure 3-3), although the species was not recorded during field assessment. The species is almost exclusively aerial, from heights of 1m up to more than 1000 m above the ground. The species may fly over the Project Area.

##### *Numenius madagascariensis* (eastern curlew)

Records of the eastern curlew exists within the Project Area; the most recent observation was recorded in 2017 from within the survey site and 2020 from the park immediately adjacent to the Project Area (Figure 3-3). Although this species was not recorded during field assessments suitable habitat is present as either low mangrove woodland for shelter habitat or a very small intertidal area potentially suitable for foraging.

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

Recent recorded occurrences for this species are noted from the southern portion of Bribie Island in 2012. Flying fox camp data suggests this species frequents the area with records indicating sightings at three nearby camps in 2021. No camps are noted within the Project Area; however, seasonal usage of canopy species blossoms is likely.

#### 3.3.5 Conservation Significant Fauna Which May Occur

##### *Calidris canutus* (red knot)

This species was recorded in 2018 within 1.2km of the Project Area (Figure 3-3). The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

##### *Calidris ferruginea* (curlew sandpiper)

Species was recorded in 2020 within 100m of the Project Area (Figure 3-3). The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

*Calidris tenuirostris* (great knot)

This species was recorded in 2020 within 700m of the Project Area (Figure 3-3). The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

*Charadrius leschenaultia* (greater sand plover)

This species was recorded in 2018 within 500m of the Project Area (Figure 3-3). The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

*Charadrius mongolus* (lesser sand plover)

This species was recorded in 2020 within 1.2km of the Project Area (Figure 3-3). The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

*Limosa lapponica baueri* (western Alaskan bar-tailed godwit)

This species was recorded in 1983 within the Project Area (Figure 5), the species was recorded within 500m of the surveyed area in 2016. The species was not recorded during field assessments although suitable foraging habitat (intertidal zone) is present.

*Phascolarctos cinereus* (koala)

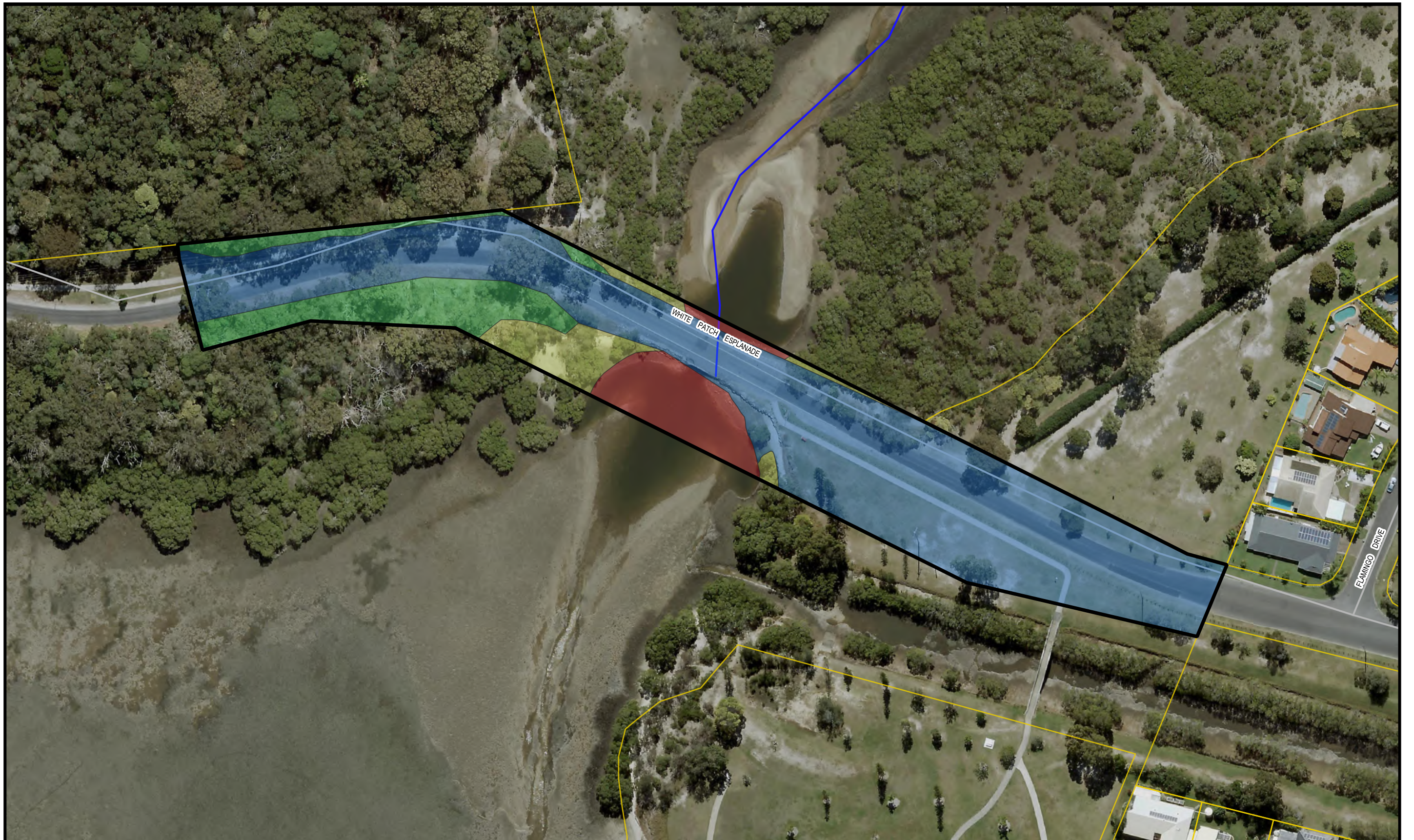
Koala habitat in the form of eucalypt dominated canopy species is present within the Project Area. A koala SAT survey was conducted within the Project Area along with the examination tree trunks for signs of koala usage. Koala usage was not confirmed within the Project Area. Recorded occurrences of this species on Bribie Island are few and with the exception of a skull record from 1965, records are undated.

*Xeromys myoides* (water mouse)

This species has been recorded on Bribie Island within 5 km of the Project Area. Surveys for nests and middens were conducted within and adjacent to the intertidal areas of the Project Area. Water mouse usage was not confirmed within the Project Area.

### **3.3.6 Migratory Species**

Several migratory species have been previously observed within or adjacent to the Project Area (Figure 3-4). No migratory species were recorded during field assessments although suitable foraging or roosting habitat is present. This includes the intertidal zone for migratory shorebirds and woodland vegetation (eucalypt or mangrove) for terrestrial migratory bird species. Wetland bird species were observed utilising the mudflats/banks adjacent to the Project Area at the time of field surveys.



**Figure 4: Fauna Habitat Types**

0 10 20 30 40 m

Scale @ A3: 1 : 1200  
 Date: 01/07/2022  
 Job: J0210  
 Drawn: Jack Caleo



DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources) 2022;  
 Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS,  
 AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the  
 GIS User Community, DATSP

Project Area

Roads

DCDB

Easement

VM watercourse/drainage - 1:25 000

**Fauna Habitat Types**

Eucalypt and Corymbia dominated open forest or woodland on sandy soils

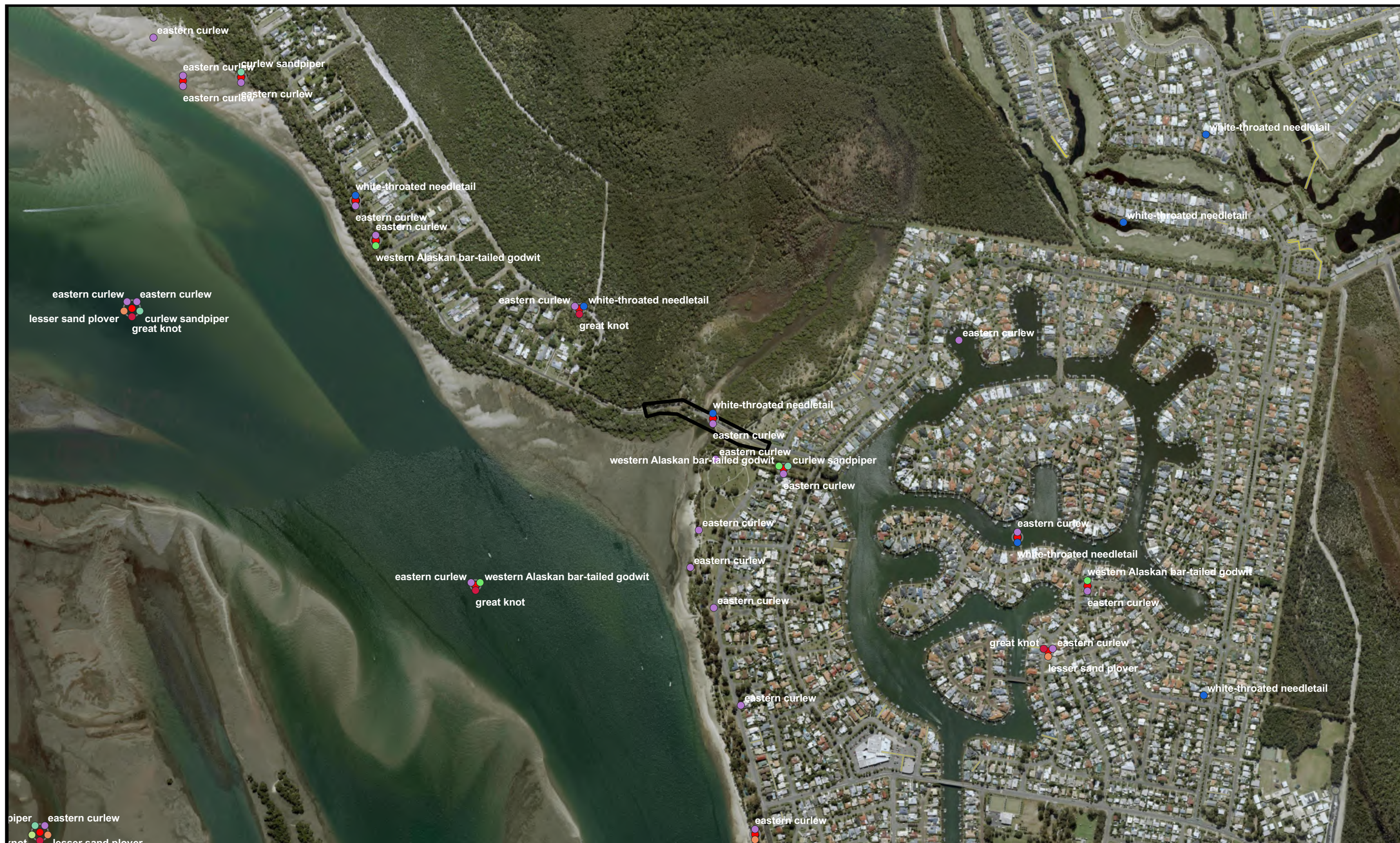
Grey mangrove low closed forest to shrubland

Intertidal mudflats

Non-remnant regrowth vegetation and mown park

**BASE/**





**Figure 5: EPBC Conservation Significant Species Records**

0 100 200 300 m

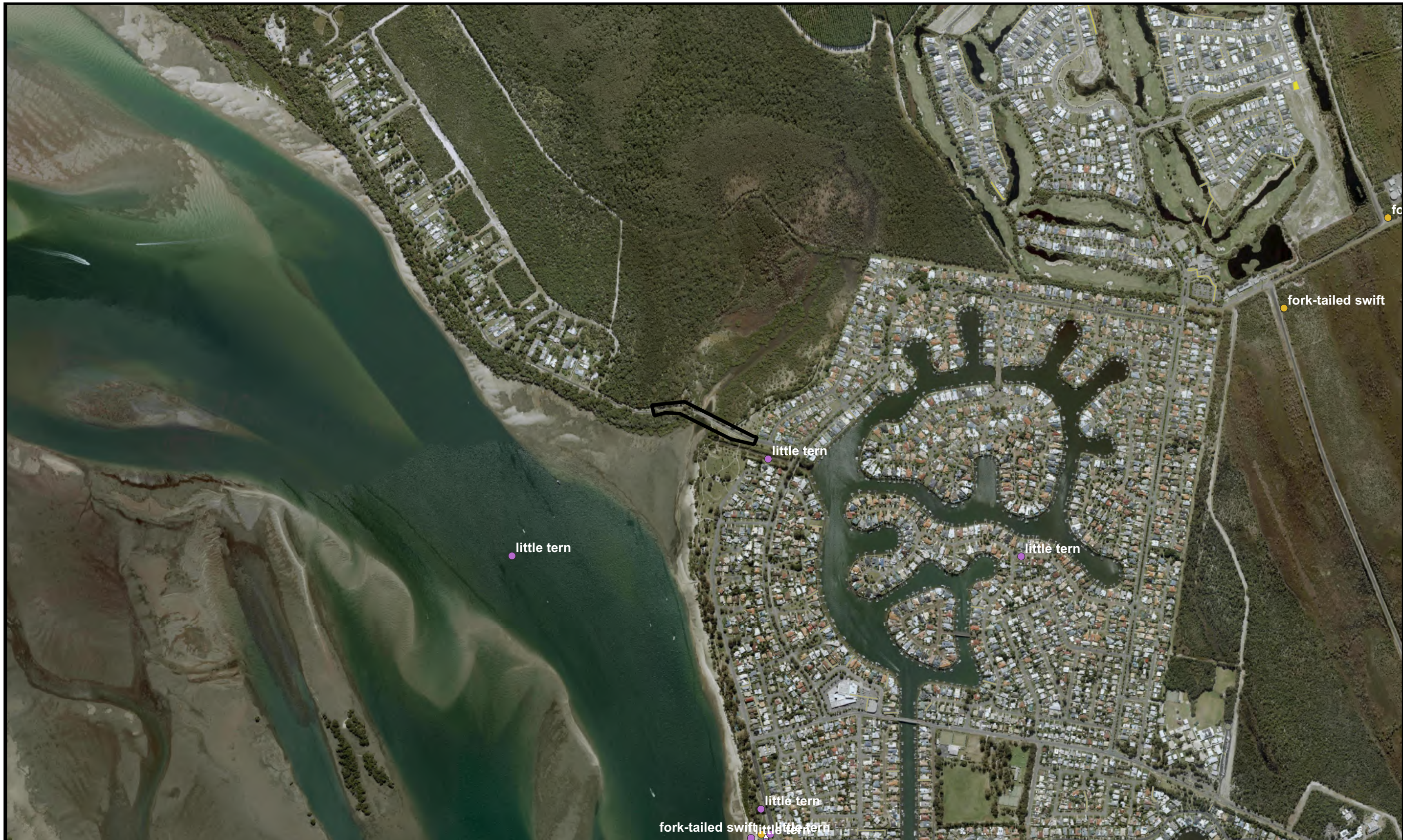
Scale @ A3: 1 : 10000  
 Date: 14/07/2022  
 Job: J0210  
 Drawn: Isaac Witten



DATA SOURCE:  
 QSPATIAL 2022:  
 The State of Queensland (Department of Resources)  
 2022: Esri, DigitalGlobe, GeoEye, i-cubed, USDA  
 FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,  
 swisstopo, and the GIS User Community, DATSIP

- Project Area
- EVNT Species**
- curlew sandpiper
- eastern curlew
- great knot
- greater sand plover
- grey-headed flying-fox
- koala
- lesser sand plover
- red knot
- western Alaskan bar-tailed godwit
- white-throated needletail





**Figure 6a: EPBC Migratory Species (Marine) Historic Records**

0 100 200 300 m

Scale @ A3: 1 : 12000  
 Date: 14/07/2022  
 Job: J0210  
 Drawn: Isaac Witten  
 DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources)  
 2022; Esri, DigitalGlobe, GeoEye, i-cubed, USDA  
 FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,  
 swisstopo, and the GIS User Community, DATSIP



Project Area

Marine Migratory Species

- fork-tailed swift
- little tern

**BASE/**



**Figure 6b: EPBC Migratory Species (Terrestrial) Historic Records**

0 100 200 300 m

Scale @ A3: 1 : 8000  
 Date: 14/07/2022  
 Job: J0210  
 Drawn: Isaac Witten  
 DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources)  
 2022; Esri, DigitalGlobe, GeoEye, i-cubed, USDA  
 FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,  
 swisstopo, and the GIS User Community, DATSIP



Project Area

Terrestrial Migratory Birds

- black-faced monarch
- oriental cuckoo
- rufous fantail
- satin flycatcher
- spectacled monarch

**BASE/**



**Figure 6c: EPBC Migratory Species (Wetland) Historic Records**

0 100 200 300 m

Scale @ A3: 1 : 8000  
 Date: 14/07/2022  
 Job: J0210  
 Drawn: Isaac Witten



DATA SOURCE:  
 OSPATIAL 2022;  
 The State of Queensland (Department of Resources)  
 2022; Esri, DigitalGlobe, GeoEye, i-cubed, USDA  
 FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,  
 swisstopo, and the GIS User Community, DATSIP

- |                                  |                      |                        |
|----------------------------------|----------------------|------------------------|
| Project Area                     | Common Greenshank    | Osprey                 |
| <b>Wetland Migratory Species</b> | Double-banded Plover | Pacific Golden Plover  |
| Asian dowitcher                  | Grey Plover          | Red-necked Stint       |
| Bar-tailed Godwit                | Grey-tailed Tattler  | Sharp-tailed Sandpiper |
| Black-tailed Godwit              | Little Curlew        | Terek Sandpiper        |
| Broad-billed Sandpiper           | Marsh Sandpiper      | Whimbrel               |
|                                  | Oriental Plover      |                        |



## 4.0 Potential Impacts

This section identifies the broad environmental factors and potential project risks which were considered as part of the MNES Impact Assessment in Section 5.0. The risks identified in Table 4 include both construction and final structure operation risks where applicable.

Table 4 - Potential Environmental Risks

Environmental Factor	Potential Environmental Impact
<b>Water</b> <i>Water Quality</i>	<p>Construction activities have the potential cause temporary increases in water pollutants if poorly managed. These include oil, grease, litter, sediment and heavy metals. Additionally concreting activities may impact pH if released.</p> <p>Following construction, water quality in the section of Wrights Creek upstream of the existing causeway is expected to improve due to increased tidal flushing reducing the potential for low dissolved oxygen or high nutrient conditions to occur.</p>
<b>Water</b> <i>Hydrology / hydraulics</i>	<p>The upgrade of the current structure will result in an improvement in tidal flushing in this section of Wrights Creek once completed and the existing structure is removed. During construction there is potential for temporary works to interfere with the tidal flow; however, this is not expected to be worse than the current causeway impacts on hydrology.</p>
<b>Water / Soils and Land</b> <i>Contamination</i>	<p>During construction there is potential for chemicals or fuels to be spilled. This has the potential to contaminate land and waterways and alter the pH of the receiving environments and harm nearby flora and fauna.</p>
<b>Soils and Land</b> <i>Erosion and Sediment Control</i>	<p>Exposure of soils particularly within construction work zones either side of Wrights Creek, drainage lines, or areas in which vegetation and soils have been disturbed may result in erosion and sedimentation from high winds, heavy rainfall or general construction activities.</p>
<b>Soils and Land</b> <i>Potential / Actual Acid Sulphate Soils</i>	<p>Construction activities have the potential to expose acid sulfate soil (ASS) within the project area, causing acidic water, aluminium and iron to mobilise into the surrounding environment. This may result in acidification of waterways, and corrosion of road structures.</p>
<b>Fauna</b> <i>Vegetation clearing</i>	<p>Vegetation clearing could lead to the loss of fauna habitat, diminished utilisation by migratory species or interruption of connectivity, preventing fauna passage between breeding, nesting or foraging habitat.</p>
<b>Fauna</b> <i>Collision / Alienation</i>	<p>General construction activities such as artificial lighting, noise, vibration, dust may create a nuisance for local fauna. Additionally clearing activities and plant and vehicle movement leading to injury through strikes, have the potential to impact on fauna.</p>
<b>Fauna</b> <i>Water Quality</i>	<p>Aquatic fauna and / or their habitats may be temporarily impacted by sediment discharged from the construction site into Wrights Creek.</p>
<b>Flora / Fauna</b> <i>Vegetation clearing</i>	<p>Vegetation clearing could lead to the loss of important microhabitat features such as leaf litter, hollows, shrubs and ground timber. It could also lead to the loss of food resources such as foliage, flowers, nectar, fruit and seeds.</p>
<b>Flora / Fauna</b> <i>Vegetation clearing</i>	<p>Clearing marine vegetation, to accommodate the new structure may temporarily reduce bank stability during construction.</p>
<b>Flora / Fauna</b> <i>Biosecurity</i>	<p>Project works have the potential to introduce weeds and pest species (eg fire ants) into the surrounding urban area or adjoining open space.</p>

To address these risks to the environment the project shall:

- Design the final structure to avoid impacting environmental aspects. Where this is unavoidable, the design shall minimise any impacts as much as possible.
- Undertake mitigation measures during the construction phase to minimise impacts on the environmental values of the site and surrounding areas.

- Develop a Construction Environmental Management Plan to address all environmental aspects relating to the project.
- Undertake rehabilitation of the site in areas that have been disturbed during construction and following the removal of the existing crossing.
- Offset the remaining environmental aspects that cannot be compensated onsite through the Queensland Offsets Policy eg marine plants.

## 5.0 MNES Impact Assessment

### 5.1 Criteria

Significant Impact Guidelines 1.1 provide over-arching guidance on determining whether an action is likely to have a significant impact on an MNES. The guidelines outline specific significant impact criteria to assist with deciding whether a referral may be warranted. Following the completion of the desktop and field investigations, matters listed under the EPBC Act which are relevant to this development include:

- Wetlands of International Importance (Moreton Bay).
- Threatened fauna species (likely to occur) – *Hirundapus caudacutus* (white-throated needletail) Vulnerable, *Numenius madagascariensis* (eastern curlew) Critically Endangered and *Pteropus poliocephalus* (grey-headed flying-fox) Vulnerable.
- Threatened fauna species (which may occur) – *Calidris canutus* (red knot) Endangered, *Calidris ferruginea* (curlew sandpiper) Critically Endangered, *Calidris tenuirostris* (great knot) Endangered, *Charadrius leschenaultia* (greater sand plover) Vulnerable, *Charadrius mongolus* (lesser sand plover) Endangered, *Limosa lapponica baueri* (western Alaskan bar-tailed godwit) Vulnerable, *Phascolarctos cinereus* (koala) Endangered, *Xeromys myoides* (water mouse) Vulnerable.
- Listed migratory species (multiple) – may and likely to occur.

The assessment of other matters has been undertaken against the specific criteria outlined in Table 5. An additional assessment of the koala has been undertaken in accordance with the 'EPBC Act referral guidelines for the endangered koala'.

Table 5 – MNES Assessment Criteria

MNES	Criteria
<p><b>Wetlands of International Importance</b> Moreton Bay</p>	<p>An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:</p> <ul style="list-style-type: none"> <li>• areas of the wetland being destroyed or substantially modified;</li> <li>• a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland;</li> <li>• the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected;</li> <li>• a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health; or</li> <li>• an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.</li> </ul>
<p><b>Threatened flora and fauna species</b> <b>Endangered or Vulnerable species</b></p>	<p>An action is likely to have a significant impact on an endangered or vulnerable species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• lead to a long-term decrease in the size of an important population of a species;</li> <li>• reduce the area of occupancy of an important population;</li> <li>• fragment an existing important population into two or more populations;</li> <li>• adversely affect habitat critical to the survival of a species;</li> <li>• disrupt the breeding cycle of an important population;</li> <li>• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;</li> </ul>

MNES	Criteria
	<ul style="list-style-type: none"> <li>• result in invasive species that are harmful to an endangered or vulnerable species becoming established in the species habitat;</li> <li>• introduce disease that may cause the species to decline; or</li> <li>• interfere substantially with the recovery of the species.</li> </ul>
<p><b>Listed migratory species</b></p> <p><b>Vulnerable species</b></p>	<p>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• 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</li> <li>• seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</li> </ul>

## 5.2 Wetlands of International Importance

The Moreton Bay Ramsar site was listed in 1993 and the site meets all nine criteria for the designation of wetlands of international importance, totalling 120,654 ha in area (DAWE, 2019). The Ramsar site is extremely varied containing both freshwater and estuarine features ranging from freshwater lakes and sedge swamps through to intertidal mudflats, seagrass beds and mangroves (DES, 2019). The intertidal zone in particular, provides valuable support for migratory species and nursery conditions for fish and crustaceans (DES, 2019). The site regularly supports more than 50,000 waterbirds, representing at least 43 species of shorebirds and at least 28 migratory shorebird species. (DoEE, 2018).

The Moreton Bay Ramsar site encompasses large parts of ocean fringing sand islands on the eastern edge which control waters and tributaries, like Pumicestone Passage, as well as intertidal and subtidal areas of the western and southern Bay. In addition, marine areas and sand banks within the central and northern Bay, and some ocean beach habitats are also incorporated (DoEE, 2018). The wetlands within the Moreton Bay Ramsar site are frequently subject to sedimentation, accretion and erosion, and hydrodynamic controls such as tidal inundation, freshwater flows and groundwater interaction (DoEE, 2018).

Water regime is variable across the Moreton Bay Ramsar site's diversity of wetland types. The coastal ocean to the east of Moreton Bay is dominated by the East Australian Current, whilst Moreton Bay is a wave-dominated estuary with semi-diurnal tides (DoEE, 2018). A sub-tropical climate delivers a distinct seasonal pattern of high summer rainfall with the potential for large runoff events followed by drier periods. During dry periods, regular clockwise water circulation occurs due to the position of the four entrances to the bay in association with the asymmetry of the flood and ebb tide flows. This can result in distinct event driven hydrology associated with ocean wave action or freshwater inflow (DoEE, 2018).

In the northern and eastern areas of the Bay, sediments are predominantly tidal delta sands. In the southern Bay, sediments are predominantly tidal delta sands with fluvial sands and muds adjacent to the mainland coast (DoEE, 2018). Salinity is variable across the wetland types within the Moreton Bay Ramsar site as are other water variables like dissolved oxygen. Generally, salinity is largely dependent on the type of wetland, the quantity and quality of flow and/or the wetlands location relative to the freshwater influence (DoEE, 2018). The distribution of mangrove and saltmarsh wetlands are influenced primarily by associated physical terrain, spatial position in the landscape and tidal inundation. Species composition of mangroves is often determined by salinity (DoEE, 2018).

The Project Area contains a small area of the Moreton Bay Ramsar site which occurs along Wrights Creek. The catchment area of Wrights Creek is approximately of 1574 ha which drains through six 1500 mm concrete pipes within the causeway at the entrance into Pumicestone Passage. In addition to being a drainage channel for overland flow, Wrights Creek at the Project Area is subject to a semi-diurnal tidal influence. Due to the tidal influence and presence of brackish or saline waters, the edges of Wrights' Creek are covered patches of mangrove, with the



intertidal zone west of the existing causeway composed of muddy / silty banks. The restricted diameter of the causeway pipes has created tidal scour on both sides of the causeway from high velocity water flow. Higher velocity has led to deepened pools which would have been shallow intertidal zones in the absence of the causeway. Restricted high velocity flows likely impact salinity, the nutrient composition and level of dissolved oxygen in Wrights Creek upstream of the causeway. It is also likely to impact fauna movement through these waters.

Table 6 Significant Impact Assessment – RAMSAR Wetlands of International Importance

EPBC Act RAMSAR Criteria – is there a real possibility that the Project will result in:	Assessment of Significance
<p>Areas of the wetland being destroyed or substantially modified?</p>	<p><b>No</b></p> <p>The site consists of an existing crossing in the form of a causeway and pipes that was established in 1970s. The project will see the construction of a new crossing immediately adjacent to the western side of the existing alignment but will also see the removal of the current infrastructure. This will see a net loss of 0.2 ha within the Ramsar wetland boundary. The removal of the existing infrastructure will provide the opportunity to add an additional 0.2 ha to the Ramsar wetland, once the old causeway is removed.</p> <p>The new infrastructure is likely to modify 0.2 ha of marine vegetation and intertidal mudflats. After construction however there will be an opportunity for regrowth on the banks when the existing crossing is removed adding approximately 0.2 ha of mangrove and intertidal habitat, balancing the creation of the new infrastructure.</p> <p>The area of Wrights Creek was modified when the original crossing was constructed. The installation of an updated crossing will see the opportunity for Wrights Creek to return to a condition closer to its original pre modified state.</p>
<p>A substantial and measurable change in the hydrological regime of the wetland?</p>	<p><b>No</b></p> <p>The portion of the Ramsar wetland within the Project Area is tidal and is the prime hydrological driver this section of Wrights Creek. In addition, 1594 ha Wrights’ Creek catchment does drain and exit through the Project Area. Large flood events that occasionally occur result in flows from outside of the Ramsar area to impact the Project Area at the causeway. The construction of the original causeway created a restricted flow along Wrights Creek which will be rectified through the new structure that will allow for a larger flow and is less of an impediment to tidal movement and flood events.</p> <p>Hydrological studies of the Project Area are yet to be completed; however, it is anticipated that increased tidal flushing will occur following the upgrade which will restore the original tidal regime of Wrights Creek.</p>
<p>The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected?</p>	<p><b>No</b></p> <p>Minor temporary impacts may occur during construction activities to the local fauna species associated with project works. A sediment silt curtain will be utilised to mitigate potential instream sediment disturbance. Temporary rock platform / structures will also be utilised in project construction. Temporary structures will be placed to limit any flow impediments and management / monitoring and treatment program will be utilised to analyse changes in water quality parameters within work zones. Tidal flow will not be significantly restricted, maintaining connectivity and allowing continual aquatic fauna movement.</p> <p>The final solution shall increase the opportunity for invertebrate fauna and fish species to utilise the area of Wrights Creek that is currently separated from</p>

EPBC Act RAMSAR Criteria – is there a real possibility that the Project will result in:	Assessment of Significance
	<p>the rest of Moreton Bay by the causeway. Increasing the size of the waterway opening and removal of pipes which currently act as the only connection will allow for a greater range of species to move into Wrights Creek. Additionally, the causeway presently inhibits the movement of benthic dwelling species between Wrights Creek and Pumicestone Passage. The construction of the bridge will allow for a continuous sand / mud flat to link under the structure and increase the opportunity of movement of a range of species and increase the area of usable habitat.</p>
<p>A substantial and measurable change in the water quality of the wetland?</p>	<p><b>No</b></p> <p>The water quality in Wrights Creek is influenced by tidal flow from Pumicestone Passage and to a lesser degree freshwater flow from wetlands on Bribie Island during large rain events.</p> <p>Increasing the waterway opening with the new structure will result in greater tidal flushing in Wrights Creek. This is likely to lead to an improvement in water quality with respect to increasing dissolved oxygen and the reduction of nutrients.</p> <p>Additionally, the current structure results in scouring of the bed either side of the causeway due to the velocity of water in the pipes. This results in resuspension of sediment and increased turbidity. It is unlikely this will occur with the new structure with reduced velocities during normal tidal flows compared the current pipe arrangement.</p>
<p>An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland?</p>	<p><b>No</b></p> <p>All material used in the construction of the road shall be sourced from licenced quarries and there is minimal potential for invasive species to occupy and spread through the wetland.</p> <p>During the construction phase there may be some initial disturbed areas which provide the opportunity for invasive species, however, with effective controls and management of invasive species this is unlikely to cause adverse effects to the ecological character of the RAMSAR wetland.</p>

### 5.3 Listed Threatened Species – Likely to Occur

#### *Hirundapus caudacutus* (white-throated needletail) Vulnerable

The white-throated needletail is wide spread in eastern and southern Australia and is species is mostly aerial, flying from heights of less than 1 m up to more than 1,000 m above the ground (Morcombe, 2000) (TSSC, 2019). Although this species occurs over most types of habitats, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (TSSC, 2019). Although considered aerial, this species roosts in trees amongst dense foliage in the canopy or in hollows (TSSC, 2019).

The white-throated needletail breeds in the northern hemisphere between late May to early June (northern summer) before flying south from August to the southern hemisphere, arriving in Australia from September onwards. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (ALA, 2022). While in Australia it has been recorded feeding on a range of insects (TSSC, 2019). This species may forage above the Project Area and opportunistically roost in the small hollows in tall trees. This species has a diverse foraging habitat requirement

and as a result, remnant and non-remnant areas within the Project Area may be considered as potential foraging habitat. Threats to the species include habitat loss and fragmentation, direct mortality from wind turbines / overhead wires and potential poisoning from organochlorines (insecticides).

There are no species-specific guidelines for determining habitat critical to the survival of the white-throated needletail and no recovery plan exists. Using the generic EPBC Act Significant Impact Guidelines 1.1 definition of habitat critical to survival; and based on the species highly mobile and aerial nature, the definition has not been met. Therefore, no habitat critical to the survival of the species is present within the Project Area.

'Important populations' of the white-throated needle tail are not identified in the SPRAT database (DAWE, 2022). Consequentially, any population potentially occurring within the Project Area has been assessed against the generic definition in the Significant Impact Guidelines 1.1. As the species does not breed in Australia, records are widely available within the region and the Project Area is not near the limit of the species range, no 'important populations' are expected to occur.

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 7. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the species, due to the absence of an important population in the Project Area and the limited clearing required for the Project.

Table 7 Significant impact assessment - *Hirundapus caudacutus* (white-throated needletail)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population of a species?	<p><b>No</b></p> <p>Foraging and opportunistic roosting habitat only was identified within / above the Project Area. This species forages aerially and can utilise highly diverse habitats, including remnant and non-remnant areas. The white-throated needletail has highly diverse habitat requirements and can disperse easily over large distances. Impacts to any population as a result of the Project would be negligible and no important populations are expected to occur within the Project Area.</p>
Reduce the area of occupancy of an important population?	<p><b>No</b></p> <p>The area of occupancy of the white-throated needletail has been estimated at 126,200 km<sup>2</sup> (DCCEE, 2022). The conservation advice has identified loss of habitat in the non-breeding range as a potential threat. This is based on loss of roosting sites in forest and woodland habitats and how loss of these habitats may result in reduction of invertebrate prey. Approximately 0.25 ha of woodland and mangrove habitat is mapped within the Project Area. The Project is not expected to significantly reduce roosting habitat or invertebrate prey to the extent that it would result in a reduction to the area of occupancy of the species. Further, no important populations are expected to occur within or above the Project Area.</p>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The species is highly mobile, predominantly aerial and limited vegetation clearing will occur as a result of the Project. Approximately 0.25 ha of woodland and mangrove habitat is mapped within the Project Area. No important populations are expected to occur within, above or adjacent to the Project Area and Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>The habitat within the Project Area was assessed against the generic EPBC Act Significant Impact Guidelines 1.1 definition of habitat critical to the survival of a species. Based on the ecological requirements of the species, it's mostly</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	aerial nature and high mobility, the definition has not been met and no habitat critical to the survival of the species is present within the Project Area.
Disrupt the breeding cycle of an important population?	<b>No</b> The white-throated needletail is a non-breeding visitor to Australia. As the species breeds in the northern hemisphere, the Project will not disrupt the breeding cycle of any population of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No</b> Some suitable foraging and roosting habitat occur within the Project Area. This species forages on insects aerially from 1 m to 1,000 m above the ground. Given the species large area of occupancy, extensive range and in light of the limited clearing, it is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	<b>No</b> No invasive species are known to be harmful to the white-throated needletail. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No</b> Disease has not been identified as a threat to the white-throated needletail.
Interfere with the recovery of the species?	<b>No</b> No recovery plan has been developed for this species. Conservation Advice identifies key threats and provides direction to mitigate threats and enable recovery. Key threats that have been identified including habitat loss and fragmentation, direct mortality and poisoning from insecticides. Approximately 0.25 ha of woodland and mangrove habitat is likely to be modified, direct mortality from the Project is unlikely and insecticides are not required. Consequentially, the Project is not expected to significantly increase threats to the species to the extent that it will interfere with the recovery of the species.

*Numenius madagascariensis* (eastern curlew) Critically Endangered

The eastern curlew is the largest migratory shorebird in the world and within Australia has a largely coastal distribution (Morcombe, 2000). This species breeds Russia, Mongolia and China and spends the non-breeding season (generally from September to March-April) in Australia (DoE, 2015). During time in Australia this species is commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (DoE, 2015). This species is infrequently associated with ocean beaches, and coral reefs, rock platforms, rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves (DoE, 2015).

Whilst in Australia this species mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline (DoE, 2015) (Marchant & Higgins, 1993). Roosting occurs during high tide on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves (DoE, 2015). The eastern curlew is carnivorous

in the non-breeding season and studies in Moreton Bay found three species of intertidal decapod dominated the diet: soldier crabs (*Myctryris longicarpus*), sentinel crabs (*Macrophthalmus crassipes*) and ghost-shrimps (*Trypea australiensis*) (Zharikov & Skilleter, 2004).

Threats in Australia, especially eastern and southern Australia, include ongoing human disturbance, habitat loss and degradation from pollution, changes to the water regime and invasive plants (DoE, 2015).

The eastern curlew has previously been recorded from the Project Area, and scattered records occur from the surrounding area. This species may use the intertidal zone predominately covered in mangroves for roosting; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the eastern curlew. Therefore, the generic EPBC Act Significant Impact Guidelines 1.1 definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on soft sheltered intertidal sandflats or mudflats and may roost among coastal vegetation including mangroves. These preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 8. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the eastern curlew. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the eastern curlew becoming established.

Table 8 Significant impact assessment - *Numenius madagascariensis* (eastern curlew)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging preferences for this species are associated with soft sheltered intertidal sandflats or mudflats, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting may occur in mangroves; however, this species prefers sandy spits, sandbars or islets when at rest. It is estimated that 0.08 ha of mangroves may be modified for this project. Therefore, impacts to any population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of the species?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 8,500 km<sup>2</sup> but may be decreasing (DoE, 2015). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The eastern curlew is highly mobile and limited mangrove clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the eastern curlew. Therefore, the generic EPBC Act Significant Impact Guidelines 1.1 definition of habitat critical to the survival of a species</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	has been applied. Non-breeding birds preferentially feed on soft sheltered intertidal sandflats or mudflats and may roost among coastal vegetation including mangroves. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat are estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population?	<b>No</b> The eastern curlew does not breed in Australia. As the species breeds in Russia, Mongolia and China, the Project will not disrupt the breeding cycle of any population of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No</b> Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging on soft sheltered intertidal sandflats or mudflats, open and without vegetation; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs during high tide on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and occasionally among mangroves. Mangroves are present and it is estimated that 0.08 ha of this vegetation may be removed for the Project. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat?	<b>No</b> Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No</b> Disease has not been identified as a threat to the eastern curlew
Interfere with the recovery of the species?	<b>No</b> No recovery plan has been developed for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified including ongoing human disturbance, habitat loss and degradation from pollution, changes to the water regime and invasive plants. The project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.

*Pteropus poliocephalus* (grey-headed flying fox) Vulnerable

The grey-headed flying-fox generally occurs along the coastal fringe from Bundaberg in Queensland to west of Melbourne in Victoria (Cronin, 2008) (DAWE, 2021). However, as the species selectively forages where food is available, only a small proportion of this range is used at any one time. As a consequence, distribution and abundance can vary widely dependant on season (DCCEEW, 2022). At a local scale, the species is generally

present intermittently and irregularly (Eby & Lunney, 2002). At a regional scale, broad trends in the distribution of plants with similar flowering and fruiting times support regular annual cycles of migration (Eby & Lunney, 2002).

The grey-headed flying-fox requires foraging resources and roosting sites. This species is a canopy-feeding frugivore and nectarivore, utilising a diversity of vegetation communities as well as commercial fruit crops and on introduced tree species in urban areas. The primary food source is native blossom from *Eucalyptus* and related genera but in some areas, it also utilises a wide range of rainforest fruits (DCCEEW, 2022). Continuous foraging resources throughout the year are rare and as result, the species migrates in response to changes in the amount and location of flowering (DCCEEW, 2022). Grey-headed flying-foxes commute daily to foraging areas, usually within 15 km of the day roost site (DCCEEW, 2022); however, may travel up to 50 km in a night to different feeding areas (Australian Museum, 2020).

This species may forage within the Project Area and opportunistically roost in the canopy trees, though no known regular roosts are found within the Project Area. A flying-fox camp is found 2.5 km south of the Project Area at Clayton Park, Bellara (on Bribie Island) and grey-headed flying-foxes have been regularly recorded at this camp as recently as February 2022. Approximately 0.2 ha of foraging habitat for this species is mapped within the Project Area.

Habitat critical to the survival of the grey-headed flying-fox is considered to be winter and spring flowering vegetation including several species observed within the Project Area: *Eucalyptus tereticornis*, *Melaleuca quinquenervia* and *Banksia* species (DAWE, 2021). Therefore, the canopy trees within the Project Area are considered to be habitat critical to the survival of the species.

The National Recovery Plan for the Grey-headed Flying-fox (DAWE, 2021) does not identify 'important populations'; rather suggests the population is a single, mobile population with individuals across five states from Queensland down to Tasmania and South Australia. As records are widely available within the region, the Project Area does not contain a known roost nor is it near the limit of the species range, no 'important populations' are expected to occur.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 9. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the species. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the grey-headed flying-fox becoming established.

Table 9 Significant impact assessment – *Pteropus poliocephalus* (grey-headed flying-fox)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population of a species?	<p><b>No</b></p> <p>Foraging habitat only, was identified within the Project Area. Grey-headed flying-foxes commute daily to foraging areas, usually within 15 km of the day roost site. Previous studies of movements of the species in northern New South Wales and southern Queensland have indicated that various seasonal movements occur among camps. As grey-headed flying-foxes are not restricted in their dispersal ability and they regularly move between foraging areas, impacts to any population as a result of the Project would be negligible and no important populations are expected to occur within the Project Area.</p>
Reduce the area of occupancy of an important population?	<p><b>No</b></p> <p>The area of occupancy is not known for this species. Approximately 0.2 ha of foraging habitat for this species is mapped within the Project Area. Due to the absence of roosts within the Project Area and the limited amount of clearing required, it is unlikely that the Project will result in a reduction to the area of occupancy of the species. Further, no important populations are expected to occur within or above the Project Area.</p>

<b>EPBC Act Criteria – is there a real possibility that the Project will:</b>	<b>Assessment of Significance</b>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The species is highly mobile and limited vegetation clearing will occur as a result of the Project. No important populations are expected to occur within the Project Area and Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>Flowering tree species during spring is considered habitat critical to the survival of the species. Approximately 0.2 ha of foraging habitat for this species is mapped within the Project Area. The proposed action will not impact on roosting habitat for this species. Grey-headed flying-fox presence is dependent on food resources, and sites noted as important in one year or period may not be visited again in the following year. Based on this and the limited amount of clearing (maximum 0.2 ha of suitable habitat) that will occur as a result of the Project, it is unlikely that the Project will adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population?	<p><b>No</b></p> <p>Mating occurs in early autumn, after which time the larger camps begin to break up, reforming in late spring/early summer, as food resources become more abundant. Males and females segregate in October when females usually give birth. Fauna spotter catchers during clearing activities, particularly during these seasons, will ensure disruptions to this species are reduced. The closest known camp is located 2.5 km south from the Project Area at Bellara. Noise associated with construction/operation of the Project is not anticipated to have a significant impact on known roost sites. Impacts to any population as a result of the Project would be negligible and no important populations are expected to occur within the Project Area.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Some suitable foraging habitat occurs within the Project Area, but no roosting camps were identified. Given the species large area of occupancy, extensive range and in light of the limited clearing impacts, it is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	<p><b>No</b></p> <p>No invasive species are known to be harmful to the grey-headed flying-fox. Management actions will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Introduce disease that may cause the species to decline?	<p><b>No</b></p> <p>Disease has not been identified as a threat to the grey-headed flying-fox.</p>



EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Interfere with the recovery of the species?	<p><b>No</b></p> <p>A recovery plan has been developed for this species. Key threats that have been identified including habitat loss and fragmentation, exploitation, competition and hybridisation, and pollutants and electrocution. Recovery objectives include protecting and increasing foraging and roosting habitat, define patterns of landscape use, increase public awareness and improve management of human interactions, develop non-destructive methods for crop protection and reducing impacts from electrocution. Mitigation measures will be developed to reduce impacts to potential habitat and this species on site. The Project is not expected to significantly increase threats to the species to the extent that it will interfere with the recovery of the species.</p>

## 5.4 Listed Threatened Species – May Occur

### Calidris canutus (red knot) Endangered

The red knot is a small to medium sized migratory shorebird which has a large distribution worldwide and particularly Australia. This species breeds in the northern hemisphere mainly Siberia and Alaska and the majority of the population spends the non-breeding season within Australia (Bamford, et al., 2008). The red knot mainly inhabits 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. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (Higgins & Davies, 1996). This species roosts on sandy beaches, spits and islets, and mudflats (Higgins & Davies, 1996). The red knot regularly feeds on worms, bivalves, gastropods, crustaceans and echinoderms, however in Australia predominately forage on shellfish (Higgins & Davies, 1996) (Piersma, et al., 1998).

Threats in Australia include habitat loss, habitat degradation, pollution, changes to the water regime, invasive plants, over-exploitation of shellfish, avian influenza and climate change impacts (DoE, 2015).

The red knot has previously been recorded from the Project Area, and scattered records occur from the surrounding area. This species may use the intertidal zone for foraging and roosting; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the red knot. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on soft sheltered intertidal sandflats or mudflats and may roost on sandy beaches, islets and mudflats. These preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 10. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the red knot. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the red knot becoming established.

Table 10 Significant Impact Assessment – *Calidris canutus (red knot)*

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of soft substrates near the edge</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	of water on the intertidal mudflats or sandflats, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting occurs on sandy beaches, spits, islets and mudflats when at rest. A total loss of minimal foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of a population and impacts to any population as a result of the Project would be negligible.
Reduce the area of occupancy of the species?	<b>No</b> The area of occupancy for this species across Australia is estimated at 6,800 km <sup>2</sup> but may be decreasing (Garnett, et al., 2011). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations?	<b>No</b> The red knot is highly mobile and limited foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. Project activities would not result in dispersal challenges for any population that may exist.
Adversely affect habitat critical to the survival of a species?	<b>No</b> There are no species-specific guidelines for determining habitat critical to the survival of the red knot. Therefore, the generic <i>EPBC Act Significant Impact Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on intertidal mudflats, sandflats and sandy beaches of sheltered coasts without vegetation and rarely use freshwater swamps and generally roosts in sandy beaches, spits, islets and mudflats. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat is estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population?	<b>No</b> The red knot does not breed in Australia. As the species breeds in Siberia and Alaska, the Project will not disrupt the breeding cycle of any population of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No</b> Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging on intertidal mudflats, sandflats and sandy beaches of sheltered coasts without vegetation and rarely use freshwater swamps; however, due to tidal scouring this type of foraging habitat is minimal. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species	<b>No</b> Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
becoming established in the endangered or critically endangered species' habitat?	and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No</b> Avian influenza has been identified as a threat to the species. Activities associated with project are unlikely to introduce this disease to the Project Area. Management actions will be undertaken to reduce the risk of spreading any pathogens through Project activities. Control efforts will be increased in areas particularly sensitive, however, the Project is unlikely to introduce diseases that may cause the species to decline.
Interfere with the recovery of the species?	<b>No</b> There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified including ongoing human disturbance, habitat loss and habitat degradation, pollution, changes to the water regime, invasive plants, over-exploitation of shellfish, hunting, disease and climate change. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.

*Calidris ferruginea* (curlew sandpiper) Critically Endangered

The curlew sandpiper is a small, slim sized migratory shorebird which has a large distribution worldwide and particularly Australia. This species is restricted to breeding in the Russian Arctic and spends the non-breeding season within Australia, Africa, Malaysia and China (Higgins & Davies, 1996). The curlew sandpiper mainly inhabits intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters (Higgins & Davies, 1996). The species generally roosts on bare dry shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and have been recorded within mangroves. In Australia, the curlew sandpiper regularly feeds on invertebrates including worms, molluscs, crustaceans and insects, as well as seeds, however they do forage on shrimp, crabs and small fish (Higgins & Davies, 1996).

Threats in Australia, especially eastern and southern Australia, include ongoing human disturbances, habitat loss and degradation from pollution, changes to the water regime and invasive plants (DoE, 2015).

The curlew sandpiper has previously been recorded from the Project Area, and scattered records occur from the surrounding area. This species may use the intertidal zone predominately covered in mangroves for roosting; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the curlew sandpiper. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on intertidal mudflats in sheltered coastal areas and may roost on bare dry shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands and have been recorded within mangroves. These preferential foraging and roosting

areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 11. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the curlew sandpiper. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the curlew sandpiper becoming established.

Table 11 Significant Impact Assessment – *Calidris ferruginea* (curlew sandpiper)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of mainly intertidal mudflats in sheltered coastal areas, of which these areas are greatly diminished due to tidal scour associated with the existing causeway and less often inland mudflats around ephemeral and permanent water. Roosting may occur in mangroves; however, this species prefers bare dry sandy beaches, sandspits, islets when at rest. It is estimated that 0.08 ha of mangroves may be modified for this project. A total loss of minimal foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of a population and impacts to any population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of the species?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 6,800 km<sup>2</sup> (DoE, 2015). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing population into two or more populations?	<p><b>No</b></p> <p>The curlew sandpiper is highly mobile and limited mangrove and foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the curlew sandpiper. Therefore, the generic <i>EPBC Act Significant Impact Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on intertidal mudflats in sheltered coastal areas and generally roosts in sandy beaches, spits, islets and mudflats and may roost among coastal vegetation including mangroves. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat are estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population?	<p><b>No</b></p> <p>The curlew sandpiper does not breed in Australian. As the species is restricted to breeding in Russia, the Project will not disrupt the breeding cycle of any population of this species.</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging on intertidal mudflats in sheltered coastal areas, and less often inland mudflats around ephemeral and permanent water sources; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs bare dry shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands and occasionally among mangroves. Mangroves are present and it is estimated that 0.08 ha of this vegetation may be removed for the Project. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	<p><b>No</b></p> <p>Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Introduce disease that may cause the species to decline?	<p><b>No</b></p> <p>There are no observed introduced diseases that are harmful to the species. Therefore, the Project is unlikely to introduced diseases which may cause the species to decline.</p>
Interfere with the recovery of the species?	<p><b>No</b></p> <p>There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified including ongoing human disturbance, habitat loss and habitat degradation, pollution, changes to the water regime, invasive plants. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.</p>

*Calidris tenuirostris* (great knot) Endangered

The great knot is a medium sized shorebird which has a large distribution worldwide, particularly Australia. This species undertakes biannual migrations to the northern hemisphere where it breeds in the northeast Siberia and far northeast Russia and most of the population spends the winter non-breeding season (generally between August and September) along the northern coasts of Australia. The great knot mainly inhabits sheltered coastal habitats with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The species rarely occurs on inland lakes and swamps (Higgins & Davies 1996; del Hoya, et al., 1996; Rodgers, et al., 2006). The species generally roosts in large groups in open areas, often at the water's edge or in shallow water close to feeding grounds (Higgins & Davies, 1996). The

great knot regularly feeds on invertebrates including bivalves, gastropods, crustaceans and other invertebrates (Higgins and Davies 1996; Moores, 2006; Garnett et al. 2011).

Threats in Australia include mangrove encroachment, habitat loss and degradation from pollution, changes to the water regime and invasive plants, (DoE, 2015).

The great knot has previously been recorded adjacent to the Project Area, and scattered records occur from the surrounding area. This species may use the intertidal zone predominately covered in mangroves for foraging; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the great knot. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on sheltered coastal habitats with large intertidal mudflats or sandflats and generally roosts in large groups in open areas, often at the water's edge or in shallow water close to feeding grounds. These preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 12. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the great knot. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the great knot becoming established.

Table 12 Significant Impact Assessment – *Calidris tenuirostris* (great knot)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of mainly sheltered coastal habitats with large intertidal mudflats or sandflats, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting occurs in large groups in open areas, often at the water's edge or in shallow water close to feeding grounds when at rest. It is estimated that 0.08 ha of mangroves may be modified for this project which is potential foraging habitat for this species amongst mudflats and sandflats. A total loss of minimal foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of a population and impacts to any population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of the species?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 2,800 km<sup>2</sup> (Garnett, et al., 2011). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing population into two or more populations?	<p><b>No</b></p> <p>The great knot is highly mobile and limited mangrove and foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the great knot. Therefore, the generic <i>EPBC Act Significant Impact</i></p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	<p><i>Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially feed on sheltered coastal habitats with large intertidal mudflats or sandflats and generally roosts in large groups in open areas, often at the water's edge or in shallow water close to feeding grounds. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat are estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population?	<p><b>No</b></p> <p>The great knot does not breed in Australian. As the species breeds in northeast Siberia and far northeast Russia, the Project will not disrupt the breeding cycle of any population of this species.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging on sheltered coastal habitats with large intertidal mudflats or sandflats; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs in open areas, often at the water's edge or in shallow water close to feeding grounds. Mangroves are present and provide foraging habitat and it is estimated that 0.08 ha of this vegetation may be removed for the Project. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	<p><b>No</b></p> <p>Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Introduce disease that may cause the species to decline?	<p><b>No</b></p> <p>There are no observed introduced diseases that are harmful to the species. Therefore, the Project is unlikely to introduced diseases which may cause the species to decline.</p>
Interfere with the recovery of the species?	<p><b>No</b></p> <p>There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified include habitat loss and degradation from pollution, changes to the water regime and invasive plants. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.</p>

*Charadrius leschenaultia* (greater sand plover) Vulnerable

The greater sand plover is a small to medium sized migratory shorebird that has a large distribution worldwide and particularly Australasia. This species undertakes annual migrations to the northern hemisphere where it breeds in Mongolia, north western China and southern Siberia and spends the non-breeding season (generally between July and November) almost entirely along the coasts of Australia (del Hoyo et al. 1996; BirdLife, 2015). The greater sand plover is entirely coastal, mainly inhabiting littoral and estuarine habitats. This species occurs on sheltered sandy, shelly or muddy beaches, large intertidal mudflats, sandbanks, salt-marshes, estuaries, coral reefs, rocky islands rock platforms, tidal lagoons and dunes near the coast (Marchant & Higgins 1993; del Hoyo et al. 1996; BirdLife 2015). The species generally roosts on sand-spits and banks on beaches or in tidal lagoons (Marchant & Higgins 1993). During the non-breeding season, the greater sand plover regularly feeds on molluscs, worms, crustaceans (especially small crabs and sometimes shrimps) and insects (including adults and larvae of termites, beetles, weevils, earwigs and ants) (Marchant & Higgins 1993; Jessop, 2003; del Hoyo et al. 1996; BirdLife 2015).

Threats in Australia include ongoing human disturbance, habitat loss and degradation from pollution, changes to water regime and invasive plants (DoE, 2015).

The greater sand plover has previously been recorded from scattered records from the surrounding area. This species may use the intertidal zone for foraging and roosting; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the greater sand plover. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage from the surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries and generally roosts on sand-spits and banks on beaches or in tidal lagoons. These preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

'Important populations' of the greater sand plover are not identified in the SPRAT database (DAWE, 2022). Consequentially, any population potentially occurring within the Project Area has been assessed against the generic definition in the Significant Impact Guidelines 1.1. As the species does not breed in Australia, records are widely available within the region and the Project Area is not near the limit of the species range, no 'important populations' are expected to occur.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 13. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the greater sand plover. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the greater sand plover becoming established.

Table 13 Significant Impact Assessment – *Charadrius leschenaultii* (greater sand plover)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of mainly surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting occurs on sand-spits and banks on beaches or in tidal lagoons when at rest. A loss of foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of an important population and impacts to any important population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of an important population?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 2,600 km<sup>2</sup> and is stable (Garnett, et al., 2011). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within</p>



EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species. In addition, no important populations are expected to occur within the Project Area.
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The greater sand plover is highly mobile and limited foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. No important populations are expected to occur within the Project Area and project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the greater sand plover. Therefore, the generic <i>EPBC Act Significant Impact Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage from the surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries and generally roosts on sand-spits and banks on beaches or in tidal lagoons. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat are estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population?	<p><b>No</b></p> <p>The greater sand plover does not breed in Australian. As the species breeds in Mongolia, north western China and southern Siberia, the Project will not disrupt the breeding cycle of any population of this species.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging from the surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs in sand-spits and banks on beaches or in tidal lagoons. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	<p><b>No</b></p> <p>Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Introduce disease that may cause the species to decline?	<p><b>No</b></p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	There are no observed introduced diseases that are harmful to the species. Therefore, the Project is unlikely to introduced diseases which may cause the species to decline.
Interfere with the recovery of the species?	<p><b>No</b></p> <p>There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions and direction to mitigate against key threats. Key threats that have been identified including habitat loss and degradation from pollution, altered water regime and invasive plants. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.</p>

Charadrius mongolus (lesser sand plover) Endangered

The lesser sand plover is a small to medium sized migratory shorebird that has an extremely large distribution worldwide and particularly Australasia. This species undertakes annual migrations southward from breeding grounds in the northern hemisphere. The species spends the non-breeding season (generally the austral summer) along the coasts of Australia (del Hoyo et al. 1996; BirdLife 2015). The lesser sand plover is strictly coastal, preferring sandy beaches, mudflats of coastal bays and estuaries, sand-flats and dunes near the coast (del Hoyo et al. 1996) and occasionally frequenting mangrove mudflats in Australia (BirdLife 2015). The species generally roosts near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs (Marchant & Higgins 1993). During the non-breeding season, the lesser sand plover regularly feeds on insects, crustaceans (especially crabs and amphipods), molluscs (especially bivalves) and polychaete worms (Marchant and Higgins 1993; Garnett et al. 2011; BirdLife 2015).

Threats in Australia include ongoing human disturbance, habitat loss and degradation from pollution, changes to the water regime and invasive plants (DoE, 2015).

The lesser sand plover has previously been recorded in scattered records occurring from the surrounding area. This species may use the intertidal zone predominately covered in mangroves for foraging; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the lesser sand plover. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage on extensive, freshly exposed areas of intertidal sandflats and mudflats in estuaries or beaches and generally roosts near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs. Very small areas of these preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 14. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the lesser sand plover. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the lesser sand plover becoming established.

Table 14 Significant Impact Assessment – *Charadrius mongolus* (lesser sand plover)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of extensive, freshly exposed areas of intertidal sandflats and mudflats in estuaries or beaches, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting occurs on or near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs when at rest. It is estimated that 0.08 ha of mangroves may be modified for this project. A total loss of minimal foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of a population and impacts to any population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of the species?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 2,600 km<sup>2</sup> and stable (Garnett et al., 2011). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing population into two or more populations?	<p><b>No</b></p> <p>The lesser sand plover is highly mobile and limited foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the lesser sand plover. Therefore, the generic <i>EPBC Act Significant Impact Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage extensive, freshly exposed areas of intertidal sandflats and mudflats in estuaries or beaches and generally roosts near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs. Small areas foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat are estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population?	<p><b>No</b></p> <p>The greater sand plover does not breed in Australian. As the species breeds in Siberia and Russia, the Project will not disrupt the breeding cycle of any population of this species.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging extensive, freshly exposed areas of intertidal sandflats and mudflats in estuaries or beaches; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits,</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	islets or reefs. Mangroves are present and it is estimated that 0.08 ha of this vegetation may be removed for the Project. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	<b>No</b> Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No</b> There are no observed introduced diseases that are harmful to the species. Therefore, the Project is unlikely to introduced diseases which may cause the species to decline.
Interfere with the recovery of the species?	<b>No</b> There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats. Key threats that have been identified include habitat loss and degradation from pollution, altered water regimes and invasive plants. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.

*Limosa lapponica baueri* (western Alaskan bar-tailed godwit) Vulnerable

The western Alaskan bar-tailed godwit has an extremely large distribution worldwide and particularly Australasia. This species undertakes migrations southwards from the northern hemisphere where it breeds in Alaska and eastern Russia (Battley, et al., 2012). The species spends the non-breeding season (generally northern hemisphere winter) mainly in coastal southern hemisphere habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies 1996). The species generally roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh (Higgins & Davies 1996). During the non-breeding season, the western Alaskan bar-tailed godwit is mainly carnivorous with a diet consisting of worms, molluscs, crustaceans, insects and some plant material (Higgins & Davies 1996).

Threats in Australia include ongoing human disturbance, habitat loss and degradation from pollution, changes to water regime and invasive plants (DoE, 2015).

The western Alaskan bar-tailed godwit has previously been recorded from the Project Area, and scattered records occur from the surrounding area. This species may use the intertidal zone predominately covered in mangroves for foraging; however, foraging habitat is limited as currently tidal scouring has reduced the extent of intertidal mudflats/sandflats within the Project Area to a minimum. Approximately 0.2 ha of roosting and foraging habitat for this species is mapped within the Project Area.

There are no species-specific guidelines for determining habitat critical to the survival of the western Alaskan bar-tailed godwit. Therefore, the generic *EPBC Act Significant Impact Guidelines 1.1* definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage exposed sandy or soft mud substrates on intertidal flats, banks and beaches and generally roosts sandy beaches, sandbars, spits and also in near-coastal saltmarsh. These preferential foraging and roosting areas are present within the Project Area, therefore habitat critical to the survival of the species is considered present within the Project Area.

'Important populations' of the greater sand plover are not identified in the SPRAT database (DAWE, 2022). Consequentially, any population potentially occurring within the Project Area has been assessed against the generic definition in the Significant Impact Guidelines 1.1. As the species does not breed in Australia, records are widely available within the region and the Project Area is not near the limit of the species range, no 'important populations' are expected to occur.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 15. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the western Alaskan bar-tailed godwit. The Project is not expected to create barriers to dispersal, affect breeding habitat or result in invasive species harmful to the western Alaskan bar-tailed godwit becoming established.

Table 15 Significant Impact Assessment – *Limosa lapponica* (western Alaskan bar-tailed godwit)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population?	<p><b>No</b></p> <p>Very small areas of foraging and roosting habitat (0.2 ha) were identified within the Project Area. Foraging habitat preferences consists of exposed sandy or soft mud substrates on intertidal flats, banks and beaches, of which these areas are greatly diminished due to tidal scour associated with the existing causeway. Roosting occurs on sandy beaches, sandbars, spits and also in near-coastal saltmarsh when at rest. It is estimated that 0.08 ha of mangroves may be modified for this project. A loss of foraging habitat of 0.2 ha will unlikely lead to a long-term impact on the size of an important population or impacts to any population as a result of the Project.</p>
Reduce the area of occupancy of an important population?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 8,100 km<sup>2</sup> and stable (Garnett et al., 2011). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of an important population.</p>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The western Alaskan bar-tailed godwit is highly mobile and limited foraging habitat clearing will occur as a result of the Project. Approximately 0.2 ha of foraging and roosting habitat for this species is mapped within the Project Area. No important populations are expected to occur within the Project Area and project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>There are no species-specific guidelines for determining habitat critical to the survival of the western Alaskan bar-tailed godwit. Therefore, the generic <i>EPBC Act Significant Impact Guidelines 1.1</i> definition of habitat critical to the survival of a species has been applied. Non-breeding birds preferentially forage exposed sandy or soft mud substrates on intertidal flats, banks and beaches and generally roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh. Small areas foraging and roosting areas are present within the Project Area; however, these</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. The total foraging and roosting habitat is estimated to total 0.2 ha. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population?	<b>No</b> The western Alaskan bar-tailed godwit does not breed in Australian. As the species breeds in Alaska and eastern Russia, the Project will not disrupt the breeding cycle of any population of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No</b> Marginal foraging and roosting habitat were identified within the Project Area. This species prefers foraging exposed sandy or soft mud substrates on intertidal flats, banks and beaches; however, due to tidal scouring this type of foraging habitat is minimal. Similarly roosting occurs on sandy beaches, sandbars, spits and also in near-coastal saltmarsh. Mangroves are present and it is estimated that 0.08 ha of this vegetation may be removed for the Project. Approximately 0.2 ha of potential suitable foraging habitat was found within the Project Area, with other areas of suitable foraging habitat beyond the Project Area. Given the species mobility, extensive range and in light of the limited clearing, it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	<b>No</b> Invasive plants are identified as a threat to this species. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No</b> There are no observed introduced diseases that are harmful to the species. Therefore, the Project is unlikely to introduced diseases which may cause the species to decline.
Interfere with the recovery of the species?	<b>No</b> There is no adopted or made Recovery Plan for this species; however, the Conservation Advice provides information on priority actions, direction to mitigate against key threats. Key threats include habitat loss and degradation from pollution, changes to water regime, and invasive plants. The Project is likely to modify 0.2 ha of marginal foraging and roosting habitat but is unlikely to increase pollution or alter the water regime once the Project is complete. The Project Area does not contain nesting or breeding habitat and is therefore unlikely to interfere with the recovery of the species.

*Phascolarctos cinereus* (koala) Endangered

The koala (*Phascolarctos cinereus*) is distributed from Cooktown south to Victoria as well as across to near Adelaide in South Australia. This species can inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities (ALA, 2022). Vegetation in which this species occurs is dominated by species from the genus

Eucalyptus, with highest densities of koala associated with eucalypt food trees occurring on more fertile soils and along watercourses (DES, 2022).

The koala is a leaf-eating specialist and have been recorded to feed on more than 120 species of Eucalyptus, Corymbia, Angophora (DAWE, 2022). By region, specific eucalypt species are generally preferred; however, the nutritional quality of the available trees, not the diversity of trees primarily drives foraging decisions (DAWE, 2022). Within the Moreton Bay Regional Council region, primary koala food trees include *Eucalyptus tereticornis*, *Eucalyptus microcorys* and *Eucalyptus robusta* (Australian Koala Foundation, 2021), the first of which was identified within the Project Area. Other Eucalyptus or Corymbia species observed are also considered important even as shelter trees.

No koalas or signs of their presence (i.e. characteristic scats and scratches) were detected during the field assessment. Recorded occurrences on Bribie Island are few (3), scattered, largely undated and one record describes a koala skull found in the northern portion on the island, in 1965. The nearest recorded occurrence is located near Toorbul on the mainland in 2018 (ALA, 2022). Key threats to the koala that are present in the Project Area and may therefore reduce their utilisation include habitat loss, the traffic along the White Patch Esplanade and domestic dogs.

Koala habitat is defined within the national recovery plan to include resources for an individual as well as a population and is described as “the total set of resources required by Koalas to meet the needs of individual survival and reproduction, and the how those resources are arranged in the landscape to maintain viable metapopulation processes (i.e. it is landscape context dependent)”. As an individual, habitat incorporates sufficient quality food and shelter trees to meet daily needs and avoid predation, ranging in size from large connected native vegetation, roadside or rail corridors, down to paddock trees with a suitable ground cover matrix to allow safe passage. As a population, habitat is spatially sufficient to support increasing or viable biological populations and includes patches and corridors for gene flow; and temporally includes patches suitable as climatic refuge resilient to drying conditions or areas available for future recolonisation. Therefore, in determining habitat critical to the survival of the species does the Project:

- Remove potential feeding and shelter trees?
- Reduce connectivity between patches for feeding, resting, commuting or dispersing?
- Remove habitat useable in extreme weather events?
- Promote additional threats?

The Project Area is likely to remove potential feeding and shelter trees; however, is unlikely to reduce connectivity any further, promote any additional threats or remove habitat useable in extreme weather events. As a consequence, that habitat within the Project Area is habitat critical to the survival of the koala.

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 16. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the koala. The Project is not expected impact a population, reduce connectivity or increase threats.

Table 16 Significant impact assessment - *Phascolarctos cinereus* (koala)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of a population?	<p><b>No</b></p> <p>Very small areas suitable habitat (0.2 ha) was identified within the Project Area. Recent species records are from the mainland and the Project Area is not at the edge of the species range.</p> <p>Therefore, impacts to any population as a result of the Project would be negligible.</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Reduce the area of occupancy of the species?	<p><b>No</b></p> <p>The area of occupancy for this species across Australia is estimated at 19,428 km<sup>2</sup> but may be decreasing (DAWE, 2022). Suitable habitat for this species will continue to be available adjacent to the Project Area and suitable habitat for this species within the Project Area is estimated at 0.2 ha. Therefore, the Project is unlikely to reduce the area of occupancy of the species.</p>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>Koalas are considered highly mobile and are known to cross cleared and disturbed areas to access suitable habitat. Approximately 0.2 ha of suitable habitat for this species is mapped within the Project Area. The Project is unlikely to further fragment habitat and permanent fencing is not being utilised, thereby not limiting potential movement of this species. Project activities would not result increase dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>Approximately 0.2 ha of suitable habitat for this species is mapped within the Project Area. Habitat trees suitable for foraging and shelter will be removed as part of this project; however, this is likely to total 0.2 ha. In addition, project activities are unlikely to reduce connectivity any further, promote any additional threats or remove habitat useable in extreme weather events. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population?	<p><b>No</b></p> <p>A maximum of 0.2 ha of potential koala habitat will be cleared for Project. However, suitable habitat for the species is common in the wider local area (Bribie Island National Park). As suitable habitat within the Project Area is very small, works are considered unlikely to disrupt the breeding cycle of individual koalas potentially utilising the Project Area. Potential fragmentation impacts will not create a barrier, including males dispersing during the breeding season.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Habitat fragmentation impacts are expected to be minimal due to the very small area (0.2 ha) of habitat being modified. Therefore, options for dispersal and connectivity function important to maintain viable populations in unlikely to be affected. Riparian habitat or climatic refuge is not present within the Project Area. Suitable habitat for this species is present in Bribie Island National Park adjacent to the Project Area. It is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat?	<p><b>No</b></p> <p>The primary invasive species which poses a threat to koala is the dog (<i>Canis lupus familiaris</i>*), and it is likely this species occurs in the Project Area. It is expected that no processes within the Project which would increase the presence of this species are expected as a result of the Project.</p>



EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Introduce disease that may cause the species to decline?	<p><b>No</b></p> <p>The project is not expected to introduce or exacerbate the spread of disease or pathogens (i.e. <i>Chlamydia</i> or <i>Phytophthora cinnamomi</i>) that may reduce the reproductive output of koalas or reduce the carrying capacity of the habitat.</p>
Interfere with the recovery of the species?	<p><b>No</b></p> <p>A recovery plan has recently been developed for this species and provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified including ongoing human disturbance, habitat loss and introduced predators. The project is likely to modify 0.2 ha of suitable habitat but is unlikely to increase predators or increase existing human disturbance/interactions. In addition, the Project is unlikely to facilitate the introduction of disease or pathogens, create a barrier to movement or reduce the carrying capacity in the region over the long term. The Project is therefore unlikely to interfere with the recovery of the species.</p>

#### *Xeromys myoides* (water mouse) Vulnerable

The water mouse occurs across a large coastal and near coastal range in Queensland and the Northern Territory in coastal saltmarsh, mangrove and adjacent freshwater wetland habitat (DERM, 2010). Within southeast Queensland this species is distributed from the Gold Coast north to the Great Sandy Strait and inland to Beerwah State Forest (DAWE, 2021). Highest densities within southeast Queensland are known from the Great Sandy Strait, the Maroochy River, Pumicestone Passage and the western shores of North and South Stradbroke Island (DAWE, 2021). In proximity to the Project Area a single undated recorded nest has been noted at White Patch and Second Lagoon. It should be noted that it appears to be some confusion associated with this record as Second Lagoon is on the eastern side of Bribie Island. Other nearby recorded occurrences of nests between 1996 and 2009 are at Gallagher Point on Bribie Island four kilometres to the northwest of the Project Area (DAWE, 2021).

The water mouse is nocturnal, sheltering during the day and between tidal cycles in constructed nesting mounds and natural and artificial hollows (DERM, 2010). The nests in tidal environments are important for breeding and refuge from high tide and predators (DCCEEW, 2022). Nests are formed in one of five shapes, these being freestanding mounds, island nests, supralittoral bank nests, tree trunk nests or spoil heap nests (DAWE, 2021); and vary in size from 20-60cm in height and basal circumference of 1.6 to 4.8m (DCCEEW, 2022). The water mouse uses a receding night high tide to hunt for prey species (small crustacean, gastropods, bivalves and flatworms) among intertidal mangroves (Kaluza, 2018). The water mouse has been observed to travel relatively large distances of up to 3 km a night while criss-crossing home ranges averaging 0.7 ha; however, larger home ranges have been estimated dependent on microhabitat complexity (DCCEEW, 2022).

Threats to this species include alteration, fragmentation or loss of habitat, recreational vehicles in intertidal areas, pesticide application, grazing, predation or nest destruction by invasive species and weed invasion.

This species is associated with aquatic environments with primary water mouse habitat consisting of intertidal wetlands containing common salt marsh, sedgeland, chenopod scrubland, *Sporobolus* grassland, as well as range of mangrove forests or communities (DERM, 2010) (Kaluza, 2018). Suitable habitat attributes available for various stages of the life cycle of this species include intact hydrology, prey resources, a defined supralittoral bank and structure (tidal pools, channels, crab holes, pneumatophores, crevices in bark and around roots, hollows in standing and fallen timber/mangroves, suspended drifts of twigs and leaves and driftwood) (DAWE, 2021). It is considered that areas with potential to be habitat include areas with one, some or all of known habitat attributes listed above which may be used for one or more of the species life cycle stages (DAWE, 2021). Habitat critical to the survival of the water mouse is not considered practical to describe (DAWE, 2021); however, it is suggested that habitat or areas with potential to be habitat important for long term recovery reflect habitat critical to the survival of this species. Therefore, given the habitat attributes listed above, the mangrove vegetation and areas with *Sporobolus* grassy understory within the Project Area are considered to be habitat critical to the survival of the species.

The conservation advice for this species considers the water mouse to be a single, nationally important population (DAWE, 2021). Genetic diversity for this species is very low across the known range and with potential habitat extensive and unsurveyed (DAWE, 2021) suggests that any occurrence of this species forms a part of an important population.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 17. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the species. The Project is not expected to create barriers to dispersal, remove large areas of habitat or result in invasive species harmful to the water mouse becoming established.

Table 17 Significant Impact Assessment – *Xeromys myoides* (water mouse)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population of a species?	<p><b>No</b></p> <p>The entire population is considered an important population. Very small areas suitable habitat (0.2 ha) was identified within the Project Area. Recent species records are from the mainland and the Project Area is not at the edge of the species range.</p> <p>Therefore, impacts to any population as a result of the Project would be negligible.</p>
Reduce the area of occupancy of an important population?	<p><b>No</b></p> <p>The area of occupancy of this species is estimated to be less than 2000 km<sup>2</sup> (DAWE, 2021). Approximately 0.2 ha of mangrove and intertidal habitat for this species is mapped within the Project Area. The Project is not expected to significantly reduce suitable habitat or prey species to the extent that it would result in a reduction to the area of occupancy of the species. Further, no important populations are expected to occur within the Project Area as all individuals are considered a single population.</p>
Fragment an existing important population into two or more populations?	<p><b>No</b></p> <p>The species is mobile (may cover 3 km in a single evening) and limited vegetation clearing will occur as a result of the Project. All individuals form part of a single population, and Project activities would not result in dispersal challenges for any population that may exist.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>No</b></p> <p>Approximately 0.2 ha of mangrove and intertidal habitat for this species is mapped within the Project Area. Several mangrove trees suitable for foraging and shelter will be removed as part of this project; however, this is likely to total less than 0.1 ha. In addition, project activities are unlikely to reduce connectivity any further, promote any additional predator threats or increase human-habitat interaction. Therefore, the project is unlikely to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population?	<p><b>No</b></p> <p>Breeding cycle information is limited, but it is suggested that this species is capable of breeding throughout the year (DCCEE, 2022). Up to a maximum of 0.2 ha of potential habitat will be modified for Project. However, suitable habitat for the species is common in the wider local area (along the coastal fringe to the north specifically where other recorded occurrences have been noted). As suitable habitat within the Project Area is very small, works are considered unlikely to disrupt the breeding cycle of individual water mouse potentially utilising the Project Area. Potential fragmentation impacts</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	will not create a barrier, including individuals dispersing during the breeding season.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>No</b></p> <p>Very small areas suitable habitat (0.2 ha) was identified within the Project Area. Given the species area of occupancy (less than 2000 km<sup>2</sup>), and in light of the limited clearing impacts and mitigation measures proposed, it is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	<p><b>No</b></p> <p>Predation and weed incursion are identified threats to this species. A Weed and Pest Management Plan will be established to mitigate and manage the potential spread threatening species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Introduce disease that may cause the species to decline?	<p><b>No</b></p> <p>Disease has not been identified as a threat to the water mouse.</p>
Interfere with the recovery of the species?	<p><b>No</b></p> <p>The recovery plan has been developed for this species and the recent updated conservation advice provides information on priority actions, direction to mitigate against key threats. Key threats that have been identified including habitat loss and fragmentation, pesticides, human-habitat interactions and introduced flora and fauna. The project is likely to modify 0.2 ha of suitable habitat but is unlikely to increase predators or increase existing human disturbance/interactions. In addition, the Project is unlikely to facilitate the introduction of disease or pathogens, create a barrier to movement or reduce the carrying capacity in the region over the long term. The Project is therefore unlikely to interfere with the recovery of the species.</p>

## 5.5 Migratory Species

### Migratory species (marine)

Migratory marine birds have a large distribution along the coasts of Australia and in some cases inland Australia. Migratory marine bird species potential occurring within the Project Area include:

- *Apus pacificus* (fork-tailed swift); and
- *Sternula albifrons* (little tern).

The little tern mainly inhabit coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches (Higgins & Davies 1996); and feeds mainly on fish with occasional consumption of crustaceans, insects, annelids and molluscs (DCCEEW, 2022). The fork tailed swift is largely aerial and is mainly insectivorous.

Threats in Australia include human disturbance, habitat loss and degradation from pollution, predation of feral animals and changes to the water regime (DoE, 2015).

These species have both been previously recorded as scattered records occurring from the surrounding area. The fork tailed swift occupies the airspace over a diverse range of habitats during their non-breeding season in Australia; therefore, the majority of wooded vegetation within the Project Area (0.28 ha) is potential habitat for this species. The little tern may roost or loaf on sand-spits, banks and bars within sheltered estuarine or coastal environments, or on the sandy shores of lakes and ocean beaches (DCCEEW, 2022); and approximately 0.2 ha of foraging habitat for this species is mapped within the Project Area.

Important habitat for the fork-tailed swift is non-breeding and has been identified as being found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial (DCCEEW, 2022). Vegetation in the Project Area is dominated by Eucalyptus canopy trees with a weed-infested understorey or mangroves. Although this is not the favoured habitat for the species, it does meet the broad definition of important habitat.

Specific important habitat for the little tern is not currently identified, as a consequence the generic *EPBC Act Significant Impact Guidelines 1.1* definition of important habitat for a migratory species has been applied. Habitat for the nesting little tern is on sand-spits, banks, ridges or islets in sheltered coastal environments, such as coastal lakes, estuaries and inlets, and also on wide and flat or gently sloping sandy ocean beaches, and also, occasionally, in sand-dunes (DCCEEW, 2022). Suitable nesting habitat for the little tern is absent from the Project Area; however, small areas (0.2 ha) of an intertidal zone are present which maybe suitable for foraging. Although this is not the favoured habitat for the species, it does meet the broad definition of important habitat.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 18. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the migratory marine birds. The Project is not expected to create barriers to dispersal, disrupt the lifecycle or result in harmful invasive species becoming established.

Table 18 Significant Impact Assessment – Migratory species (marine)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
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?	<p><b>No</b></p> <p>The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. No threshold area for important habitat for these species can be determined at this time or has been identified (DoE, 2015).</p> <p>Approximately 0.2 ha of intertidal zone and 0.2 ha of woodland habitat is mapped within the Project Area. As the fork tailed swift is almost exclusively aerial and the little tern prefers coastal sand bars and spits, the Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the fork-tailed swift.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<p><b>No</b></p> <p>Invasive species (introduced predators) are identified as a threat to migratory marine birds. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically	<p><b>No</b></p> <p>Migratory marine species are highly mobile and limited foraging and roosting habitat clearing will occur as a result of the Project. The little tern preferentially nests, forage and</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
significant proportion of the population of a migratory species?	<p>roost in coastal habitats including mudflats and sand spits; whilst the fork tailed swift may often flying over the Project Area and migrates to Siberia to breed (Higgins 1999).</p> <p><b>fork-tailed swift</b> – The global population is estimated to be more than 90,000 individuals (DCCEEW, 2022), with an ecologically significant proportion of the fork-tailed swift population is estimated at 1,000 individuals (1%, upper threshold) and 100 individuals (0.1%, lower threshold) (DoE, 2015). This species is non-breeding and highly mobile whilst in Australia. Approximately 0.2 ha of woodland habitat is mapped within the Project Area, which is considered not large enough to support an ecologically significant proportion of the population.</p> <p><b>little tern</b> – The global population of this species is variously estimated at 140,000 to 410,000 birds (DCCEEW, 2022), with the estimated population in Australia at 10% of the global population (14,000 to 41,000 individuals). An ecologically proportion of individuals could therefore be estimated at 1,400 individuals (1%, upper threshold) and 140 individuals (0.1%, lower threshold). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, of which none is suitable for breeding. Due to the very small area likely utilised by this species for foraging it is considered not large enough to support an ecologically significant proportion of the population.</p> <p>Given the limited amount of clearing required and with the implementation of mitigation measures in place, the Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of a population of these species.</p>

#### Migratory species (terrestrial)

Migratory terrestrial birds have a large distribution along the northern coast and in particular the eastern Australia coast. Migratory terrestrial bird species with the potential to occur within the Project Area include:

- *Cuculus optatus* (oriental cuckoo).
- *Monarcha melanopsis* (black-faced monarch).
- *Symposiachrus trivirgatus* (spectacled monarch)
- *Myiagra cyanoleuca* (satin flycatcher).
- *Rhipidura rufifrons* (rufous fantail).

These species all primarily reside in forested habitats including coastal forests, woodlands, mangroves, drier woodlands and open forests (Blakers et al. 1984; Emison et al. 1987; Officer 1969), and are primarily insectivorous, preying on arthropods (mostly insects) although very occasionally will also eat seeds.

Threats of these species in Australia, include habitat loss and degradation from pollution, changes to the water regime, pest animals (black rat – *Rattus rattus*) and invasive plants (DoE, 2015).

These species have all been previously recorded from within or adjacent to the Project Area, and scattered records also occur from the wider surrounding area. These species may use the eucalypt woodland and mangroves areas for roosting and foraging. Approximately 0.28 ha (combined Eucalypt and mangrove woodland) of roosting and foraging habitat for these species is mapped within the Project Area.

Important habitat for the terrestrial migratory species (DoE, 2015) with the potential to occur in the Project Area are displayed below in Table 19.

Table 19 important Habitat for Terrestrial Migratory Species

Species	Important Habitat	1% and 0.1% Area thresholds (ha)	Presence of habitat in Project Area
<i>Cuculus optatus</i> (oriental cuckoo).	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types.	250,000 and 25,000	0.2 ha of Eucalypt woodland present within Project Area meeting the broad definition of important habitat.
<i>Monarcha melanopsis</i> (black-faced monarch).	Wet forest specialist, found mainly in rainforest and wet sclerophyll forest, especially in sheltered gullies and slopes with a dense understorey of ferns and/or shrubs.	2,600 and 260	0.2 ha of Eucalypt woodland present within Project Area. Understorey of scattered shrubs with bracken fern. Does not meet the broad definition of important habitat, but this species may utilise (on rare occasions) vegetation within the Project Area.
<i>Symposiachrus trivirgatus</i> (spectacled monarch)	Dense vegetation, mainly in rainforest but also in moist forest or wet sclerophyll and occasionally in other dense vegetation such as mangroves, drier forest and woodlands.	2,100 and 210	0.2 ha of Eucalypt woodland and 0.08 ha of mangroves present within Project Area meeting the broad definition of important habitat.
<i>Myiagra cyanoleuca</i> (satin flycatcher).	Eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland types. During migration, habitat preferences expand, with the species recorded in most wooded habitats except rainforests. Wintering birds in northern Qld will use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps.	4,400 and 440	0.2 ha of Eucalypt woodland and 0.08 ha of mangroves present within Project Area meeting the broad definition of important habitat.
<i>Rhipidura rufifrons</i> (rufous fantail).	Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands.	7,500 and 750	0.2 ha of Eucalypt woodland and 0.08 ha of mangroves present within Project Area meeting the broad definition of important habitat.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 20. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the migratory terrestrial birds. The Project is not expected to create barriers to dispersal, disrupt the lifecycle or result in harmful invasive species becoming established.

Table 20 Significant Impact Assessment – Migratory species (terrestrial)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
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?	<p><b>No</b></p> <p>Threshold areas for important habitat are listed in Table 19 (DoE, 2015), of which 210 ha (spectacled monarch) is associated within the smallest 0.1% threshold. Therefore, the impact of up to 0.28 ha of mangrove and eucalypt woodland habitat associated with the project are not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles.</p> <p>Approximately 0.08 ha of mangroves and 0.2 ha of woodland habitat is mapped within the Project Area. Given abundant similar vegetation located adjacent in Bribie Island National Park or along other parts of the foreshore on Bribie Island, the project is unlikely to isolate an area of important habitat for these species.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<p><b>No</b></p> <p>Invasive species are identified as a threat to migratory terrestrial birds. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific managements will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<p><b>No</b></p> <p>Migratory terrestrial species are highly mobile and limited foraging and roosting habitat clearing will occur as a result of the Project. Migratory terrestrial birds preferentially inhabit coastal forests, woodlands, mangroves and drier woodlands and open forests. Breeding habitat for some species may be present or absent within the preferential habitat identified within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. Breeding areas are discussed below:</p> <p><b>oriental cuckoo</b> – an ecologically significant proportion of the oriental cuckoo population is estimated at 10,000 individuals (1%, upper threshold) and 1,000 individuals (0.1%, lower threshold) (DoE, 2015). This species breeds in Siberia and southeast Asia and is highly mobile whilst in Australia (Marchant 1986). Approximately 0.2 ha of woodland habitat is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>black-faced monarch</b> – an ecologically significant proportion of the black-faced monarch population is estimated at 465 individuals (1%, lower threshold) and 47 individuals (0.1%, upper threshold) (DoE, 2015). This species breeds in rainforest habitat (DCCEEW, 2022), which has not been identified within the Project Area. Approximately 0.2 ha of woodland habitat is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	<p><b>spectacled monarch</b> - an ecologically significant proportion of the spectacled monarch population is estimated at 650 individuals (1%, lower threshold) and 65 individuals (0.1%, upper threshold) (DoE, 2015). This species may frequent open woodlands and mangroves (0.28 ha), which occur within the Project Area (Marchant 1986). Therefore, available habitat within the Project Area is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>satin flycatcher</b> – an ecologically significant proportion of the spectacled monarch population is estimated at 1,700 individuals (1%, lower threshold) and 170 individuals (0.1%, upper threshold) (DoE, 2015). This species breeds at elevations of more than 600 m above sea level in south-eastern Australia, which has not been identified within the Project Area (Frith 1969); however, suitable foraging habitat (eucalypt woodland and mangroves – 0.28 ha) is present within the Project Area. Therefore, available habitat within the Project Area is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>rufous fantail</b> – an ecologically significant proportion of the spectacled monarch population is estimated at 3,400 individuals (1%, lower threshold) and 340 individuals (0.1%, upper threshold) (DoE, 2015). This species breeds in dense wet forests-rainforests, mangroves, wet gullies in eucalypt forests and other dense vegetation (Frith 1969). 0.28 ha of suitable habitat is available for this species within the Project Area; however, available habitat is not considered large enough to support an ecologically significant proportion of the population.</p>

#### Migratory species (wetland)

Migratory wetland birds have a large distribution in Australia, in particular along the coasts and inland habitats. Migratory wetland bird species include:

- *Calidris acuminata* (sharp-tailed sandpiper).
- *Calidris falconellus* (broad-billed sandpiper).
- *Calidris ruficollis* (red-necked stint).
- *Charadrius bicinctus* (double-banded plover).
- *Charadrius veredus* (oriental plover).
- *Limnodromus semipalmatus* (Asian dowitcher).
- *Limosa lapponica* (bar-tailed godwit).
- *Limosa limosa* (black-tailed godwit).
- *Numenius minutus* (little curlew).
- *Numenius phaeopus* (whimbrel).
- *Pandion haliaetus* (osprey).
- *Pluvialis fulva* (pacific golden plover).
- *Pluvialis squatorola* (grey plover).
- *Tringa brevipes* (grey-tailed tattler).
- *Tringa nebularia* (common greenshank).
- *Tringa stagnotilis* (marsh sandpiper).
- *Xenus cinereus* (terek sandpiper).



These species all mainly inhabit inland and coastal areas with muddy or sandy edges of shallow fresh or brackish wetlands. Often these areas contain inundated or emergent sedges, grass, saltmarsh or other low vegetations, and mangroves or bare sandflats and mudflats (Marchant & Higgins 1993). These species mainly forage for molluscs, insects, worms, crustaceans, and fish (osprey) (Higgins & Davies 1996).

Threats in Australia, include habitat loss and degradation from pollution, changes to the water regime and invasive plants, human interactions and direct mortality (DoE, 2015).

These species have all been previously recorded from within or adjacent to the Project Area, and scattered records occur from the surrounding area. These species may use the mudflats or sandflat as areas for roosting and foraging. Approximately 0.2 ha of intertidal zone potentially usable for these species is mapped within the Project Area.

Identifying important habitat for these species is based on the *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE, 2017). This guideline emphasizes several criteria in assessing important habitat including whether the area is recognised as internationally important for migratory shorebirds, supports 0.1% or more of a flyway population of migratory species, supports more than 2,000 or more shorebirds, or supports 15 or more migratory shorebirds species. The Moreton Bay Ramsar site regularly supports more than 50,000 waterbirds, representing at least 43 species of shorebirds and at least 28 migratory shorebird species. (DoEE, 2018). Within or adjacent to the Project Area recent records (within the last 5 years) scattered occurrences of several shorebird species have been recorded (ALA, 2022): however, 0.1% or more of fly populations of most species or more than 2,000 shorebirds are unlikely to occur within the 0.2 ha of suitable habitat available within the Project Area. Although the Project Area is unlikely to support large numbers of migratory wetland species; due to part of the Project Area encompassing a very small portion (0.2 ha) of the Moreton Bay Ramsar wetland, it can be considered important habitat for migratory wetland species.

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 21. The outcome of this assessment was that the Project is considered unlikely to result in a significant impact to the migratory wetland birds. The Project is not expected to create barriers to dispersal, disrupt the lifecycle or result in harmful invasive species becoming established.

Table 21 Significant Impact Assessment – Migratory species (wetland)

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
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?	<p><b>No</b></p> <p>The Project Area contains 0.2 ha of important habitat but given these species migratory habits and scattered nature and often temporal variability of food resources, it is unlikely that existing resources within the Project Area would be utilised frequently and on a permanent basis.</p> <p>Direct impacts (vegetation clearing of mangroves) are estimated at &lt;0.1 ha and potential modification of the intertidal zone approximately 0.2 ha. It is expected that the completed project will improve the water regime by providing improved tidal flushing and a more stabilised water regime. As such, the project is unlikely to worsen the nutrient or hydrological cycles of the wider environment.</p> <p>Potential impacts to important habitat during construction such as increased erosion and sedimentation will be managed as per a construction management plan, to be developed prior to work commencing. The Project is unlikely to substantially modify, destroy or isolate an area of important habitat to a migratory species.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<p><b>No</b></p> <p>Invasive species are identified as a threat to migratory wetland birds. Weed and pest management will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific managements will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
<p>Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?</p>	<p><b>No</b></p> <p>Migratory wetland species are highly mobile and limited foraging and roosting habitat clearing will occur as a result of the Project. Migratory wetland birds preferentially inhabit sandflats and mudflats, sometimes with vegetation including mangroves or bare ground. Breeding habitat for all species is absent within the habitat identified within the Project Area; however, foraging, and roosting habitat is identified, although these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat. Breeding areas are discussed below.</p> <p><b>sharp-tailed sandpiper</b> – An ecologically significant proportion of the sharp-tailed sandpiper population is estimated at 850 individuals (1%, lower threshold) and 85 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to Siberia to breed (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>broad-billed sandpiper</b> – An ecologically significant proportion of the broad-billed sandpiper population is estimated at 300 individuals (1%, lower threshold) and 30 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to breed in north-east Europe and western Siberia (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>red-necked stint</b> - An ecologically significant proportion of the red-necked stint population is estimated at 4750 individuals (1%, lower threshold) and 475 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds in Siberia and sporadically in north and west Alaska (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>double-banded plover</b> – An ecologically significant proportion of the double-banded plover population is estimated at 190 individuals (1%, lower threshold) and 19 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species only breeds in New Zealand (DCCEEW, 2022). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>oriental plover</b> – An ecologically significant proportion of the oriental plover population is estimated at 2300 individuals (1%, lower threshold) and 230 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to breed in northern and eastern Mongolia and south-eastern Siberia (DCCEEW, 2022). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>Asian dowitcher</b> – An ecologically significant proportion of the Asian dowitcher population is estimated at 140 individuals (1%, lower threshold) and 14 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to central and eastern Siberia, Mongolia and north-east China (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>bar-tailed godwit</b> – An ecologically significant proportion of the bar-tailed godwit population is estimated at 3250 individuals (1%, lower threshold) and 325 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to breed in</p>

EPBC Act Criteria – is there a real possibility that the Project will:	Assessment of Significance
	<p>north of Scandinavia, Russia and north-west Alaska (Marchant &amp; Higgins 1993). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>black-tailed godwit</b> - An ecologically significant proportion of the black-tailed godwit population is estimated at 1600 individuals (1%, lower threshold) and 160 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to breed in northern hemisphere in Russia, Korea, China and Mongolia (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>little curlew</b> – An ecologically significant proportion of the little curlew population is estimated at 1100 individuals (1%, lower threshold) and 110 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds in Russia (DCCEEW, 2022). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>whimbrel</b> – An ecologically significant proportion of the whimbrel population is estimated at 650 individuals (1%, lower threshold) and 65 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to north and west Alaska to breed (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>osprey</b> – An ecologically significant proportion of the osprey population is estimated at 240 individuals (1%, lower threshold) and 24 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (DCCEEW, 2022). Approximately 0.082 km of coastline is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>pacific golden plover</b> – An ecologically significant proportion of the pacific golden plover population is estimated at 1200 individuals (1%, lower threshold) and 120 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds mostly in northern Siberia (DCCEEW, 2022). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>grey plover</b> - An ecologically significant proportion of the grey plover population is estimated at 800 individuals (1%, lower threshold) and 80 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds north of 65° N in the northern hemisphere, in northern Siberia (AOU 1983; Bent 1962; Cramp &amp; Simmons 1983). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>grey-tailed tattler</b> – An ecologically significant proportion of the grey plover population is estimated at 700 individuals (1%, lower threshold) and 70 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds in Siberia (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p>

<p><b>EPBC Act Criteria – is there a real possibility that the Project will:</b></p>	<p><b>Assessment of Significance</b></p>
	<p><b>common greenshank</b> – An ecologically significant proportion of the common greenshank population is estimated at 1100 individuals (1%, lower threshold) and 110 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds in Eurasia, the northern British Isles, Scandinavia, east Estonia, Russia and Ukraine (Higgins &amp; Davies 1996). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>marsh sandpiper</b> – An ecologically significant proportion of the marsh sandpiper population is estimated at 1300 individuals (1%, lower threshold) and 130 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species migrates to east Europe, southern Siberia and northern China to breed (DCCEEW, 2022). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p><b>terek sandpiper</b> – An ecologically significant proportion of the terek sandpiper population is estimated at 500 individuals (1%, lower threshold) and 50 individuals (0.1%, upper threshold) (Hansen, et al., 2016). This species breeds on the north coast of the Gulf of Bothnia Finland, Ukraine and northern Russia (Marchant &amp; Higgins 1993). Approximately 0.2 ha of intertidal zone is mapped within the Project Area, which is not considered large enough to support an ecologically significant proportion of the population.</p> <p>Project activities would not result in the disruption of the lifecycle for any species population that may exist. Small areas of foraging and roosting areas are present within the Project Area; however, these areas are not considered preferential and if utilised, likely as secondary option to adjacent habitat.</p>

## 6.0 Conclusion

This report has been prepared to undertake a self-assessment of the proposed new crossing structure across Wrights Creek under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), to determine whether the project is likely to have significant impacts on Matters of National Environmental Significance (MNES) therefore, requiring referral to the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW).

This assessment was based on reviewing reference materials (outlined in section 4.0 Potential Impacts) and completing desktop assessments and field investigations.

Desktop assessments of the Project Area found a total of four (4) MNES categories potentially occurring within 5 km of the surveyed area. These were:

- Wetlands of International importance – Moreton Bay
- Listed Threatened Ecological Communities
- Threatened Species
- Migratory Species

Following the completion of the desktop and field investigations, matters listed under the EPBC Act which are relevant to this development include:

- Wetlands of International Importance
  - Moreton Bay
- Conservation significant fauna species – likely to occur.
  - *Hirundapus caudacutus* (white-throated needletail) Vulnerable
  - *Numenius madagascariensis* (eastern curlew) Critically Endangered
  - *Pteropus poliocephalus* (grey-headed flying-fox) Vulnerable
- Conservation significant fauna Species - may occur.
  - *Calidris canutus* (red knot) Endangered
  - *Calidris ferruginea* (curlew sandpiper) Critically Endangered
  - *Calidris tenuirostris* (great knot) Endangered
  - *Charadrius leschenaultia* (greater sand plover) Vulnerable
  - *Charadrius mongolus* (lesser sand plover) Endangered
  - *Limosa lapponica baueri* (western Alaskan bar-tailed godwit) Vulnerable
  - *Phascolarctos cinereus* (koala) Endangered
  - *Xeromys myoides* (water mouse) Vulnerable
- Listed migratory species (multiple).

No evidence of any conservation significant or migratory species was found during the field assessment.

An assessment of EPBC Significance Impact Guideline 1.1 for wetlands of international importance found that the project was unlikely to have a significant impact on the Moreton Bay Ramsar wetland.

An assessment of the EPBC Significance Impact Guideline 1.1 for Critically Endangered fauna, found the Project was unlikely to have a significance impact on any critically endangered species.

An assessment of the EPBC Significance Impact Guideline 1.1 for Endangered fauna, found the Project was unlikely to have a significance impact on any endangered species.

An assessment of the EPBC Significance Impact Guideline 1.1 for Vulnerable fauna, found the Project was unlikely to have a significant impact on any vulnerable species.

An assessment of the EPBC Significance Impact Guideline 1.1 for migratory species, found the Project was unlikely to have a significant impact on migratory species.

In summary, it has been determined that it is unlikely the project will have a significant impact on Matters of National Environmental Significance. However as the works are occurring within a RAMSAR site, it is recommended that Moreton Bay Regional Council consider the need for referral to the Commonwealth.

## 7.0 References

- ALA, 2022. [Online]  
Available at: <https://spatial.ala.org.au/>
- Australian Koala Foundation, 2021. *Trees for koalas- National Koala Tree Planting List*. [Online]  
Available at: <https://www.savethekoala.com/how-to-help/trees-koalas/>
- Australian Museum, 2020. *Grey-headed flying fox - fact sheet*. [Online]  
Available at: <https://australian.museum/learn/animals/bats/grey-headed-flying-fox/>
- Bamford, M. et al., 2008. *Migratory Shorebirds of East Asian - Australasian Flyway: Population estimates and internationally important sites*. [online]. Canberra: DAWE.
- Battley, P. et al., 2012. Contrasting extreme long-distance migration patterns in bar-tailed godwits *Limosa lapponica*. *Journal of Avian Biology*, Volume 43, pp. 21-32.
- BirdLife, 2015. *Species fact sheet: Charadrius leschenaultii*. [Online]  
Available at: [Http://www.birdlife.org](http://www.birdlife.org)  
[Accessed 2022].
- Cronin, L., 2008. *Australian Mammals*. Crows Nest, Sydney, NSW: Jacana Books, an imprint of Allen & Unwin.
- DAWE, 2019. *Ramsar wetlands*. [Online]  
Available at: <https://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=41>
- DAWE, 2021. *Conservation Advice for Xeromys myoides (water mouse)*, Canberra: Department of Agriculture Water and the Environment.
- DAWE, 2021. *National Recovery Plan for the Grey-headed Flying-fox*, Canberra : Department of Agriculture, Water and the Environment.
- DAWE, 2022. *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory*, Canberra: Department of Agriculture Water and the Environment.
- DAWE, 2022. *National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)*, Canberra: Department of Agriculture, Water and the Environment.
- DCCEEW, 2022. *National flying fox monitoring viewer*. [Online]  
Available at: <http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf>
- DCCEEW, 2022. *Species Profile and Threats Database*. [Online]  
Available at: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- del Hoya, J., Elliot, A., Christie, D. & Sargatal, J., 1996. *Handbook of the Birds of the World: Hoatzin to Auks*. Barcelona: Lynx Editions.
- DERM, 2010. *National recovery plan for the water mouse (false water rat) Xeromys myoides*, Brisbane: Department of Environment and Resource Managment. Queensland Government.
- DES, 2019. *Moreton Bay Ramsar internationally important wetland - facts and maps*. [Online]  
Available at: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/ramsar-wetland-moreton-bay/>
- DES, 2022. *Koala facts*. [Online]  
Available at: <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/facts>
- DoE, 2015. *Conservation Advice Calidris ferruginea curlew sandpiper.*, Canberra: Department of the Environment.
- DoE, 2015. *Conservation Advice Numenius madagascariensis eastern curlew.*, Canberra: Department of the Environment.
- DoE, 2015. *Referral guideline for 14 birds listed as migratory species under the EPBC Act*, Canberra: Department of the Environment.
- DoE, 2015. *Wildlife Conservation Plan for Migratory Shorebirds.*, Canberra: Department of Environment.

DoEE, 2017. *EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*, Canberra: Department of Environment and Energy, Commonwealth of Australia.

DoEE, 2018. *Moreton Bay Ramsar site – Ramsar Information Sheet*. [Online]  
Available at: <https://www.dceew.gov.au/sites/default/files/documents/41-ris.pdf>

Eby, P. & Lunney, D., 2002. Managing the Grey-headed Flying-fox as a threatened species in NSW. In: *Proceedings of the Royal Zoological Society of New South Wales*. s.l.:Royal Zoological Society of New South Wales, Mosman, Sydney.

Garnett, S., Szabo, J. & Dutson, G., 2011. *The Action Plan for Australian Birds 2010*. Canberra: CSIRO Publishing.

Hansen, B. D. et al., 2016. *Revision of the East Asian-Australasian Flyway Population Estimates for 37 listed Migratory Shorebird Species*, Melbourne: Unpublished report for the Department of the Environment, Birdlife Australia.

Higgins, P. J. & Davies, S. J. J. F., 1996. *Handbook of Australian, New Zealand and Antarctic Birds*. Victoria: Oxford University Press.

Jessop, A., 2003. Gut analysis of five wader species collected from the nw of Western Australia. *Stilt*, Volume 43, pp. 3-13.

Kaluza, J., 2018. *The ecology and conservation of the water mouse (Xeromys myoides) along the Maroochy River Catchment in southeast Queensland*, Brisbane: University of Queensland.

Marchant, S. & Higgins, P., 1993. *Handbook of Australian, New Zealand and Antarctic Birds*. s.l.:Oxford University Press.

Moore, N., 2006. South Korea's shorebirds: a review of abundance, distribution, threats and conservation status. *Stilt*, pp. 62-72.

Morcombe, M., 2000. *Field Guide to Australian Birds*, Archerfield Queensland: Steve Parish Publishing Pty Ltd.

Piersma, T. et al., 1998. A new pressure sensory mechanism for prey detection in birds: the use of principles of seabed dynamics?. *Biological Sciences*, Volume 265, pp. 1377-1383.

Rodgers, D., Moore, N. & Battley, P., 2006. ). Northwards migration of shorebirds through Saemangeum, The Geum estuary and Gomso Bay, South Korea in 2006.. *Stilt*, pp. 73-89.

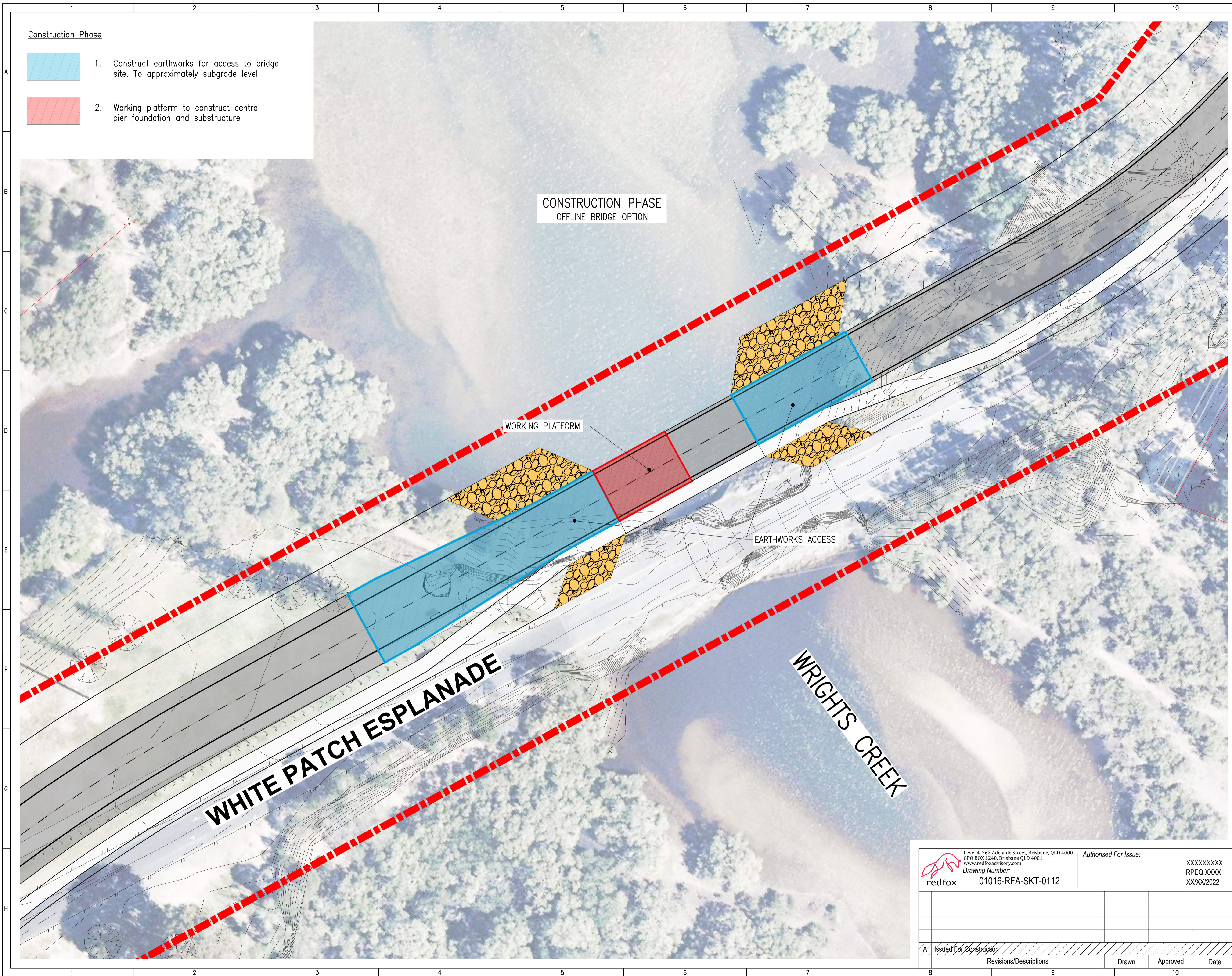
TSSC, 2019. *Conservation Advice *Hirundapus caudacutus* White-throated Needletail*, Canberra: Threatened Species Scientific Committee. Department of the Environment and Energy.

Zharikov, Y. & Skilleter, G. A., 2004. Why do eastern curlews *Numenius madagascariensis* feed on prey that lowers intake rate before migration?. *Journal of Avian Biology*, 35(6), pp. 533-542.



**Appendix A**

# **Option Design Layout**



**Construction Phase**

- 1. Construct earthworks for access to bridge site. To approximately subgrade level
- 2. Working platform to construct centre pier foundation and substructure

CONSTRUCTION PHASE  
OFFLINE BRIDGE OPTION

WORKING PLATFORM

EARTHWORKS ACCESS

WHITE PATCH ESPLANADE

WRIGHTS CREEK



**ENGINEERING,  
CONSTRUCTION &  
MAINTENANCE**

**AUTHORISATION**

Delivery Manager \_\_\_\_\_ Date \_\_\_\_\_

Project Owner / Manager \_\_\_\_\_ Date \_\_\_\_\_

Program Responsible Officer \_\_\_\_\_ Date \_\_\_\_\_

**PROJECT INFORMATION**

Project Number MBRC BUDGET NUMBER

Coordinator \_\_\_\_\_ Team Leader \_\_\_\_\_

Designer \_\_\_\_\_ Checked \_\_\_\_\_

N.M (GMC) 15/03/2022  
Surveyor Survey Date / Ref. No.

Survey Datum

MGA (GDA94) AHD Derived  
ZONE 56

Horizontal \_\_\_\_\_ Vertical \_\_\_\_\_

A1 / A3 0 2 4 6 8 10m  
1:250 / 1:500

Scales

**ISSUE**

Revisions

Original Issue \_\_\_\_\_ Date: ??/??/??

**PROJECT DESCRIPTION**

WHITE PATCH,  
WHITE PATCH  
ESPLANADE

CAUSEWAY UPGRADE

-  
Offline Bridge Option  
Plan Layout

**DRAWING NUMBER**

**0112**

Drawing Number \_\_\_\_\_ Rev. \_\_\_\_\_

Drawing 6 of 8 Original Plan Size A1

	Level 4, 262 Adelaide Street, Brisbane, QLD 4000 GPO BOX 1240, Brisbane QLD 4001 www.redfoxadvisory.com Drawing Number 01016-RFA-SKT-0112	Authorised For Issue: XXXXXXXX RPEQ XXXX XXXXX/2022		
	Issued For Construction	Revisions/Descriptions	Drawn	Approved

## **Appendix B**

# **Protected Matters Search**



# EPBC Act Protected Matters Report

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

Report created: 05-May-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

# Summary

## Matters of National Environment Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar)</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	4
<a href="#">Listed Threatened Species:</a>	83
<a href="#">Listed Migratory Species:</a>	80

## Other Matters Protected by the EPBC Act

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

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

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

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	115
<a href="#">Whales and Other Cetaceans:</a>	13
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	1

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	3
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	3
<a href="#">EPBC Act Referrals:</a>	13
<a href="#">Key Ecological Features (Marine):</a>	None
<a href="#">Biologically Important Areas:</a>	6
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar Wetlands)

[ [Resource Information](#) ]

Ramsar Site Name	Proximity	Buffer Status
<a href="#">Moreton bay</a>	Within Ramsar site	In feature area

### Listed Threatened Ecological Communities

[ [Resource Information](#) ]

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland</a>	Endangered	Community may occur within area	In buffer area only
<a href="#">Lowland Rainforest of Subtropical Australia</a>	Critically Endangered	Community may occur within area	In buffer area only
<a href="#">Subtropical and Temperate Coastal Saltmarsh</a>	Vulnerable	Community likely to occur within area	In buffer area only

### Listed Threatened Species

[ [Resource Information](#) ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>BIRD</b>			
<a href="#">Anthochaera phrygia</a> Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
<a href="#">Cyclopsitta diophthalma coxeni</a> Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea antipodensis gibsoni</a> Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Fregetta grallaria grallaria</a> White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Grantiella picta</a> Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Limosa lapponica baueri</a> Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Pterodroma neglecta neglecta</a> Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Turnix melanogaster</a> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<b>FISH</b>			
<a href="#">Epinephelus daemeli</a> Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus whitei</a> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Nannoperca oxleyana</a> Oxleyan Pygmy Perch [64468]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Pseudomugil mellis</a> Honey Blue Eye, Honey Blue-eye [26180]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thunnus maccoyii</a> Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
<b>FROG</b>			
<a href="#">Litoria olongburensis</a> Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Mixophyes fleayi</a> Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area	In buffer area only
<b>INSECT</b>			
<a href="#">Argynnis hyperbius inconstans</a> Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area	In feature area
<b>MAMMAL</b>			
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Dasyurus maculatus maculatus (SE mainland population)</a> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Petauroides volans</a> Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Petaurus australis australis</a> Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Potorous tridactylus tridactylus</a> Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area	In feature area
<b>PLANT</b>			
<a href="#">Acacia attenuata</a> [10690]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Acronychia littoralis</a> Scented Acronychia [8582]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Bosistoa transversa</a> Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Cryptocarya foetida</a> Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Cryptostylis hunteriana</a> Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Cupaniopsis shirleyana</a> Wedge-leaf Tuckerroo [3205]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Macadamia integrifolia</a> Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Macadamia ternifolia</a> Small-fruited Queensland Nut, Gympie Nut [7214]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Macadamia tetraphylla</a> Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Persicaria elatior</a> Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Phaius australis</a> Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Phaius bernaysii</a> Yellow Swamp-orchid [4918]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Rhodamnia rubescens</a> Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Rhodomyrtus psidioides</a> Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Samadera bidwillii</a> Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thesium australe</a> Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<b>REPTILE</b>			
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Coeranoscincus reticulatus</a> Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Delma torquata</a> Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<b>SHARK</b>			
<a href="#">Carcharias taurus (east coast population)</a> Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Sphyrna lewini</a> Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

### Listed Migratory Species [ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>Migratory Marine Birds</b>			
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
<a href="#">Ardenna carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Ardenna grisea</a> Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Sternula albifrons</a> Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<b>Migratory Marine Species</b>			
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#"><i>Eretmochelys imbricata</i></a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#"><i>Eubalaena australis</i> as <i>Balaena glacialis australis</i></a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#"><i>Lamna nasus</i></a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
<a href="#"><i>Lepidochelys olivacea</i></a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#"><i>Megaptera novaeangliae</i></a> Humpback Whale [38]		Congregation or aggregation known to occur within area	In feature area
<a href="#"><i>Mobula alfredi</i> as <i>Manta alfredi</i></a> Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In feature area
<a href="#"><i>Mobula birostris</i> as <i>Manta birostris</i></a> Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
<a href="#"><i>Natator depressus</i></a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#"><i>Orcaella heinsohni</i></a> Australian Snubfin Dolphin [81322]		Species or species habitat likely to occur within area	In feature area
<a href="#"><i>Orcinus orca</i></a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#"><i>Pristis zijsron</i></a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Sousa sahalensis as Sousa chinensis</a> Australian Humpback Dolphin [87942]		Breeding known to occur within area	In feature area
<b>Migratory Terrestrial Species</b>			
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
<a href="#">Symposiachrus trivirgatus as Monarcha trivirgatus</a> Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
<b>Migratory Wetlands Species</b>			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
<a href="#">Calidris alba</a> Sanderling [875]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area	In feature area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area	In feature area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]		Species or species habitat known to occur within area	In feature area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Roosting known to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Roosting known to occur within area	In feature area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Philomachus pugnax</a> Ruff (Reeve) [850]		Roosting known to occur within area	In feature area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area	In feature area
<a href="#">Tringa brevipes</a> Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area	In feature area
<a href="#">Tringa incana</a> Wandering Tattler [831]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area	In feature area

## Other Matters Protected by the EPBC Act

Listed Marine Species			[ Resource Information ]
Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>Bird</b>			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In buffer area only
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Ardenna carneipes as Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Ardenna grisea as Puffinus griseus</a> Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In buffer area only
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
<a href="#">Calidris alba</a> Sanderling [875]		Roosting known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area	In feature area
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea antipodensis gibsoni as Diomedea gibsoni</a> Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
<a href="#">Himantopus himantopus</a> Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area	In feature area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Philomachus pugnax</a> Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Recurvirostra novaehollandiae</a> Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Rostratula australis as Rostratula benghalensis (sensu lato)</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Sternula albifrons as Sterna albifrons</a> Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
<a href="#">Symposiachrus trivirgatus as Monarcha trivirgatus</a> Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Tringa brevipes as Heteroscelus brevipes</a> Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Tringa incana as Heteroscelus incanus</a> Wandering Tattler [831]		Roosting known to occur within area	In feature area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area	In feature area
<b>Fish</b>			
<a href="#">Acentronura tentaculata</a> Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
<a href="#">Campichthys tryoni</a> Tryon's Pipefish [66193]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys amplexus</a> Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Corythoichthys ocellatus</a> Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area	In feature area
<a href="#">Festucalex cinctus</a> Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys cyanospilos</a> Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys heptagonus</a> Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus kelloggi</a> Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus trimaculatus</a> Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Hippocampus whitei</a> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
<a href="#">Maroubra perserrata</a> Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
<a href="#">Micrognathus andersonii</a> Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area	In feature area
<a href="#">Micrognathus brevirostris</a> thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area	In feature area
<a href="#">Microphis manadensis</a> Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus dunckeri</a> Duncker's Pipehorse [66271]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus spinosissimus</a> Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
<a href="#">Solenostomus paradoxus</a> Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Stigmatopora nigra</a> Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
<a href="#">Urocampus carinirostris</a> Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
<a href="#">Vanacampus margaritifer</a> Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
<b>Mammal</b>			
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area	In feature area
<b>Reptile</b>			
<a href="#">Acalyptophis peronii</a> Horned Seasnake [1114]		Species or species habitat may occur within area	In buffer area only
<a href="#">Aipysurus laevis</a> Olive Seasnake [1120]		Species or species habitat may occur within area	In feature area
<a href="#">Astrotia stokesii</a> Stokes' Seasnake [1122]		Species or species habitat may occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Disteira kingii</a> Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
<a href="#">Disteira major</a> Olive-headed Seasnake [1124]		Species or species habitat may occur within area	In buffer area only
<a href="#">Emydocephalus annulatus</a> Turtle-headed Seasnake [1125]		Species or species habitat may occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		Species or species habitat may occur within area	In feature area
<a href="#">Laticauda laticaudata</a> a sea krait [1093]		Species or species habitat may occur within area	In feature area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

## Whales and Other Cetaceans

[ [Resource Information](#) ]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area	In feature area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Congregation or aggregation known to occur within area	In feature area
<a href="#">Orcaella heinsohni as Orcaella brevirostris</a> Australian Snubfin Dolphin [81322]		Species or species habitat likely to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#">Sousa sahalensis as Sousa chinensis</a> Australian Humpback Dolphin [87942]		Breeding known to occur within area	In feature area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area



Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

### Habitat Critical to the Survival of Marine Turtles

Scientific Name	Behaviour	Presence	Buffer Status
Nov-Feb			
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Nesting	Known to occur	In feature area

### Extra Information

#### State and Territory Reserves [\[ Resource Information \]](#)

Protected Area Name	Reserve Type	State	Buffer Status
Bribie Island	National Park	QLD	In feature area
Moreton Bay	Marine Park	QLD	In feature area
Pumicestone Channel	Fish Habitat Area (B)	QLD	In buffer area only

#### Nationally Important Wetlands [\[ Resource Information \]](#)

Wetland Name	State	Buffer Status
<a href="#">Bribie Island</a>	QLD	In feature area
<a href="#">Moreton Bay</a>	QLD	In buffer area only
<a href="#">Pumicestone Passage</a>	QLD	In buffer area only

#### EPBC Act Referrals [\[ Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
<a href="#">Banksia Beach Water Treatment Plant</a>	2007/3396	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
<a href="#">Bongaree Seawall Renewal Project</a>	2012/6688	Not Controlled Action	Completed	In buffer area only
<a href="#">Construction of Sewerage Pipeline</a>	2009/4868	Not Controlled Action	Completed	In buffer area only
<a href="#">First Avenue Stormwater Discharge Improvement</a>	2002/604	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Not controlled action</b>				
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area
<a href="#">Installation of a sewer rising main and replacement of the existing PVC rising m</a>	2005/2058	Not Controlled Action	Completed	In buffer area only
<a href="#">Kakadu Beach high tide shore bird roost maintenance, Bribie Island, QLD</a>	2014/7181	Not Controlled Action	Completed	In buffer area only
<a href="#">Moreton Bay Regional Council/Natural resources management/Lot 4 Esplanade Toorbul QLD 4510/QLD/Maintenance of a high tide shore bird roost</a>	2014/7188	Not Controlled Action	Completed	In buffer area only
<a href="#">Pacific Harbour Project</a>	2000/53	Not Controlled Action	Completed	In buffer area only
<a href="#">Residential Viewing Corridor Overlooking Moreton Bay</a>	2007/3775	Not Controlled Action	Completed	In buffer area only
<a href="#">Spitfire Channel Dredging</a>	2005/2247	Not Controlled Action	Completed	In buffer area only
<a href="#">Toorbul Foreshore Wader Roost Enhancement</a>	2004/1349	Not Controlled Action	Completed	In feature area

#### Referral decision

<a href="#">Bongaree Seawall Renewal Project, Qld</a>	2012/6671	Referral Decision	Completed	In buffer area only
---	-----------	-------------------	-----------	---------------------

#### Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
<b>Dolphins</b>			
<a href="#">Sousa chinensis</a>			
Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur	In feature area
<a href="#">Tursiops aduncus</a>			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur	In feature area
<b>Marine Turtles</b>			
<a href="#">Caretta caretta</a>			
Loggerhead Turtle [1763]	Nesting	Known to occur	In feature area
<a href="#">Chelonia mydas</a>			
Green Turtle [1765]	Foraging	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
<b>Sharks</b>			
<a href="#">Carcharias taurus</a>			
Grey Nurse Shark [64469]	Foraging	Known to occur	In feature area
<b>Whales</b>			
<a href="#">Megaptera novaeangliae</a>			
Humpback Whale [38]	Resting on migration (southbound)	Known to occur	In buffer area only

# Caveat

## 1 PURPOSE

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

The report contains the mapped locations of:

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

## 2 DISCLAIMER

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

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

## 3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

## 4 LIMITATIONS

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

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

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

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

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

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

# Acknowledgements

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

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

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

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

[© Commonwealth of Australia](#)

Department of Agriculture Water and the Environment

GPO Box 858

Canberra City ACT 2601 Australia

+61 2 6274 1111

## **Appendix C**

# **Likelihood of Occurrence Assessment**

A likelihood of occurrence assessment for conservation significant species identified during the desktop review was undertaken. The assessment considered known habitat and ecological requirements of the species against the vegetation and habitat types identified in the field survey.

Each species was assessed against the categories defined below.

- Known: Species was positively identified and recorded in the Project site during the field assessment; or previous, reliable records occur within the Project site.
- Likely to occur: Species was not recorded during the field survey or previously, however there are known records within the nearby surrounding area and suitable habitat exists in the Project site.
- May occur: Species was not recorded during the field survey or previously, however known records occur in the surrounding area and/or habitat in the Project site is marginal or degraded.
- Unlikely to occur: Habitat in the Project site might be suitable or marginal; however, species was not recorded during the field survey, and no known records of the species exist within the surrounding area.

This process is to be used as a guide and is not to be used as indicating species presence or absence other than where observed presence is indicated.



Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<b>Migratory Marine Birds</b>				
<i>Anous stolidus</i> (Common Noddy)	SL	Mi	The common noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. During the breeding season, they usually occur on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters. Birds may nest in bushes, saltbush, or other low vegetation. They may also nest on the ground in Pigface ( <i>Carpobrotus</i> spp.) or grass, on bare rock, on top of rocks protruding above vegetation, on shingle beaches, among coral rubble or in sand close to grassy areas. The species has also been recorded nesting in the forks of tall trees, at the top of Coconut Palms ( <i>Cocos nucifera</i> ), in holes in dead timber and on tree-stumps (DAWE, 2022).	<b>Unlikely to occur</b> There are several recorded occurrences located near the Project Area. Current known distribution does encompass the Project Area. Suitable habitat is unlikely to occur within the Project Area.
<i>Apus pacificus</i> (Fork-Tailed Swift)	SL	Mi	This species occurs in all states, with scattered records in Queensland. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. They mostly occur over inland plains but sometimes above foothills or in coastal areas; over cliffs and beaches and also over islands and sometimes well out to sea; over settled areas, including towns, urban areas, and cities; mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland, or saltmarsh; and at treeless grassland and sandplains covered with spinifex, open farmland, and inland and coastal sand-dunes and sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area. This species may overfly the Project Area.
<i>Ardenna carneipes</i> (Flesh-Footed Shearwater)	SL	Mi	These species are classified as aerial pelagic marine seabirds, spending most of their time in flight over inshore, offshore and in pelagic waters ranging widely in the Southern Ocean. These species are known to frequent small islands off the southern coasts of Australian and Antarctic islands for breeding purposes. Their diets usually consist of fish and cephalopods and feed within the southern regions of Australia (DAWE, 2022).	<b>Unlikely to occur</b> One recorded occurrence located near the Project Area in 1966. Suitable habitat is unlikely to occur within the Project Area.
<i>Ardenna grisea</i> (Sooty Shearwater)	SL	Mi		<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Calonectris leucomelas</i> (Streaked Shearwater)	SL	Mi		<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area.
<i>Fregata ariel</i> (Lesser Frigatebird)	SL	Mi	It is common in tropical and subtropical seas, breeding on remote islands, including Christmas Island in the Indian Ocean in recent years. It is almost exclusively a sea bird spending many months out at sea seeking refuge on remote islands and coming to nest between May and December in trees on Christmas Island (ALA, 2022).	<b>Unlikely to occur</b> One recorded occurrence located near the Project Area. Suitable habitat is unlikely to occur within the Project Area.
<i>Fregata minor</i> (Great Frigatebird)	SL	Mi	This species has a wide distribution throughout the world's tropical seas. Hawaii is the northernmost extent of their range in the Pacific Ocean, in the Central and South Pacific, colonies are found on most islands' groups from Wake Island to the Galapagos to New Caledonia with a few pairs nesting on Australian possessions in the Coral Sea. Colonies are also found on numerous Indian Ocean islands including Aldabra, Christmas Island, the Maldives and Mauritius (ALA, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area.
<i>Phaethon lepturus</i> (White-Tailed Tropicbird)	SL	Mi	This species occupies marine habitats in tropical waters with sea-surface temperatures of more than 22°C. The tropicbird breeds on islands and atolls, where it nests in a variety of habitats including on bare sandy ground, in closed-canopy rainforest, on rocky cliffs and in quarries. The species feeds over warm waters of low salinity close to Christmas Island, but also disperse as far as the continental shelf off northern Western Australia (Marchant & Higgins, 1990). In Australian waters they are more pelagic and are rarely found inshore or beachcast (DAWE, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area.
<i>Sternula albifrons</i> (Little Tern)	SL	Mi	This species can be divided into two major subpopulations: a northern subpopulation that breeds across northern Australia, from about Broome to eastern Cape York Peninsula; and an eastern subpopulation that breeds on the eastern and south-eastern coast of the mainland and northern and eastern Tasmania. This species inhabits sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours, and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. They appear to be less often on offshore continental islands or coral cays off Queensland (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Marginal suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<b>Migratory Terrestrial Birds</b>				
<i>Cuculus optatus</i> (Oriental Cuckoo)	SL	Mi/Ma	The Oriental Cuckoo usually frequents various forest types including coniferous, deciduous, and mixed forests, monsoon forests and rainforest edges. It also occurs in farmland with scattered trees. In the winter range, it can be occasionally found in swamps, mangroves, plantations, river flats, roadsides, and islands (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area. Suitable habitat is likely to occur within the Project Area.
<i>Monarcha melanopsis</i> (Black-Faced Monarch)	SL	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 (DAWE, 2021). It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. The species especially occurs in marginal habitats during winter or during passage (migration) (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence adjacent to the Project Area in 2017. Suitable habitat is likely to occur within the Project Area.
<i>Monarcha trivirgatus</i> (Spectacled Monarch)	SL	Mi	Spectacled monarch typically inhabits understorey of (moist eucalypt forests, rainforests, gullies, riparian areas). The species also inhabits mangroves and other densely vegetated habitats. Predominantly coastal but range extends inland (DAWE, 2022).	<b>May occur</b> No recorded occurrences located near the Project Area. Suitable habitat utilised when migrating may occur within the Project Area.
<i>Myiagra cyanoleuca</i> (Satin Flycatcher)	SL	Mi	The satin flycatcher is widespread in eastern Australia. The species inhabits heavily vegetated gullies in wet eucalypt dominant sclerophyll forests and taller woodlands, often near wetlands or watercourses. On migration, they occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. The species sometimes also occur in dry sclerophyll forests and woodlands, usually dominated by eucalypts (DAWE, 2022).	<b>May occur</b> There are several recorded occurrences located near the Project Area. Suitable habitat utilised when migrating may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Rhipidura rufifrons</i> (Rufous Fantail)	SL	Mi	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as <i>Eucalyptus microcorys</i> , <i>E.cypellocarpa</i> , <i>E. radiata</i> , <i>E. regnans</i> , <i>E. delegatensis</i> , <i>E. pilularis</i> or <i>E.resinifera</i> ; usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including <i>E. maculata</i> , <i>E. melliodora</i> , ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area with two recorded occurrences adjacent to the Project Area in 2018. Suitable habitat utilised when migrating likely to occur within the Project Area.
<b>Migratory Wetlands Birds</b>				
<i>Actitis hypoleucos</i> (Common Sandpiper)	SL	Mi	Wide range of coastal wetlands and some intact wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream, around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties (DAWE, 2022).	<b>Unlikely to occur</b> There are frequent recorded occurrences located near the Project Area; however, suitable habitat is unlikely to occur within the Project Area as species is rarely on mudflats.
<i>Arenaria interpres</i> (Ruddy Turnstone)	SL	Mi	This species is widespread within Australia during its non-breeding period of the year from Tasmania to Darwin. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed. mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays, and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In north Australia it is known to occur in a wide variety of habitats and may prefer wide mudflats (DAWE, 2022).	<b>Unlikely to occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Marginal suitable habitat may occur within the Project Area, however, species prefers rocky shores.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Calidris acuminata</i> (Sharp-Tailed Sandpiper)	SL	Mi	This species occurs on muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans, and hypersaline salt lakes inland. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores and swamps and creeks lined with mangroves (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Suitable habitat may occur within the Project Area.
<i>Calidris alba</i> (Sanderling)	SL	Mi	They are occasional in the Gulf of Carpentaria and Torres Strait. Scattered records occur in mid-east and south-east Queensland from Townsville and Alva Beach, south to Fraser Island, and around Moreton Bay and Point Danger, including on offshore islands. In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. Less often the species occurs on more sheltered sandy shorelines of estuaries, inlets, and harbours. Rarely, they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, salt ponds and samphire flats. There are rare inland records from sandy shores of ephemeral brackish lakes and brackish river-pools (DAWE, 2022).	<b>Unlikely to occur</b> There are several recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area as species prefers open exposed sand and beaches.
<i>Calidris falcinellus</i> (Broad-Billed Sandpiper)	SL	Mi	This species is most common on the north and north-west coasts and occur regularly at scattered localities in southern Australia. In Queensland, there are scattered coastal records, including at the south and south-east Gulf of Carpentaria. Occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, reefs or rocky platforms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby. They favour mud among, or fringed by, mangroves, particularly on the seaward side and sometimes occur in estuaries edged by saltmarsh. Rarely recorded inland. Foraging occurs on exposed flats of soft mud or wet sand at edges of coastal and near-coastal wetlands. They roost on the banks of sheltered sandy, shelly or shingly beaches. They nest on the ground, frequently in the top of a tussock (DAWE, 2022).	<b>Likely to occur</b> There are several recorded occurrences located near the Project Area. Suitable foraging habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Calidris melanotos</i> (Pectoral Sandpiper)	SL	Mi	This species occurs on wetlands that have open fringing mudflats and low, emergent, or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. The species is usually found in coastal or near coastal habitat but is occasionally found further inland (DAWE, 2022).	<b>May occur</b> There are several recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.
<i>Calidris pugnax</i> (Ruff)	SL	Mi	The ruff is a migratory species that occurs in grassy tundra, along shores of lakes and ponds, in swampy meadows and marshes, also on mudflats and flooded fields, salt ponds. Breeds in the northern hemisphere and regularly visits Australia. Nests in depression in meadow, marsh, or clump of grass (DAWE, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Current known distribution does encompass the Project Area. Suitable habitat is likely to occur within the Project Area.
<i>Calidris ruficollis</i> (Red-Necked Stint)	SL	Mi	This species is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions and found inland in all states when conditions are suitable. They are mostly found in coastal areas, including in sheltered inlets, bays, lagoons, and estuaries with intertidal mudflats, often near spits, islets, and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs, or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks, and pools in salt flats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Marginal suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Charadrius bicinctus</i> (Double-Banded Plover)	SL	Mi	This species found in both coastal and inland areas. During the non-breeding season, it is common in eastern and southern Australia, mainly between the Tropic of Capricorn and western Eyre Peninsula, with occasional records in northern Queensland and Western Australia (Marchant & Higgins 1993). They are often 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 saltworks (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.
<i>Charadrius veredus</i> (Oriental Plover)	SL	Mi	This species is a non-breeding visitor to Australia, where the species occurs in both coastal and inland areas, mostly in northern Australia. They spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. They then usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps or open areas that have been recently burnt (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.
<i>Gallinago hardwickii</i> (Latham's Snipe)	SL	Mi	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) (DAWE, 2022). Habitat preferences include soft wet ground or shallow water with tussocks and other green or dead growth, wet parts of paddocks or near dams, scrub, or open woodland (Knight, Pizzey, & Pizzey, 2012).	<b>Unlikely to occur</b> There are frequent recorded occurrences located near the Project Area. However, the Project Area is more influenced by the marine environment rather than the freshwater environments in which this species prefers.
<i>Limnodromus semipalmatus</i> (Asian Dowitcher)	SL	Mi	The Asian Dowitcher is known to visit to Australia, and occurs in sheltered coastal environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats. In Australia, the Port Hedland Saltworks provides crucial habitat for the species. The species is commonly found in the round ponds and channels of saltworks and sewage farms. It is also found at near-coastal swamps and lakes (DAWE, 2022).	<b>May occur</b> There are several recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Gallinago megala</i> (Swinhoe's Snipe)	SL	Mi	In Queensland specimens have been taken at Normanton and have been sighted at Mount Isa. During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps, and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens. Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams, and sewage ponds. They are also found in drying claypans, and inundated plains pitted with crab holes (DAWE, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. The Project Area is more influenced by the marine environment rather than the freshwater environments in which this species prefers.
<i>Limosa lapponica</i> (Bar-Tailed Godwit)	SL	Mi	The bar-tailed Godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria, including the offshore islands. It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. This species has been sighted in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks, and airstrips, although it is commonly recorded in paddocks (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area with four recorded occurrences adjacent to the Project Area in 2020. Suitable habitat may occur within the Project Area.
<i>Limosa limosa</i> (Black-Tailed Godwit)	SL	Mi	The black-tailed Godwit is found in all states and territories of Australia; however, it prefers coastal regions, and the largest populations are found on the north coast between Darwin and Weipa. It is generally found in small numbers elsewhere and there are scattered inland records. primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand, or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near coastal, wetlands, such as saltmarsh, salt flats, river pools, swamps, lagoons, and floodplains. There are a few inland records, around shallow, freshwater, and saline lakes, swamps, dams, and bore-overflows. They also use lagoons in sewage farms and saltworks (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.



Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Numenius minutus</i> (Little Curlew)	SL	Mi	This species spends the non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast. There are records of the species from inland Australia, and widespread but scattered records on the east coast. The species has also been recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island. The species is recorded in Australia between September and April and there are few winter records. Most often found feeding in short, dry grassland and sedgeland, including dry floodplains and black soil 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 (DAWE, 2022).	<b>May occur</b> There are several recorded occurrences located near the Project Area. Marginal suitable habitat may occur within the Project Area.
<i>Numenius phaeopus</i> (Whimbrel)	SL	Mi	The whimbrel is a regular migrant to Australia and New Zealand, with a primarily coastal distribution. There are also scattered inland records of Whimbrels in all regions. It is found in all states but is more common in the north. It is found along almost the entire coast of Queensland, 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. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used salt flats with saltmarsh, or saline grasslands with standing water left after high springtides, and in similar habitats in sewage farms and salt fields (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area with four recorded occurrences within the Project Area in 2019 (ALA, 2021). Suitable habitat is likely to occur within the Project Area.
<i>Pandion haliaetus</i> (Osprey)	SL	Mi	The species occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish, or saline water for foraging (Marchant & Higgins, 1993). They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs, and large lakes and. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites (DAWE, 2022).	<b>May occur</b> No recorded occurrences located near the Project Area. Suitable habitat is likely to occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Pluvialis fulva</i> (Pacific Golden Plover)	SL	Mi	This species is widespread in coastal regions, though there are also several inland records (in all states). Recorded occurrences are especially widespread along the Queensland and NSW coastlines. In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats, and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> , or beds of seagrass) in sheltered areas including harbours, estuaries, and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish, or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass (DAWE, 2022).	<b>Likely to occur</b> There are frequent recorded occurrences located near the Project Area with two recorded occurrences within the Project Area in 2014. Suitable habitat is likely to occur within the Project Area.
<i>Pluvialis squatarola</i> (Grey Plover)	SL	Mi	The Grey Plover has been recorded in all states, where it is found along the coasts, and it especially abundant coastlines of South Australia and Western Australia (Albany and the northern Kimberley coast). In Queensland, large numbers have been recorded in the south-eastern Gulf of Carpentaria but records elsewhere are at sparsely scattered sites along the east coast. In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayment's, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Suitable habitat may occur within the Project Area.
<i>Tringa brevipes</i> (Grey-Tailed Tattler)	SL	Mi	The grey-tailed Tattler is found along the entire coast, with small numbers located in the Gulf of Carpentaria. It is widespread along the east coast and the Torres Strait. There is a continuous population along the entire east coast of Cape York Peninsula. Inland records include Burdekin Weir, Charters Towers and Mount Isa; however, these are rare, with the species preferring coastal locations. Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral, or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel, or shells and also on intertidal mudflats in embayment's, estuaries and coastal lagoons, especially fringed with mangroves (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Tringa glareola</i> (Wood Sandpiper)	SL	Mi	In Queensland there are sparsely scattered records, mainly recorded southern Australia. This species uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially <i>Melaleuca</i> and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. They are rarely found using brackish wetlands, or dry stunted saltmarsh. Typically they do not use coastal flats, but are occasionally recorded in stony wetlands. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (DAWE, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area as rarely using brackish wetlands.
<i>Tringa incana</i> (Wandering Tattler)	SL	Mi	This species is uncommon in Australia. There are a few records from around Darwin and as a passage migrant in Torres Strait, and along the east coast, often on offshore or nearshore islands and reefs, south as far as Moruya (NSW). It is also recorded on Lord Howe and Norfolk Islands. They are generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches and tends to avoid mudflats. Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline (DAWE, 2022).	<b>Unlikely to occur</b> No recorded occurrences located near the Project Area. Suitable habitat is unlikely to occur within the Project Area as species avoids mudflats.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Tringa nebularia</i> (Common Greenshank)	SL	Mi	This species does not breed in Australia; however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. This species 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 embayment's, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes, and inundated floodplains, claypans and salt flats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area with one recorded occurrence within the Project Area in 1983 (prior to current development). Suitable habitat may occur within the Project Area.
<i>Tringa stagnatilis</i> (Marsh Sandpiper)	SL	Mi	The marsh sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. It lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia they prefer intertidal mudflats (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Suitable habitat may occur within the Project Area.
<i>Xenus cinereus</i> (Terek Sandpiper)	SL	Mi	This species has a primarily coastal distribution, with occasional records inland. It is more widespread and common in northern and eastern Australia than southern Australia. It is widespread in coastal Queensland, from south-east of the Gulf of Carpentaria, north to Torres Strait and along the eastern coast to south-east Australia. Mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayment's, harbours, or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire forbland (DAWE, 2022).	<b>May occur</b> There are frequent recorded occurrences located near the Project Area. Suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<b>Plants</b>				
<i>Acacia attenuata</i> (whipstick wattle)	V	V	<i>This species</i> is endemic to southeast Queensland and is found from Bundaberg to Burleigh Heads on the Gold Coast and within 30 km of the coastline. <i>Acacia attenuata</i> is a slender shrub that grows 3 to 4 m tall. It is found in wet heathland and open eucalypt forest communities in low-lying coastal habitats where soils are sandy / peaty and subject to seasonal waterlogging. It is also found in open woodland and open forest communities, usually with a heath understorey (DES, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Acronychia littoralis</i> (scented acronychia)	E	E	Scented Acronychia occurs in coastal areas (<2 km from the sea) in sub-littoral rainforest, usually in transitional zones between littoral rainforest and swamp sclerophyll forest, littoral and coastal cypress pine communities or on the margin of littoral forest and cleared land (DAWE, 2022).  Scented Acronychia has a narrow coastal distribution in eastern Australia between Fraser Island in Queensland and Port Macquarie on the north coast of NSW. In Queensland there are two, small, genetically isolated populations that consist of two trees at a single site on the Gold Coast and some trees in and near the Cooloola Section of Great Sandy National Park (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Arthraxon hispidus</i> (hairy-joint grass)	V	V	<i>Arthraxon hispidus</i> is a slender, tufted, creeping perennial grass found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps and occasionally in woodlands. This species has been recorded from scattered locations throughout Queensland and occurs north to Port Douglas, and west to disjunct occurrences around springs in Carnarvon National Park (NP); however, most occurrences are from Noosa southwards (DES, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Bosistoa transversa</i> (three leaved bosistoa)		V	<i>Bosistoa transversa</i> is a small tree which grows in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 300 m in altitude. This species is often associated with vegetation which includes <i>Argyrodendron trifoliolatum</i> , <i>Syzygium hodgkinsoniae</i> , <i>Endiandra pubens</i> , <i>Dendrocnide photinophylla</i> , <i>Acmena ingens</i> , <i>Diploglottis australis</i> and <i>Diospyros mabacea</i> (DES, 2022). This species is known from coastal districts from the Richmond River, NSW, to Mt Larcom near Gladstone, Queensland	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Cryptocarya foetida</i> (stinking Cryptocarya)	V	V	<i>Cryptocarya foetida</i> is known from Iluka, New South Wales, to Fraser Island and east of Gympie, southern Queensland. This species grows in littoral rainforest, usually on sandy soils, with mature trees also growing on basalt soils (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Cryptostylis hunteriana</i> (leafless tongue-orchid)		V	The Leafless Tongue-orchid has been reported to occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, <i>Xanthorrhoea</i> 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 (DAWE, 2022).  In Queensland, populations are located within the Moreton and Wide Bay Pastoral Districts; and records indicate that the species has been collected from around Toowoomba, Cooloola, Maroochydore, D'agular Range and Tin Can Bay (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Cupaniopsis shirleyana</i> (wedge leaf tuckeroo)	V	V	<i>Cupaniopsis shirleyana</i> is a shrub or small tree that grows up to 6 m in height on a variety of soils and occurs in a variety of rainforest types including vine thicket and dry rainforest. This species has been recorded on hillsides, mountain tops, lower slopes of valleys, stream beds and along riverbanks at elevations between 20 to 550m. <i>Cupaniopsis shirleyana</i> is restricted to south east Queensland, from Brisbane, north to Bundaberg (DES, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Macadamia integrifolia</i> (macadamia nut)	V	V	<i>Macadamia integrifolia</i> occurs from Mount Bauple, near Gympie, to Currumbin Valley in the Gold Coast Hinterland, south-east Queensland. The flowering period for this species is August to October, with fruiting December to March. This species occurs in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges (DAWE, 2021)	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Macadamia ternifolia</i> (bopple nut)	V	V	<i>Macadamia ternifolia</i> is restricted to an area between Mount Pinbarren, south to Mary Cairncross Park, near Maleny. This species occurs in fertile, basalt-derived soils on steep southern slopes in association with <i>Argyrodendron trifoliatum</i> - <i>Dissiliaria baloghioides</i> alliance in the Blackall Range area and Araucarian microphyll-notophyll mixed tall closed forest at Mt Pinbarren (DAWE, 2021)	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Macadamia tetraphylla</i> (rough shelled bush nut)	V	V	This species occurs from northern NSW to south-east Queensland. Flowers late winter to mid spring. Fruits mid-summer. It generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites (DAWE, 2021).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Persicaria elatior</i> (tall knotweed)	V	V	This species normally grows on sandy, alluvial soil in swampy areas and riparian herblands along watercourses and lake edges. Occasionally in swamp forest or associated with disturbance. Occurs in the Moreton District of south east Queensland (DES, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Phaius australis</i> (lesser swamp-orchid)	E	E	<i>Phaius australis</i> is endemic to Australia and occurs in eastern Queensland and northern New South Wales. This species is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where broad-leaved paperbark ( <i>Melaleuca leucadendra</i> ) or swamp Mahogany ( <i>Lophostemon suaveolens</i> ) grows. It is typically restricted to swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest. <i>Phaius australis</i> grows in areas where soils are almost always damp, but not flooded for lengthy periods. They often grow in deep shade but can also occur in full sun. The flowering season of <i>Phaius australis</i> is mainly between August and December (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Phaius bernaysii</i> (yellow swamp orchid)	E	E	<i>Phaius bernaysii</i> is known to grow along the margins between open forest/woodland and closed sedgeland, along the perimeter of a swamp, often in a fairly shady environment in <i>Melaleuca quinquenervia</i> – <i>Eucalyptus robusta</i> open forest in sandy or peaty soil. This species is currently known to occur only in one area on Stradbroke Island, near Myora in Queensland (DEWHA, 2008).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Rhodamnia rubescens</i> (scrub turpentine)	CE	CE	Occurs from areas inland of Bundaberg, south to NSW. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000 mm-1,600 mm. Found in littoral, warm temperate and subtropical rainforest, and wet sclerophyll forest usually on volcanic and sedimentary soils (TSSC, 2020). Flowering occurs from August to October, with fruit ripening from October to December (ALA, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Rhodomyrtus psidioides</i> (native guava)	CE	CE	Occurs from NSW, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland. The species occurs in rainforest and its margins with sclerophyll vegetation, often near creeks and drainage lines. <i>Rhodomyrtus psidioides</i> is a pioneer species in disturbed environments and is locally common in disturbed areas, such as regrowth and rainforest margins (TSSC, 2020). Flowering occurs from late spring to early summer (OEH, 2021).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Samadera bidwillii</i> (quassia)	V	V	<i>Samadera bidwillii</i> is endemic to Queensland and is currently known to occur in several localities between Scawfell Island, near Mackay, and Goomborian, north of Gympie. This species commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. <i>Samadera bidwillii</i> is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<i>Thesium australe</i> (austral toadflax)	V	V	<i>Thesium australe</i> has a widespread but sporadic distribution, occurring between the Bunya Mountains in south-east Queensland to north-east Victoria and as far west as the southern, central and northern tablelands in New South Wales and the Toowoomba region. <i>Thesium australe</i> is largely confined to moist grasslands, grassy woodlands or sub-alpine grassy heathlands, occurring in association with Kangaroo grass ( <i>Themeda triandra</i> ) and <i>Poa</i> spp. It is hemi-parasitic and often is parasitic on <i>Themeda triandra</i> (DAWE, 2022).	<b>Unlikely to occur</b> – No records of this species on Bribie Island or the nearby mainland. Suitable habitat absent from the Project Area.
<b>Fauna</b>				
<b>Amphibians</b>				
<i>Litoria longburensis</i> (wallum sedgefrog)	V	V	The species occurs in south-east Queensland from Fraser Island to Woolgoola, northern New South Wales, covering 1001-80000 km <sup>2</sup> along coastal New South Wales and Queensland. The species inhabits ephemeral, seasonal and permanent wetlands with emergent reeds, ferns and/or sedges, in undisturbed coastal wallum (DAWE, 2022). Known from REs including 12.2.12 (wet heathlands), 12.2.15 (wet sedgeland), 12.2.5a (open-forest to low closed-forest on beach ridges) and 12.2.7 (open-forest to woodland on sand plains) and 11.10.4 (DAWE, 2022).	<b>Unlikely to occur</b> – Numerous records exist on Bribie Island for this species. However, suitable freshwater habitat absent from the Project Area.



Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Mixophyes fleayi</i> (Fleay's Frog)	E	E	The Fleay's frog is narrowly and disjunctly distributed in wet forests from the Conondale Range in south east Queensland, south to Yabbra Scrub in north east New South Wales. While the majority of records for the species are from altitudes above 400 m, Fleay's frog is also known from lowland rainforest. This species is associated with montane rainforest and open forest communities adjoining rainforest. It occurs along stream habitats from first to third order streams (i.e. small streams close to their origin through to permanent streams with grades of 1 in 50) and is not found in ponds or ephemeral pools. In Queensland, important habitat has been defined as: 'permanent and semi-permanent freshwater streams, between 100-1000 m in altitude, in rainforest and other forest communities of the McPherson, Main and Conondale Ranges, Mount Tamborine, and the Mistake and Bunya Mountains' (DAWE, 2022).	<b>Unlikely to occur</b> – Not previously recorded on Bribie Island or the adjacent mainland. Nearest recorded occurrence north of Bellthorpe National Park 50 km to the northwest (ALA, 2022). Suitable freshwater habitat absent from the Project Area.
<b>Birds</b>				
<i>Anthochaera phrygia</i> (regent honeyeater)	CR	CE	The regent honeyeater is largely restricted to dry box-ironbark open-forest and woodland areas inland of the Great Dividing Range. In Queensland they are restricted to the south-east. Information on their movements is limited. When foraging, this species is reliant on the nectar from eucalypts such as <i>Eucalyptus sideroxylon</i> , <i>Eucalyptus albens</i> , <i>Eucalyptus melliodora</i> and <i>Eucalyptus blakelyi</i> , however will also eat arthropods and fruit. As a result, this species prefers areas of habitat close to creeks and valleys, where the soil is wet and fertile and flowering trees are reliable (DAWE, 2022)	<b>Unlikely to occur</b> – a recorded occurrence of this species from the north end of Bribie Island (ALA, 2022). However, suitable habitat for this species is marginal.
<i>Botaurus poiciloptilus</i> (Australasian bittern)	E	E	In Australia, the Australasian bittern's core range is the south and east (including Tasmania) and the south-west of western Australia, with apparently isolated records and perhaps populations elsewhere around coastal regions. This species favours freshwater wetlands and rarely, estuarine or tidal wetlands. Its preferred microhabitats are shallow water with tall vegetation such as rushes, reeds and sedges or trampled vegetation adjacent to deep-water pools (DAWE, 2022).	<b>Unlikely to occur</b> – Recorded occurrences on Bribie Island north and south of the Project Area from 2013 (ALA, 2022); however, only marginal suitable habitat for this species present.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Calidris canutus</i> (Red Knot)	E	E/ Mi	In Australasia the species 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. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DAWE, 2022). The Red Knot usually forage in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide and roosts on sandy beaches, spits, islets, and mudflats (DAWE, 2022).	<b>May occur</b> – Species previously recorded within 500m of the Project Area as recently as 2018 (ALA, 2022). Marginal suitable foraging habitat present within Project Area.
<i>Calidris ferruginea</i> (Curlew Sandpiper)	CR	CE/ Mi	In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns (DAWE, 2022). The species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters (DAWE, 2022). The species forages on mudflats and nearby shallow water and generally roosts on bare dry shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (DAWE, 2022). This species breeds outside of Australia (DAWE, 2022).	<b>May occur</b> – Species previously within the Project Area (1983) prior to current development and recorded within 500m of the Project Area as recently as 2020 (ALA, 2022). Marginal suitable foraging habitat present within Project Area.
<i>Calidris tenuirostris</i> (Great Knot)	CR	CE/ Mi	The great knot has been recorded around the entirety of the Australian coast, with a few scattered records inland. An important site for the species is Moreton Bay in Queensland (DAWE, 2022). In Australia, the species prefer sheltered coastal habitats with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries, and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The species rarely occurs on inland lakes and swamps (DAWE, 2021). Typically, the species roosts in large groups in open areas, often at the water's edge or in shallow water close to feeding grounds (DAWE, 2022).	<b>May occur</b> – Species previously recorded within 500m of the Project Area as recently as 2020 (ALA, 2022). Marginal suitable foraging habitat present within Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Charadrius leschenaultii</i> (Greater Sand Plover)	V	V	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs (DAWE, 2022). They are occasionally recorded on near-coastal saltworks and salt lakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands (DAWE, 2022).	<b>May occur</b> – Species previously recorded within 500m of the Project Area as recently as 2018 (ALA, 2022). Marginal suitable foraging habitat present within Project Area.
<i>Charadrius mongolus</i> (Lesser Sand Plover)	E	E/ Mi	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal salt pans, brackish swamps and sandy or silt islands in riverbeds (Marchant & Higgins, 1993). In north-western Australia, the species appears to use the Port Hedland saltworks in preference to nearby beaches (DAWE, 2022). This species is seldom recorded away from the coast, at margins of lakes, soaks and swamps associated with artesian bores (Marchant & Higgins 1993). This species breeds outside of Australia (DAWE, 2022).	<b>May occur</b> – Species previously recorded within 500m of the Project Area as recently as 2020 (ALA, 2022). Marginal suitable foraging habitat present within Project Area.
<i>Cyclopsitta diophthalma coxeni</i> (Coxen's Fig-Parrot)		E	Recorded from the Maryborough - Gympie district in Queensland to the Macleay River on the NSW mid north coast. In NSW, the species is found in the Urbenville and Murwillumbah, and has been recorded in the Tweed, Brunswick, Richmond and Clarence valleys. Occurs in a range of habitats including lowland sub-tropical rainforest and dry rainforest, woodland, scrub, cleared land, urban and agricultural areas, from sea level to 900 metres asl. Microhabitat consists of areas where fig trees predominate. It feeds predominantly on fig seeds, but also feeds on fruit of other native and exotic trees as well as insect larvae. Nests are found in the canopy of tall trees in or near rainforest in the underside of a dead limb (DAWE, 2022).	<b>Unlikely to occur</b> – The closest recent recorded occurrence for this species is a record from near Maleny in 2001. This species has not been recorded on Bribie Island or the adjacent mainland. Suitable habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Erythrotriorchis radiatus</i> (Red Goshawk)	E	V	Endemic to northern and eastern Australia in coastal and subcoastal areas with large home ranges of up to 200km <sup>2</sup> . The red goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins, 1993). This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. The species nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. No breeding has been recorded in central Australia (DAWE, 2022).	<b>Unlikely to occur</b> - No nesting habitat was identified within the Project site during the field assessment. This species is considered rare, if not extinct, from Southeast Queensland. The most recent dated record from 1992 occurs 20 km to the northwest, whilst an undated record with high spatial uncertainty (accuracy to 10 km) is noted 8 km to the south west (ALA, 2022).
<i>Falco hypoleucos</i> (Grey Falcon)	V	V	The grey falcon is sparsely distributed across most of the Australian continent. The species occurs either as a resident or nomadic visitor to inland parts of all mainland states. This species prefers lightly treed inland plains, gibber deserts, sand ridges, pastoral lands, and timbered watercourses (Knight, Pizzey, & Pizzey, 2012). Also occurs near wetlands where surface water attracts prey. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse (Knight, Pizzey, & Pizzey, 2012)	<b>Unlikely to occur</b> – Species has not been previously recorded on Bribie Island or the nearby mainland. Suitable habitat does not occur within the Project Area.
<i>Fregetta grallaria grallaria</i> (White-bellied Storm-Petrel (Australasian))	LC	V	This species breeds on small offshore islets and rocks in the Lord Howe Island group, including Roach Island and Balls Pyramid. Its pelagic distribution is poorly understood, but it has been recorded north and east of its breeding islands to the tropics, in the Tasman Sea, Coral Sea, and north of New Zealand and it is thought that some birds also reach the central Pacific Ocean. It has also been recorded over near-shore waters off the coasts of Queensland. It occurs across sub-tropical and tropical waters in the Tasman Sea, Coral Sea and, possibly, the central Pacific Ocean. In the non-breeding season, it reaches and forages over near-shore waters along the continental shelf of mainland Australia (DAWE, 2022)	<b>Unlikely to occur</b> – Species has not been previously recorded on Bribie Island or adjacent mainland and other northern Moreton Bay Islands (ALA, 2022). Suitable habitat is unlikely to occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Grantiella picta</i> (Painted Honeyeater)		V	This highly nomadic species is distributed mainly west of the Great Dividing Range, and occurs from north Queensland, south to the Australian Capital Territory and Victoria where breeding populations appear to have declined. Painted honeyeaters mostly occur in woodland habitats which have an abundance of mistletoes. These woodlands are usually dominated by <i>Acacia</i> spp. e.g., brigalow ( <i>Acacia harpophylla</i> ), weeping myall ( <i>Acacia pendula</i> ), and mulga ( <i>Acacia aneura</i> ), belah ( <i>Casuarina cristata</i> ) and bull-oak ( <i>Allocasuarina luehmannii</i> ). Also found in white cypress ( <i>Callitris glaucophylla</i> ) woodlands in the eastern part of their range, if mistletoes are abundant (DAWE, 2022)	<b>Unlikely to occur</b> - No suitable habitat is found within the Project Area and no nearby records occur. Mistletoe was recorded during the field survey on some of the dominant canopy trees; however, this species is considered a vagrant east of the Great Dividing Range in Queensland.
<i>Hirundapus caudacutus</i> (White-Throated Needletail)	V	V/ Mi	The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. Further south on the mainland, it is widespread in Victoria, though more so on and south of the Great Divide, and there are few records in western Victoria outside the Grampians and the Southwest (DAWE, 2022). This species is almost exclusively aerial, from heights of less than 1m up to more than 1000m above the ground. They are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but less commonly recorded flying above woodland (DAWE, 2022). They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps (DAWE, 2022).	<b>Likely to occur</b> – Species is exclusively aerial. It has been previously recorded in the Project Area in 2014 (ALA, 2022). This species may overfly the Project Area.
<i>Lathamus discolor</i> (Swift Parrot)	E	CE	The swift parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. This species is mostly found in Victoria and New South Wales, with small numbers recorded in southeast Queensland. Whilst on the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species. Non-breeding birds preferentially feed in inland box-ironbark and grassy woodlands, and coastal swamp mahogany ( <i>Eucalyptus robusta</i> ) and spotted gum ( <i>Corymbia maculata</i> ) woodland when in flower (DAWE, 2022).	<b>Unlikely to occur</b> – not previously recorded on Bribie Island, and the nearest recorded occurrences is from 1983 approximately 5km to the west on the mainland (ALA, 2022). Marginal suitable foraging habitat may occur within the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<p><i>Limosa lapponica baueri</i></p> <p>(Western Alaskan Bar-tailed Godwit)</p>	V	V	<p>The bar-tailed godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria (DAWE, 2022). The species occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DAWE, 2022). The species usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They prefer exposed sandy or soft mud substrates on intertidal flats, banks, and beaches. The species roosts on sandy beaches, sandbars, spits and in near-coastal saltmarsh (DAWE, 2022). This species breeds outside of Australia</p>	<p><b>May occur</b> – This species has been recorded within the Project Area (1983) prior to current development and recently recorded at Toorbul (1km to west) in 2016 (ALA, 2022).</p> <p>Marginal suitable roosting or foraging habitat occurs within the Project Area.</p>
<p><i>Numenius madagascariensis</i></p> <p>(Eastern Curlew)</p>	E	CE/ Mi	<p>Within Australia, the eastern curlew has a primarily coastal distribution across all states. During the non-breeding season in Australia, the species 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. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves (Marchant &amp; Higgins, 1993). The species mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on salt flats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline (Marchant &amp; Higgins, 1993). The species roosts during high tide periods on sandy spits, sandbars, and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. They occasionally roost on reef-flats, in the shallow water of lagoons and other near-coastal wetlands (Marchant &amp; Higgins, 1993).</p>	<p><b>Likely to occur</b> – Species has been previously recorded within the Project Area in 2017 (ALA, 2022). This species has also been recorded in the park adjacent in 2020 (ALA, 2022).</p> <p>Suitable habitat may occur within the Project Area.</p>
<p><i>Pachyptila turtur subantarctica</i></p> <p>(Fairy Prion - southern)</p>		V	<p>Fairy Prion (southern) is a pelagic seabird which regularly feed in large flocks, sometimes with other seabirds. The species as a whole has a circumpolar distribution, and probably frequents subtropical waters during the non-breeding period (DAWE, 2022). Breeds in sub Antarctic cool temperate islands.</p>	<p><b>Unlikely to occur</b> – Species has not been previously recorded in the wider survey extent.</p> <p>Suitable habitat is unlikely to occur within the Project Area.</p>

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Pterodroma neglecta neglecta</i> (Kermadec Petrel)	LC	V	The Kermadec Petrel (western) is a pelagic seabird that occurs in tropical, subtropical, and temperate waters of the Pacific Ocean. It has been recorded in waters of 15–25°C in the subtropics and in colder waters in temperate regions, with one bird sighted in the northern Pacific Ocean in waters of about 6°C. It breeds on islands, atolls, and islets in the southern Pacific Ocean (DAWE, 2022).	<b>Unlikely to occur</b> – Species has not been previously recorded in the wider survey extent. Suitable habitat is unlikely to occur within the Project Area.
<i>Rostratula australis</i> (Australian Painted Snipe)	E	E	The Australian painted snipe has a scattered distribution across eastern and northern Australia (DAWE, 2022). Shallow freshwater wetlands are the main habitat for the Australian painted snipe (Marchant & Higgins, 1993). Such wetlands may include lakes, swamps, claypans, inundated / waterlogged grassland, dams, irrigated crop land and sewage ponds (Marchant & Higgins, 1993). Preferred wetland habitats boast emergent vegetation (including tussocks, grasses, sedges, rushes, reeds, cane grass and/or Melaleuca) (Marchant & Higgins, 1993). Nesting occurs amongst vegetation in or adjacent to wetlands (DAWE, 2022).	<b>Unlikely to occur</b> – Undated and spatially generalised recorded occurrences are noted from Bribie Island and the nearby mainland. However, suitable freshwater wetland habitat is absent from the Project Area.
<i>Sternula nereis nereis</i> (Australian Fairy Tern)		V	Within Australia, this species occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia. The Australian fairy tern nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (DAWE, 2022).	<b>Unlikely to occur</b> – No recorded occurrences on Bribie Island or the nearby mainland. Suitable habitat within the Project Area absent

<p><b>Seabirds</b></p> <p><i>Diomedea antipodensis</i> (Antipodean Albatross) (- / V)</p> <p><i>Diomedea antipodensis gibsonii</i> (Gibson's Albatross) (- / V)</p> <p><i>Diomedea exulans</i> (Wandering Albatross) (- / V)</p> <p><i>Macronectes giganteus</i> (Southern Giant-Petrel) (E / E, Mi)</p> <p><i>Macronectes halli</i> (Northern Giant Petrel) (- / V)</p> <p><i>Thalassarche carteri</i> (Indian Yellow-nosed Albatross) (V / V)</p> <p><i>Thalassarche cauta</i> (shy albatross) (E / E)</p> <p><i>Thalassarche eremita</i> (Chatham Albatross) (- / E)</p> <p><i>Thalassarche impavida</i> (Campbell Albatross) (- / V)</p> <p><i>Thalassarche melanophris</i> (Black-browed Albatross) (- / V)</p> <p><i>Thalassarche salvini</i> (Salvin's Albatross) (- / V)</p> <p><i>Thalassarche steadi</i></p>	<p>Marine seabirds range widely in the Southern Ocean and many breed on offshore Australian and Antarctic islands. Their diets usually consist of fish and cephalopods</p>	<p><b>Unlikely to occur</b></p> <p>No recorded occurrences located near the Project Area.</p> <p>Suitable habitat is unlikely to occur within the Project Area.</p>
--	--	---



Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
(White-capped Albatross) (V / V)				
<i>Turnix melanogaster</i> (Black-Breasted Button-quail)	V	V	<p>The Black-breasted Button-quail is restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest; however, this species may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes (DAWE, 2022).</p> <p>The Black-breasted Button-quail is endemic to eastern Australia. It is restricted to coastal and near-coastal regions of south-eastern Queensland and north-eastern New South Wales. Known distribution in Queensland extends from near Byfield in the north, south to the New South Wales border and westwards to Palm Grove National Park and Barakula State Forest (DAWE, 2022).</p>	<b>Unlikely to occur</b> – The nearest recorded occurrences is from north of Donnybrook on the mainland in 2012; however this species has not been recorded on Bribie Island. Marginal suitable habitat may occur within the Project Area.
<b>Fishes</b>				
<i>Carcharias taurus</i> (Grey Nurse Shark - east coast population)	E	CE	Grey nurse sharks are found primarily in warm temperate (from subtropical to cool temperate) inshore waters around rocky reefs and islands, in or near deep sandy-bottomed gutters or rocky caves, and occasionally in the surf zone and shallow bays (DAWE, 2022). Grey nurse sharks have a broad inshore distribution, primarily in subtropical to cool temperate waters around the main continental land masses. The Australian east coast population is considered to extend from the Capricornia coast (central Queensland) to Narooma in southern New South Wales (DAWE, 2022).	<b>Unlikely to occur</b> – An open water species – suitable habitat within the Project Area absent. Frequently recorded in open ocean east of Moreton Island, however, recorded occurrences absent within Moreton Bay.
<i>Carcharodon carcharias</i> (Great White Shark)	SL	V/Mi	These species are considered open pelagic marine species that are restricted to aquatic environments and are predominately in open water in southern regions of coastal and continental shelf waters of Australia. They occasionally can be found close inshore around rocky reefs, surf beaches and shallow coastal bays to outer continental shelf and slope areas. They also make open ocean excursions and can cross ocean basins (DAWE, 2022).	<b>Unlikely to occur</b> – An open water species – suitable habitat within the Project Area absent. A single recorded occurrence of skeletal remains recorded within Moreton Bay.
<i>Epinephelus daemeli</i> (Black Rockcod)		V	Black cod generally inhabit near-shore rocky and offshore coral reefs at depths down to 50 m. In coastal waters adult black cod are found in rock caves, rock gutters and on rock reefs. In Australia, the distribution of black cod ranges from southern Queensland through NSW to northern Victoria (TSSC, 2012).	<b>Unlikely to occur</b> – Suitable habitat within the Project Area absent. A single record in open ocean east of Moreton Island, however, recorded occurrences absent within Moreton Bay.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Hippocampus whitei</i> (White's seahorse)	E	E	White's seahorse is known to occur at depths between 1-15 metres and is found utilising a wide range of habitat types (both natural and artificial); however, this species prefers underwater structure or complexity in the form of gorgonian habitats, sponges, soft corals, <i>Sargassum sp.</i> macroalgae or seagrass. More complex habitats are believed to provide better protection and more available food resources; however, habitat selection may also be influenced by prey or predators (TSSC, 2020).  <i>Hippocampus whitei</i> is known to occur in estuaries from St Georges Basin, NSW to Hervey Bay, QLD (TSSC, 2020).	<b>Unlikely to occur</b> – Recorded occurrences absent from waters surrounding Bribie Island; however, this species has been recorded in Moreton Bay (2002) and near the wrecks at Moreton Island (2018) (ALA, 2022). Suitable complex habitat absent from the Project Area.
<i>Nannoperca oxleyana</i> (Oxleyan Pygmy Perch)	V	E	This species has a patchy distribution and is confined to dystrophic, freshwater systems draining through sandy coastal lowlands and 'wallam' heaths (Banksia dominated heathlands) between north-eastern NSW and south-eastern Queensland. Specific habitat requirements for this fish include slow-flowing, fresh, acidic waters with abundant aquatic vegetation (DAWE, 2022).	<b>Unlikely to occur</b> – Recorded occurrences absent from Bribie Island and the nearby mainland. Suitable habitat (slow flowing acidic streams) absent from the Project Area.
<i>Pristis zijsron</i> (Green Sawfish)	SL	V/Mi	The green sawfish are commonly found in estuaries and freshwater rivers and creeks in tropical waters such as Queensland, the Northern Territory and Western Australia. They move between fresh and salt water easily and can occur at the bottom of shallow muddy rivers (DAWE, 2022).	<b>Unlikely to occur</b> – The most recent recorded occurrence in Moreton Bay is from 1950. Suitable habitat may occur within the Project Area, however, a lack of recent records suggest this species is unlikely to occur.
<i>Pseudomugil mellis</i> (Honey Blue Eye)		V	This species inhabits slightly acidic (pH 4.4–6.8), clear and tannin-stained lakes, streams and wetlands, with sandy or muddy bottoms in coastal heath (wallum) ecosystems (DAWE, 2022). The species usually occurs where there is little or no flow, and the fish can find shelter in dense, aquatic vegetation, such as emergent and submerged sedges, along the margins (DAWE, 2022)  The Honey Blue-eye is endemic to Queensland and recorded in the Noosa River drainage system north to Tin Can Bay. A population occurs on Fraser Island and an outlying population in a lake at the northern end of Dismal Swamp, south of Shoalwater Bay (DAWE, 2022)	<b>Unlikely to occur</b> – Recorded occurrences absent from Bribie Island and the nearby mainland. Suitable habitat (freshwater lakes, streams and wetlands) absent from the Project Area.
<i>Rhincodon typus</i> (Whale Shark)	SL	V/Mi	The whale shark has a broad distribution in tropical and warm temperate seas, usually between latitudes 30°N and 35°S. They are known to inhabit both deep and shallow coastal waters and the lagoons of coral atolls and reefs (DAWE, 2022).	<b>Unlikely to occur</b> – recorded occurrences absent from the Moreton Bay region. Suitable habitat for this species absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Sphyrna lewini</i> (Scalloped Hammerhead)		Conser- vation depend- ant	<p>Scalloped hammerhead are mobile animals that range widely over shallow coastal shelf waters, but rarely venture into or across deep ocean waters. Scalloped hammerhead pups are born in shallow intertidal habitats and they remain in shallow inshore habitats for the first few years of their lives (TSSC, 2018).</p> <p>The scalloped hammerhead has a circum-global distribution in tropical and sub-tropical waters. Within Australian waters the scalloped hammerhead extends from New South Wales (approximately from Wollongong, where it is less abundant), around the north of the continent and then south into Western Australia to approximately Geographe Bay (DAWE, 2022).</p>	<b>Unlikely to occur</b> - occurrences in Moreton Bay of juvenile specimens, however, not recorded in Pumicestone Passage. Marginal suitable habitat may occur for pups within intertidal habitat at the mouth of Wrights Creek.
<i>Thunnus maccoyii</i> (Southern Bluefin Tuna)		Conser- vation depend- ant	<p>Adult Southern Bluefin Tuna in Australian waters, ranges widely from northern Western Australia (WA) to the southern region of the continent, including Tasmania, and to northern New South Wales, appearing in eastern Australian waters mainly during winter (DAWE, 2022).</p> <p>The Southern Bluefin Tuna is described as a high-level apex predator and an opportunistic feeder, preying on a wide variety of fishes, crustaceans, cephalopods, salps, and other marine animals in deeper, colder waters (DAWE, 2022).</p>	<b>Unlikely to occur</b> – no recorded occurrences in Moreton Bay or adjacent open ocean. This species is typical of the open ocean where prey is located.
<b>Insects</b>				
<i>Argynnis hyperbius inconstans</i> (Australian Fritillary)	E	CE	<p>The Australian fritillary butterfly has been recorded in south eastern Queensland and north-eastern New South Wales between Gympie and Port Macquarie.</p> <p>The Australian fritillary butterfly is restricted to areas where its larval food plant, <i>Viola betonicifolia</i> (the arrowhead violet), occurs. The arrowhead violet is widespread throughout Queensland and New South Wales, at both high and low altitudes. However, the Australian fritillary butterfly appears to only occupy lower altitude sites (&lt;600 m) (DAWE, 2022)</p>	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. The larval food plant <i>Viola betonicifolia</i> has not been recorded on Bribie Island. Suitable food resources are absent within the Project Area.
<b>Mammals</b>				

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat, Large Pied Bat)	V	V	<p>The species' current distribution is also poorly known. Records exist from Shoalwater Bay, north of Rockhampton, Queensland, through to the vicinity of Ulladulla, New South Wales in the south. Despite the large range, it has been suggested that the species is far more restricted within the species' range than previously understood.</p> <p>Sandstone cliffs and fertile woodland valley habitat within close proximity of each other is habitat of importance to the large-eared pied bat. Records from south-east Queensland suggest that rainforest and moist eucalypt forest habitats on other geological substrates at high elevation are of similar importance to the species (DAWE, 2022)</p>	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable foraging habitat absent from the Project Area.
<i>Dasyurus hallucatus</i> (Northern Quoll)		E	<p>The northern quoll was once widespread across northern Australia, found from Western Australia to south east Queensland. Their distribution and population suffered dramatic declines after the introduction of the cane toad. Currently in Queensland, the northern quoll is known to occur as far south as Gracemere and Mount Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into central Queensland to the vicinity of Carnarvon Range National Park.</p> <p>The northern quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll are also known to occupy non rocky lowland habitats such as beachscrub communities in central Queensland. Northern quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal (DAWE, 2022).</p>	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable foraging and denning habitat absent from the Project Area.
<i>Dasyurus maculatus maculatus</i> (SE mainland population) (Spot-tailed Quoll)	E	E	<p>Historically, the spot-tailed quoll was found across eastern Australia, from south east Queensland to Tasmania. However, the mainland distribution of this sub-species reduced significantly in the latter half of the 20th century. In Queensland, this species is now known to five broad regions: four from coastal ranges and the Great Dividing Range from the New South Wales border to Gladstone, and the fifth in the Brigalow Belt South Bioregion.</p> <p>The spot-tailed quoll inhabits a range of different vegetation communities, including temperate and subtropical rainforests, wet sclerophyll forest, lowland forests, open and closed eucalypt woodlands, inland riparian and River Red Gum (<i>Eucalyptus camaldulensis</i>) forests and coastal heathlands. It is reported that they prefer mature wet forest that has den sites and is relatively undisturbed from thinning (DAWE, 2022).</p>	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable foraging and denning habitat absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Macroderma gigas</i> (Ghost Bat)	E	V	The Ghost Bat is found in Northern Australia where it has a scattered distribution throughout Queensland, Northern Territory and Western Australia. It has been recorded in both arid regions (Pilbara region) and rainforest areas (north Queensland). It roosts in caves, old mine tunnels and in deep cracks in rocks. Distributed widely but patchily across the northern half of Australia and are found in a variety of tropical habitats. Largest colonies are at Mount Etna caves, near Rockhampton in Queensland (ALA, 2022).	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable roosting habitat absent from the Project Area.
<i>Petauroides volans</i> (Greater Glider)	V	V	The greater glider ( <i>Petauroides volans</i> ) is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species (TSSC, 2016).  Since genetic taxonomic review in 2020, greater gliders are divided into three distinct species; with <i>Petauroides volans</i> distribution from Bundaberg south to Victoria, <i>Petauroides armillatus</i> populations in mid-Queensland from the Eungella Range to just north of Townsville and <i>Petauroides minor</i> north from Townsville (McGregor, 2020)	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable denning habitat absent from the Project Area.
<i>Petaurus australis</i> <i>australis</i> Yellow-bellied Glider (south-eastern)	V	V	This species occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Yellow-bellied gliders Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. They extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar (OEH, 2022).  The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria (ALA, 2022).	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable habitat absent from the Project Area.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Phascolarctos cinereus</i> (Koala)	E	E	This species feed almost entirely on eucalypts most likely in riverine and riparian habitats (DAWE, 2022). In Queensland, the species contains scattered populations throughout moist forests along the coastline, sub-humid woodlands in central and southern regions and within eucalypt woodlands along watercourses within semi-arid areas further west (DAWE, 2022). The greatest density of koalas occurs in south-east Queensland, with lower densities occurring through central and eastern areas including the Brigalow Belt, Mitchell Grass Downs, Mulga lands and the Desert Uplands (DAWE, 2022).	<b>May occur</b> – Species has been previously recorded in the desktop search extent with the nearest recorded occurrence near Toorbul on the mainland in 2018 (ALA, 2022). ALA records on Bribie Island are undated and describe a koala skull recorded in the northern portion on the island.  Suitable habitat may occur within the Project Area.
<i>Potorous tridactylus tridactylus</i> (Long-nosed Potoroo - northern)	V	V	This species' distribution covers eastern Australia, from south east Queensland to Victoria. The populations in Queensland are scattered and limited information is available; locations where this species have been recorded include Many Peaks Range, south-east of Gladstone, Bellthorpe, Border Ranges, Bilburin and in Lamington National Parks and surrounds.  The long-nosed potoroo occurs across a range of vegetation types from subtropical and warm temperate rainforest through tall open forest with dense understorey to dense coastal heaths. Its main requirement is thick groundcover, which it needs for protection and nesting material. It also prefers light soils that are easy to dig in for the underground roots and fungi that it eats (DAWE, 2022).	<b>Unlikely to occur</b> – This species has not been recorded on Bribie Island or the surrounding area. Suitable habitat largely absent from the Project Area.
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)		V	The grey-headed flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas. The primary food source is blossom from Eucalyptus and related genera (DAWE, 2022).  The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of Melaleuca, mangroves and riparian vegetation; however, colonies also use highly modified vegetation in urban and suburban areas (DAWE, 2022).	<b>Likely to occur</b> – Recent recorded occurrences for this species are noted from the southern portion of Bribie Island in 2012 (ALA, 2022). Flying fox camp data (DAWE, 2022) suggests this species frequents the area with records indicating sightings at three nearby camps in 2021. No camps are noted within the Project Area; however, seasonal usage of canopy species blossoms is likely.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<i>Xeromys myoides</i> (Water Mouse)	V	V	The water mouse occurs in three regions of coastal Australia: The Northern Territory, central south Queensland and south-east Queensland. The species habitat includes mangrove communities and adjacent sedgeland, grasslands and freshwater wetlands. A supralittoral bank where present maybe be utilised by the Water Mouse for nesting (DAWE, 2022). The water mouse travels between nests at the supralittoral bank and the first 100 m into the mangroves (DAWE, 2022). The floor of mangrove habitats provides a variety of microhabitat features important to the water mouse including tidal pools, channels, crab holes, pneumatophores, crevices in bark and around roots, hollows in standing and fallen timber, suspended drifts of twigs and leaves and driftwood. The water mouse may nest or forage in the following Queensland Regional Ecosystems considered essential habitat for this species: 8.1.1, 11.1.1, 11.1.2, 11.1.4, 12.1.1, 12.1.2, 12.1.3, 12.2.5, 12.2.7, 12.2.11, 12.2.12 and 12.2.14 (DAWE, 2022).	<b>May occur</b> – Species has been previously recorded within 5km of the Project Area, with the most recent occurrence being 2011 near Donnybrook on the mainland. This species has a single recorded occurrence on the eastern side of Bribie Island in 1984. Suitable habitat foraging and nesting habitat (RE 12.1.3 and 12.2.5) occur along Wright's Creek and the Bribie Island foreshore. Extensive surveys during field surveys did not observe indicators of this species presence (nests or middens).
<b>Reptiles</b>				
<b>Marine turtles:</b> <i>Caretta caretta</i> Loggerhead turtle (E / E) <i>Chelonia mydas</i> Green turtle (V / V) <i>Dermochelys coriacea</i> Leatherback turtle (E / E) <i>Eretmochelys imbricata</i> Hawksbill turtle (E / V) <i>Lepidochelys olivacea</i> Olive Ridley turtle (E / E) <i>Natator depressus</i> Flatback turtle (V / V)			Six of the world's seven species of marine turtle live in the waters around Australia. While marine turtles spend most of their life in the sea, the females come ashore during the breeding season on islands and some mainland areas to lay their eggs on sandy beaches (DAWE, 2022).	<b>Unlikely to occur</b> – recorded occurrences of all marine turtle species have been noted in Moreton Bay, particularly eastern facing beaches. Suitable foraging resources are absent from the Project Area as are coarse or fine sand beaches for nesting.

Species	Status		Habitat	Likelihood of Occurrence
	NC Act	EPBC Act		
<p><i>Coeranoscincus reticulatus</i></p> <p>(Three-toed Snake-tooth Skink)</p>		V	<p>The three-toed snake-tooth skink has a limited distribution, found from Fraser Island in south east Queensland to Crescent Head in north east New South Wales. Majority of records are from the Border Ranges near the New South Wales/Queensland border, however they have also been recorded in other locations including Conondale National Park (NP), Great Sandy NP, Binna Burra, Emuvalle, Tambourine Mountain, Lamington NP, Cooloola State Forest and Cunningham's Gap NP.</p> <p>In Queensland they have been found in habitats with high foliage cover, including rainforest, closed forest, wet sclerophyll forest, tall open Blackbutt (<i>Eucalyptus pilularis</i>) forest, open eucalypt and closed Brush Box (<i>Lophostemon confertus</i>) forest. High ground cover and/or woody debris is likely a habitat requirement (DAWE, 2022)</p>	<p><b>Unlikely to occur</b> – The nearest recent recorded occurrence for this species is Maroochydore (Sunshine Coast), 45 km to the north in 2002. Suitable habitat for this species in the Project Area is absent.</p>
<p><i>Delma torquata</i></p> <p>(Adorned Delma, Collared Delma)</p>	V	V	<p>This species has been recorded at the following sites: the Bunya Mountains, Blackdown Tablelands National Park, Expedition National Park, Western Creek, and the Toowoomba Range. The collared delma normally inhabits eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones 3, 9, and 10. The presence of rocks, logs, bark and other coarse woody debris, and mats of leaf litter (typically 30–100 mm thick) appears to be an essential characteristic of the adorned delma microhabitat and is always present where the species occurs (DAWE, 2022).</p>	<p><b>Unlikely to occur</b> – Land Zone 3, 9 and 10 are not mapped within the Project Area. Minimal suitable microhabitat may occur found within the remnant areas of Project Area. This species has never been recorded on Bribie Island.</p>

## References

ALA. (2022). Retrieved from Atlas of Living Asutralia: <https://spatial.ala.org.au/>

Birdlife Australia. (2022). *Powerful Owl - Ninox strenua - Factsheet*. Retrieved from Birdlife Australia: <https://www.birdlife.org.au/bird-profile/powerful-owl>

DAWE. (2022). *National flying fox monitoring viewer*. Retrieved from Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf>

DAWE. (2022). *Species Profile and Threats Database*. Retrieved from Department of Agriculture, Water and the Environment: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

DES. (2022). *Species Profile Search*. Retrieved from Department of Environment and Science, Queensland Government: <https://apps.des.qld.gov.au/species-search/>



- DEWHA. (2008). *Approved Conservation Advice for Phaius bernaysii*. Canberra: Department of the Environment, Water, Heritage and the Arts. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/4918-conservation-advice.pdf>.
- Knight, F., Pizzey, G., & Pizzey, S. (2012). *The Field Guide to the Birds of Australia 9th Edition*. Harper Collins.
- Marchant, S., & Higgins, P. (1993). *Handbook of Australian, New Zealand and Antarctic Birds*. Oxford University Press.
- McGregor, D. C.-J. (2020). Genetic evidence supports three previously described species of greater glider, *Petauroides volans*, *P. minor*, and *P. armillatus*. *Scientific Reports*. doi:10. doi:<https://doi.org/10.1038/s41598-020-76364-z>
- Museum, A. (2022, 04 21). Retrieved from Australian Museum: <https://australian.museum/learn/animals/mammals/short-beaked-echidna/>
- OEH. (2021). *Scrub Turpentine*. Retrieved from Office of Environment and Heritage, NSW Government: <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20341>
- OEH. (2022). *Search for threatened species*. Retrieved from NSW Office of Environment and Heritage: <https://www.environment.nsw.gov.au/threatenedspeciesapp/>
- Queensland Museum. (2022). *Sand Yabby - Cherax robusta*. Retrieved from Queensland Museum: <https://www.qm.qld.gov.au/Explore/Find+out+about/Animals+of+Queensland/Crustaceans/Rare+or+threatened+crustaceans/Sand+Yabby>
- Queensland Museum. (2022). *Swamp Crayfish - Tenuibranchiurus glypticus*. Retrieved from Queensland Museum: <https://www.qm.qld.gov.au/Explore/Find+out+about/Animals+of+Queensland/Crustaceans/Rare+or+threatened+crustaceans/Swamp+Crayfish>
- TSSC. (2012). *Commonwealth Listing Advice on Epinephelus daemeli (Black Rock-cod)*. Canberra: Threatened Species Scientific Committee, Department of Sustainability, Environment, Water, Population and Communities. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/68449-listing-advice.pdf>.
- TSSC. (2016). *Conservation Advice Petauroides volans greater glider*. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-20160525.pdf>
- TSSC. (2018). *Listing Advice Sphyrna lewini scalloped hammerhead*. Department of Environment and Energy, Threatened Species Scientific Committee, Canberra. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/85267-listing-advice-15032018.pdf>.
- TSSC. (2020). *Conservation Advice Hippocampus whitei White's Seahorse*. Threatened Species Scientific Committee, Department of Agriculture, Water and the Environment. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/66240-conservation-advice-12122020.pdf>.

TSSC. (2020). *Conservation Advice Rhodamnia rubescens Scrub Turpentine*. Canberra: Threatened Species Scientific Committee, Department of Agriculture, Water and the Environment. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/15763-conservation-advice-11122020.pdf>.

TSSC. (2020). *Conservation Advice Rhodomyrtus psidioides Native Guava*. Canberra: Threatened Species Scientific Committee, Department of Agriculture, Water and the Environment. Retrieved from <http://www.environment.gov.au/biodiversity/threatened/species/pubs/19162-conservation-advice-12122020.pdf>.