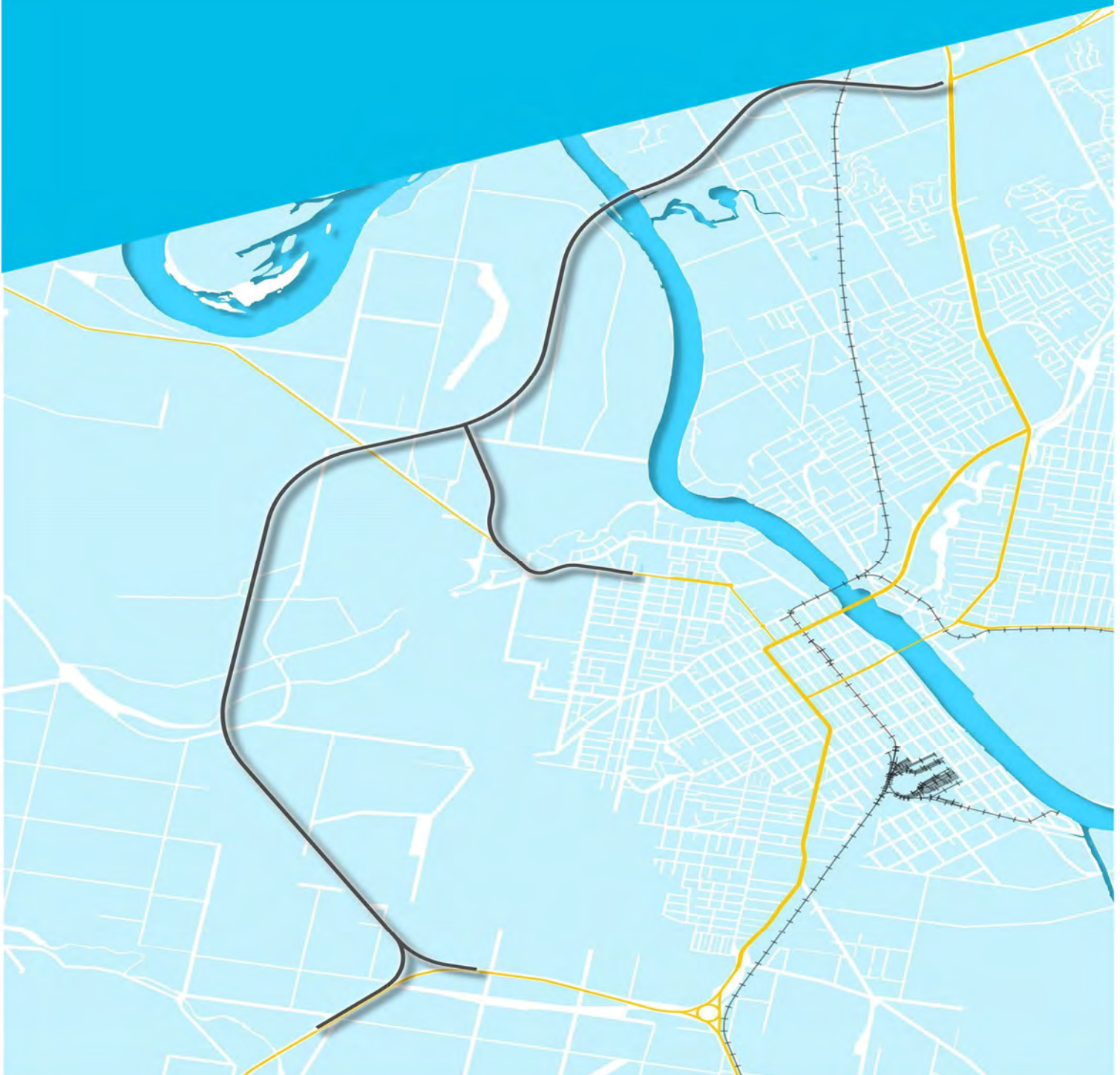




# Migratory Shorebird Survey Report

Rockhampton Ring Road - Business Case



**DRAFT**

## Migratory Shorebird Survey Report

Rockhampton Ring Road - Business Case

Client: Department of Transport and Main Roads

ABN: 39 407 690 291

Prepared by

**AECOM Australia Pty Ltd**

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15-Oct-2020

Job No.: 60593305

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## Quality Information

Document      Migratory Shorebird Survey Report

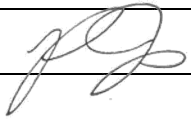
Ref              60593305

Date             15-Oct-2020

Prepared by    Amelia Mack

Reviewed by    Liz Fisher

### Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
0	15-Oct-2020	Draft Issue	Paul Jones Project Manager	

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## Executive Summary

AECOM Australia Pty Ltd (AECOM) was commissioned by the Department of Transport and Main Roads (TMR) in November 2018 to carry out the Rockhampton Ring Road (RRR) Preliminary Evaluation (PE) and Detailed Business Case (DBC) (the Project).

In February 2019, two targeted migratory shorebird surveys were undertaken by AECOM to identify areas of potential important habitat and the migratory shorebirds that may be impacted by the Project. As prescribed by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Department of the Environment and Energy, 2017), replicate surveys are recommended to measure population and habitat variability. This report details the methods and results of a third targeted migratory shorebird survey undertaken over five days in March 2020.

The 2020 survey was preceded by significant rainfalls in February and March which influenced the habitat conditions observed. These conditions were characterised by flooded wetlands with significantly larger wetted areas compared with previous surveys (with the exception of Pink Lily Lagoon) with high cover of low fringing vegetation. The flooding of these wetlands resulted in the banks of the southern wetlands being inundated and hence no muddy margins were present, which are required for foraging for a number of migratory shorebird species. In the Lotus Lagoons and Pink Lily Lagoon, some muddy margins were present however these were very narrow.

The wetland conditions at the time of survey did not provide suitable habitat for significant populations of migratory shorebird species with the exception of Latham's snipe. A total of seven Latham's snipe were recorded throughout the survey. Four were flushed from the surrounding vegetation at one small lagoon at Lotus Lagoons and three were observed foraging amongst flooded tussocks in low land areas between Nelson Lagoon and the Capricorn Highway.

Habitat was considered to be suitable for this species at all of the surveyed wetlands. This varied from previous surveys which found that the Lotus Lagoons and the southern lagoons (i.e. Nelson Lagoon, Dunganweate Lagoon and Capricorn Highway Lagoon) did not provide suitable habitat for the species. The survey demonstrated the temporal variation in habitat availability and quality and how this impacts the presence of and utilisation by Latham's snipe in the Study Area. These southern lagoons only become suitable for Latham's snipe when they are fully inundated and fringing vegetation is present. This will generally occur later in the wet season or if there is an early above average rainfall event.

Based on the habitat condition observed during the survey, it is likely that the Project Area is able to support at least 18 individual Latham's snipe and is within a naturally occurring open freshwater wetland with vegetation cover nearby. As such, the habitat is considered to be 'important habitat' for the species in the context of assessing significance of impacts to Matters of National Environmental Significance (MNES) (Department of the Environment, 2013). No important habitat for other listed migratory shorebirds was identified during the field surveys.

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## 1.0 Introduction

### 1.1 Project Background

AECOM Australia Pty Ltd (AECOM) was commissioned by the Department of Transport and Main Roads (TMR) in November 2018 to carry out the Rockhampton Ring Road (RRR) Preliminary Evaluation (PE) and Detailed Business Case (DBC) (the Project).

The RRR Project will provide a western road link of the Bruce Highway to the west of Rockhampton, with key linkages into the city at the Capricorn Highway, West Rockhampton, Alexandra Street and Yaamba Road (Rockhampton – Yeppoon Road).

In February 2019, two targeted migratory shorebird surveys were undertaken by AECOM to identify areas of potential important habitat and to identify the migratory shorebirds that may be impacted by the Project. As prescribed by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Department of the Environment and Energy, 2017), replicate surveys are recommended to measure population variability.

This report details the methods and results of a third targeted migratory shorebird survey undertaken over five days in March 2020.

### 1.2 Project Area

The Project commences on the Capricorn Highway approximately 2 kilometres (km) west of the intersection of the Bruce and Capricorn Highways at the Yeppen Roundabout. The alignment traverses north through the Western Yeppen Floodplain sweeping around the Rockhampton Airport at Pink Lily and intersecting the Rockhampton - Ridgeland Road before crossing the Fitzroy River north of Limestone Creek. After crossing the Fitzroy River, it intersects Alexandra Street in Parkhurst and connects with the Bruce Highway at the Bruce Highway and Rockhampton - Yeppoon Road intersection.

The preferred RRR alignment including connection points is herein referred to as the Project Area (Figure 1). The Project Area is inclusive of a 20 metre (m) construction area buffer and is therefore considered a worst-case estimate of total area to be disturbed by the Project.

### 1.3 Survey Area

Previous ecological surveys as part of the Project's environmental assessments have identified areas of potential migratory shorebird habitat. In order to characterise the migratory shorebird species that may be using these habitats and the impacts that may occur at these locations as a result of the Project, field surveying was completed in an area greater than the Project Area. This area encompasses the aforementioned potential sensitive environments and the Project Area and is henceforth referred to as the Survey Area (Figure 1).

The Survey Area represents the total area aimed to be surveyed as part of this assessment. However, it should be noted that survey effort was subject to land access approval under TMR's notice of entry (NOE) process.

### 1.4 Project Aims and Objectives

The aim of the migratory shorebird assessment was to document the presence, abundance, behaviour and habitat utilisation of the target species during the 2019-2020 visitation period. The survey replicates previous survey effort from 2019 and was aimed at augmenting the data from these surveys. As habitat condition for migratory shorebirds responds to climatic conditions, several subsets of data are required at different times in the annual cycle (Department of the Environment and Energy, 2017) to properly understand habitat utilisation over a large temporal scale.

To achieve this, the aims of this survey were to:

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- Review existing relevant data for the Project Area
- Developed and implement a targeted survey methodology based on survey guidelines (Department of the Environment Water Heritage and the Arts, 2010; Department of the Environment and Energy, 2017)
- Identify the presence or potential presence of the target species (migratory shorebird listed under the EPBC Act (Table 1)
- Identify the presence of 'important habitat' for migratory shorebirds within the Study Area.
- Potential habitat at the time of survey was identified and characterised.



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DATUM GDA 1994, PROJECTION MGA ZONE 56  
0 550 1,100 2,200  
Metres

1:46,000 (when printed at A3)

**LEGEND**

- Highways
- Major watercourse
- Minor watercourse
- Project Area
- Survey Area
- Proposed Project Bridges



Data sources:  
Base Data: (c) State of Queensland (Department of Natural Resources, Mines and Energy) 2019.  
Baseline Roads and Tracks, Railway Network.  
Aecom 2019, Corridor and RRR Data

**ROCKHAMPTON RING ROAD**

**PROJECT AREA & SURVEY AREA**

PROJECT ID 60593305  
CREATED BY MacKA  
LAST MODIFIED 23-Apr-2020  
VERSION 1

Figure  
**1**



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## 2.0

## 2.0 Regulatory Framework

### 2.1 *Environmental Protection and Biodiversity Conservation Act 1999*

The Commonwealth EPBC Act provides the legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are defined under the EPBC Act as 'matters of national environmental significance' (MNES). Under the provisions of the EPBC Act, an action that is likely to have a significant impact on a MNES requires the approval of the Minister for Environment and Energy. The Act identifies nine MNES:

1. world heritage properties
2. national heritage places
3. wetlands of international importance (Ramsar wetlands)
4. nationally listed threatened species and communities
5. listed migratory species
6. protection of the environment from nuclear actions
7. commonwealth marine environment
8. the Great Barrier Reef Marine Park
9. a water resource, in relation to coal seam gas development and large coal mine development.

The MNES relevant to this report is 'listed migratory species'.

Australia is located within the East-Asian Australasian Flyway for migratory shorebirds. These species breed as far north as Siberia and Alaska during the northern hemisphere summer and migrate to non-breeding grounds in Australia and New Zealand to avoid the northern winter and take advantage of energy rich food sources in the southern hemisphere. Migrating shorebirds arrive in northern Australia between late August and early November. Many birds remain in the northern hemisphere, but others disperse southwards for the austral summer.

The EPBC Act includes a list of migratory shorebird species, comprising:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under an international agreement such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

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## 3.0 Assessment Methodology

### 3.1 Previous Field Surveys

Previous ecological assessments within the RRR Survey Area have been undertaken. The methodology employed for these surveys involved:

- A desktop review of literature, and searches of publicly available datasets and online mapping
- A five-day fauna survey comprising targeted migratory shorebird survey, fauna habitat assessments, spotlighting, active searches, passive microchiropteran bat call detection, camera trapping and general bird surveys from 4 to 8 February 2019
- A four-day flora survey comprising regional ecosystem (RE) mapping, vegetation assessments, marine plant assessments, wetland delineation from 11 to 14 February 2019
- A five-day survey comprising a targeted migratory shorebird survey from 11 to 15 February 2019
- A one-day survey in October 2019 to assess the vegetation and fauna habitat potential within additional areas added onto the Project Area
- A threatened turtle and fish passage assessment of the Survey Area undertaken from 10 to 14 June 2019.

### 3.2 March 2020 Survey

A migratory shorebird survey was undertaken to identify the shorebird species and their habitat, that are known to or are likely to use the wetlands within the Survey Area for foraging and/or roosting. The survey was conducted over five days from 16 to 20 March, 2020 by four ecologists (four ecologists for three days, two ecologists for the full five days). Target species were those listed as Migratory under the EPBC Act and included (but was not limited to) the species listed in Table 1. The following sections detail the survey approach and methods.

**Table 1 The 37 migratory shorebird species listed under the EPBC Act**

Scientific Name	Common Name
<i>Actitis hypoleucos</i>	Common sandpiper
<i>Arenaria interpres</i>	Ruddy turnstone
<i>Calidris acuminata</i>	Sharp-tailed sandpiper
<i>Calidris alba</i>	Sanderling
<i>Calidris canutus</i>	Red knot*
<i>Calidris ferruginea</i>	Curlew sandpiper*
<i>Calidris melanotos</i>	Pectoral sandpiper
<i>Calidris ruficollis</i>	Red-necked stint
<i>Calidris subminuta</i>	Long-toed stint
<i>Calidris tenuirostris</i>	Great knot*
<i>Charadrius bicinctus</i>	Double-banded plover
<i>Charadrius dubius</i>	Little ringed plover
<i>Charadrius leschenaultii</i>	Greater sand plover*
<i>Charadrius mongolus</i>	Lesser sand plover*
<i>Charadrius veredus</i>	Oriental plover
<i>Gallinago hardwickii</i>	Latham's snipe



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Scientific Name	Common Name
<i>Gallinago megala</i>	Swinhoe's snipe
<i>Gallinago stenura</i>	Pin-tailed snipe
<i>Glareola maldivarum</i>	Oriental pratincole
<i>Tringa brevipes</i>	Grey-tailed tattler
<i>Tringa incana</i>	Wandering tattler
<i>Limicola falcinellus</i>	Broad-billed sandpiper
<i>Limnodromus semipalmatus</i>	Asian dowitcher
<i>Limosa lapponica</i>	Bar-tailed godwit*
<i>Limosa limosa</i>	Black-tailed godwit
<i>Numenius madagascariensis</i>	Eastern curlew*
<i>Numenius minutus</i>	Little curlew
<i>Numenius phaeopus</i>	Whimbrel
<i>Phalaropus lobatus</i>	Red-necked phalarope
<i>Philomachus pugnax</i>	Ruff
<i>Pluvialis fulva</i>	Golden plover
<i>Pluvialis squatarola</i>	Grey plover
<i>Tringa glareola</i>	Wood sandpiper
<i>Tringa nebularia</i>	Common greenshank
<i>Tringa stagnatilis</i>	Marsh sandpiper
<i>Tringa totanus</i>	Common redshank
<i>Xenus cinereus</i>	Terek sandpiper

\* Species also listed as 'Vulnerable', 'Endangered' or 'Critically Endangered' under the EPBC Act

### 3.2.1 Site Selection

As prescribed by the *EPBC Act Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Department of the Environment and Energy, 2017), wetlands and watercourses mapped within and adjacent to the Project Area were targeted for migratory shorebird surveys to identify areas of potential important habitat. Wetlands were selected based on the proximity to the Project Area, approved land access and on the habitat values observed and recorded during the initial ecological assessment (4 to 8 February 2019). Ground surveys were conducted by observers on foot at five wetlands within the Survey Area (Figure 2).

### 3.2.2 Survey Timing

Numbers of shorebirds vary during the visitation period, particularly in the north of the country, due to higher abundance of shorebirds during inbound and outbound migration at the beginning and end of the non-breeding season. Timing for shorebirds surveys must consider this population fluctuation as well as being conducted when habitat conditions are suitable for migratory shorebirds i.e. when water is present with a minimally vegetated, exposed margin (Department of the Environment and Energy, 2017).

Climatic conditions leading into the shorebirds survey and during the previous wet season (2018-2019) were unseasonably dry (Figure 3) leading to low or no water in many of the wetlands as well as causing algal blooms in Pink Lily Lagoon. As such the timing of this survey was extended to late in the visitation period to increase the chance of rainfall events which may improve the habitat quality and in turn maximise the opportunity to observe shorebird usage.

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Significant rainfall in February and early March (Figure 3) improved conditions in wetlands compared with early summer and consultation with local bird experts determined that mid-March still coincided with the period when the majority of shorebirds are present in Rockhampton. As such the survey window provided the best opportunity to observe migratory shorebirds based on a combination of suitability of habitat conditions and timing in the visitation period.

The survey timing followed the EPBC Act Industry Guidelines (Department of the Environment and Energy, 2017), occurring when the majority of migratory shorebirds are present in the area (Rockhampton's wet season).

### 3.2.3 Survey Techniques

Survey techniques were employed to observe migratory shorebirds and to help characterise potential habitat for these species within the Study Area. However, given the results from previous surveys in 2019 yielding a high abundance of Latham's snipe, this species was targeted specifically with additional techniques including detection by flushing transects through suitable wetlands. The survey techniques included:

- **Point surveys** – This technique involved recording the presence and abundance of each species detected at a series of specified locations. Sampling points were systematically pre-determined within the Study Area and were scheduled for visits at different times throughout daylight hours. Spotting scopes and binoculars were used to visually identify species from a distance, and observe abundance, behaviour and species' richness. Time allocated at each point was a minimum of 60 minutes, however this was regularly significantly extended where it was considered as necessary. A total of 18 point surveys were conducted throughout the survey.
- **Flushing transects** – This involved a group of observers walking parallel at 3-5 meter (m) spacing, across an area of suitable habitat. This technique was employed to target Latham's snipe as the species typically utilises fringing vegetation for cover and can be difficult to detect by point surveys. A total of 18 flushing transects were completed.
- **Habitat assessment** – A total of 19 habitat assessments were undertaken to characterise the habitat values for migratory shorebirds within the Study Area. Habitat attributes recorded during the habitat assessments include:
  - A description of the soil and the wetland features (i.e. wetted width, shape, depth)
  - Presence and type of dominant aquatic and terrestrial vegetation
  - Presence of habitat features necessary for shorebirds e.g. muddy margins, fringing vegetation, riparian vegetation
  - Hydrology
  - Presence and abundance waterbirds and shorebirds
  - Habitat suitability for wading shorebirds
  - Habitat suitability for Latham's snipe
  - Disturbance
  - Survey conditions
  - Any other significant habitat features or values present.

The locations of the point surveys, flushing transects and habitat assessments are shown on Figure 2.

### 3.2.4 Survey Effort

Greater survey effort was undertaken at large wetlands or wetlands with greater ecological value as identified during previous surveys. All wetlands were identified to be non-tidal and as such the survey coverage, survey timing and minimum data requirements relating to non-tidal areas as defined in the guidelines (Department of the Environment and Energy, 2017) were considered when developing the methodology. These requirements are outlined in Table 2.



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The timing and effort of survey at each wetland is described in Table 3. Each wetland was targeted at different times throughout the day wherever possible, including dawn and dusk to observe diurnal and crepuscular habits.

The locations of the point surveys, flushing transects and habitat assessments are shown on Figure 2. The timing and effort of survey at each wetland is described in Table 3.

**Table 2 Industry survey guidelines for migratory shorebirds in non-tidal areas**

Survey Coverage Requirements	Survey Timing Requirements	Survey Effort Requirements	Minimum Data Requirements
<ul style="list-style-type: none"> <li>All of the habitat thought to be used by the same population of shorebirds</li> <li>The entire area of contiguous habitat where shorebirds may occur</li> </ul>	<ul style="list-style-type: none"> <li>During the months when the majority of shorebirds are present (or during the northern hemisphere breeding season to obtain data on non-breeding, non-migrating populations of immature migratory shorebirds)</li> <li>When habitat conditions are suitable for migratory shorebirds (i.e. water is present and minimally vegetated, exposed margin)</li> <li>Not to be undertaken during periods of high rainfall or strong wind</li> <li>Not to be undertaken when activities are taking place which cause shorebird disturbance</li> </ul>	<ul style="list-style-type: none"> <li>Ideally survey effort should be comprised of four surveys for roosting shorebirds during the period when the majority of shorebirds are present in the area</li> <li>One survey during the northern hemisphere breeding season to capture data on birds that remain in Australia during the breeding season as well as the double-banded plover.</li> </ul>	<ul style="list-style-type: none"> <li>Total abundance</li> <li>Total richness</li> <li>Species abundance</li> <li>Shorebird behaviour</li> <li>Survey conditions</li> <li>Number of observers and experience level</li> <li>Method used to conduct the survey</li> <li>Habitat characteristics which may include: <ul style="list-style-type: none"> <li>Dominant landform type</li> <li>Hydrology</li> <li>Dominant terrestrial and aquatic vegetation types</li> <li>Intertidal substrate characteristics</li> <li>Invasive species</li> <li>Current disturbance regime</li> <li>Presence of suitable nocturnal roosting areas</li> </ul> </li> </ul>

**Table 3 Surveyed wetlands**

Site Name	Coordinates	Access Notes	Date and Time	Survey Effort
Pink Lily Lagoon	-23.344985, 150.476504	No access to the southern portion of Pink Lily Lagoon.	16/03/2020: 12.30pm – 4.15pm (4 people)	<ul style="list-style-type: none"> <li>21-person hours</li> <li>3 point surveys</li> <li>6 flushing transects</li> <li>3 habitat assessments</li> </ul>
	-23.340021, 150.484086	No access to any of the adjacent lagoons east of Von Allmen Road.	18/03/2020: 4.45pm – 5.45pm (2 people)	
	-23.343134, 150.485835		19/03/2020: 7.30am – 9.30am (2 people)	

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Site Name	Coordinates	Access Notes	Date and Time	Survey Effort
Lotus Lagoons (multiple small lagoons that can join together in times of higher rainfall)	-23.369691, 150.463480	No access to the larger lagoon east of Nine Mile Road.	17/03/2020: 7.45am-9.00am (2 people)  17/03/2020: 7.45am-9.30am (2 people) Note different location to that listed above  17/03/2020: 9.30am – 11.15am (2 people)  17/03/2020: 1.30pm – 3.45pm (2 people)  17/03/2020: 4.30pm – 5.00pm (2 people)	<ul style="list-style-type: none"> <li>• 15-person hours</li> <li>• 5 point surveys</li> <li>• 7 flushing transects</li> <li>• 8 habitat assessments</li> </ul>
Dunganweate Lagoon	-23.400136, 150.461978  -23.401566, 150.464829	Access only provided to the very eastern portion of this lagoon.	18/03/2020: 8.45am – 10.30am (4 people)  19/03/2020: 3.30pm – 4.30pm (2 people)	<ul style="list-style-type: none"> <li>• 9-person hours</li> <li>• 2 point surveys</li> <li>• 2 flushing transects</li> <li>• 1 habitat assessment</li> </ul>
Nelson Lagoon, including flooded palustrine wetland	-23.403563, 150.469213	Access only provided to the very eastern portion of this lagoon.	18/03/2020: 10.45am – 12.15pm (4 people)  19/03/2020: 4.45pm – 5.15pm (2 people)  20/03/2020: 7.30am – 9.30am (2 people)	<ul style="list-style-type: none"> <li>• 11-person hours</li> <li>• 3 point surveys</li> <li>• 3 flushing transects</li> <li>• 2 habitat assessments</li> </ul>
Capricorn Highway Wetlands (north and south of Capricorn Highway)	-23.411715, 150.476140	No access, surveyed from the road reserve only.	19/03/2020: 11.15am – 12.15pm (2 people)  19/03/2020: 12.15pm – 12.30pm (2 people)	<ul style="list-style-type: none"> <li>• 2.5-person hours</li> <li>• 2 point surveys</li> <li>• 2 habitat assessments</li> </ul>

**3.3 Limitations**

Due to landholder access restrictions, field surveying was not undertaken on all properties that intersect the Project Area, and most lagoons were only able to be accessed from part of their extent which meant flushing surveys were limited. Partial access was given for Pink Lily Lagoon, Lotus Lagoon, Dunganweate Lagoon and Nelson Lagoon. Additionally, the Capricorn Highway Lagoon was unable to be accessed and the survey was limited to the adjacent road reserve. No access was given to Black Duck Lagoon, or the wetlands to the east of Pink Lily Lagoon.

The field survey was undertaken in a single survey event in March 2020. Although this coincided with the activity period for seasonally dependent migratory shorebirds, the survey represents a 'snapshot' of the species using the Survey Area at a single point in time. However, this survey is a replicate to two previous surveys undertaken in February 2019 which provides an indication of habitat use over two seasons.



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DATUM GDA 1994, PROJECTION MGA ZONE 56  
0 450 900 1,800  
Metres

1:38,000 (when printed at A3)

**LEGEND**

- Highways
- Roads and Tracks
- Major watercourse
- Minor watercourse
- Mapped wetlands
- Project Area
- Survey Area
- Stationary shorebird survey
- General observation
- Shorebird habitat assessment
- Flush transects



Data sources:  
Base Data: (c) State of Queensland (Department of Natural Resources, Mines and Energy) 2019.  
Baseline Roads and Tracks, Railway Network.  
Aecom 2019, Corridor and RRR Data

ROCKHAMPTON RING ROAD

SURVEYED WETLANDS

PROJECT ID 60593305  
CREATED BY McKeeJ2  
LAST MODIFIED 25-Apr-2020  
VERSION 1

Figure  
**2**



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## 4.0 Assessment Results

### 4.1 Climatic Conditions

The migratory bird survey was undertaken over a five-day period between 16 and 20 March 2020. Weather conditions over this period consisted of warm days with moderate humidity and mild nights. A review of the daily weather observations sourced from the Bureau of Meteorology (BOM) Rockhampton Aero Station (Station 39083) recorded the minimum and maximum temperature during the survey as 18.6 degrees Celsius (°C) (recorded 17 March 2020) and 30.0°C respectively (recorded 16 March 2020). No rainfall was recorded during the survey period (Bureau of Meteorology, 2019).

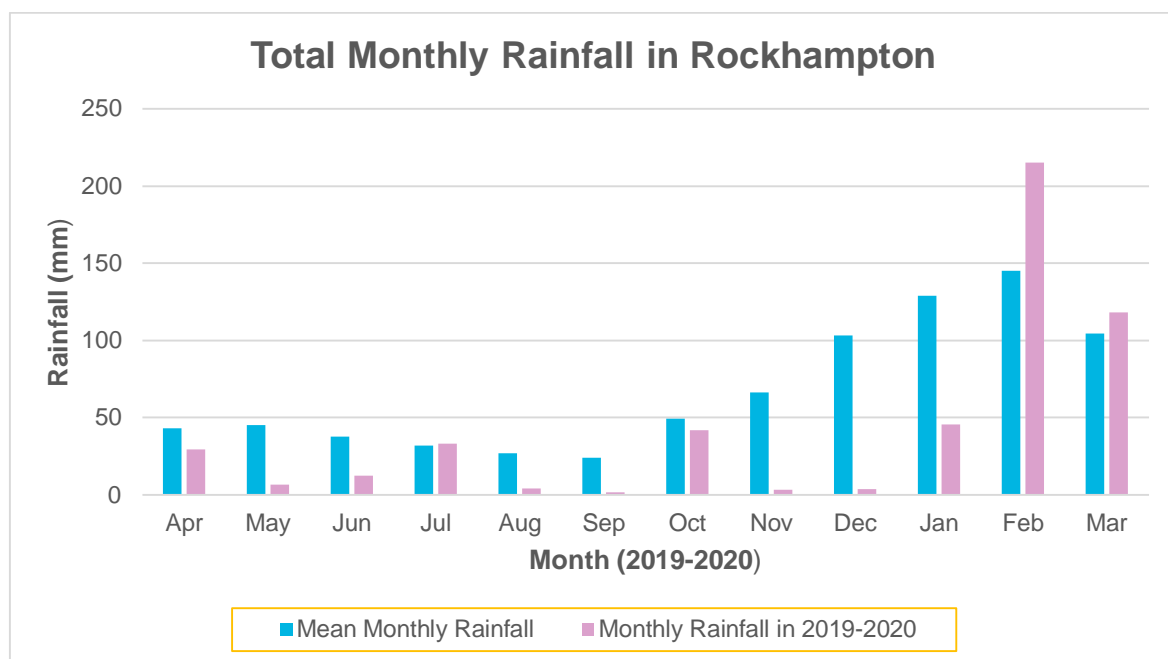


Figure 3 Climatic conditions before and during 2019 initial surveying

### 4.2 Observers

The survey team consisted of two teams of two AECOM ecologists. Each team was led by a principal ecologist with extensive experience in avifauna survey and accompanied by a professional level ecologist with several years of experience in bird survey. The experience of each observer is detailed below:

#### Anthony Bougher (Team Lead):

Anthony has over 25 years' experience related to environmental impact assessment and monitoring of a wide range of projects in wetland, coastal and marine environments. This experience has included a wide range of avifauna surveys (including migratory shorebirds). Anthony has been a registered "A Class" bird bander with the Australian Bird and Bat Banding Scheme (ABBS) for 25 years and has operated a long-term bird banding research project that has processed over 7000 birds.

#### Liz Fisher (Team Lead):

Liz is a principal ecologist and has been working in the consultancy sector for over 12 years. She has a wide range of industry experience and a broad knowledge of ecology with a specialty for resources and infrastructure projects in the area of flora, fauna, biodiversity offsets and monitoring, particularly within Southern, Central and Northern Queensland region. She has been involved in avifauna surveys on numerous projects targeting a range of listed migratory and threatened bird species.

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### Amelia Mack (Field Ecologist):

Amelia has four years' experience as an ecological consultant and in that time has worked on a range of projects in the mining, oil and gas, renewable energy and urban development industries throughout Queensland. Amelia's experience includes conducting environmental impact assessments and wildlife habitat assessments and targeted surveys for migratory shorebirds and threatened fauna species such as the koala, Corben's long eared bat, greater glider, and southern black-throated finch. Amelia has experience conducting shorebird surveys within the Rockhampton region for the South Rockhampton Flood Levy Project in 2018.

### Jessie McKee (Field Ecologist):

Jessie has three years' experience in environmental management, monitoring, targeted assessments, and reporting. Jessie has well developed skills in collection and analysis of field data and experience in mapping with several GIS platforms. She has assisted with environmental impact assessments for large linear infrastructure, transport, mining and renewable energy projects. Jessie has been involved with a number of avifauna surveys including the 2019 migratory shorebirds survey for the Rockhampton Ring Road Project.

## 4.3 Wetland Values

Migratory shorebird species use a variety of different wetland habitats for foraging, typically in or near water, wading up to a depth of around 15 centimetres (cm) for long-legged species. Shorebirds occur in marine habitats including ocean beaches, rocky coastlines, intertidal mudflats. They also occur in coastal wetland habitats and river estuaries, including saltmarsh and mangroves, and in freshwater wetland habitats such as marshes, the margins of lagoons and along creeks (Department of the Environment, 2015). Migratory shorebirds will also utilise other potential habitats within urbanised areas including parks with open grassland, golf courses, other types of open/undeveloped land, and may use artificial structures as roosting habitat.

Migratory shorebirds at non-tidal wetlands such as the inland systems within the Survey Area tend to show more dispersive behaviours than those inhabiting tidal areas. Inland wetlands can provide highly productive food sources but many are also ephemeral due to climatic variability and may only provide suitable habitat every few years (Department of the Environment and Energy, 2017). Further, climatic variation can cause significant and relatively sudden changes to the availability and quality of habitat for migratory shorebirds. For example, a large rainfall event may flood a wetland such that muddy margins are no longer available and the depth becomes unsuitable for some species to forage. Extended periods of drought may also reduce the availability of fringing vegetation which some species rely on for refuge, such as Latham's snipe.

Water levels at a wetland can vary between wetlands in different, years, months or weeks of the visitation period. Further, the time period that suitable habitat may be present at a particular location could vary from a few months to possibly only a few weeks. An example of this was observed during the field survey. At the Lotus Lagoons, a small pool (approximately 3m wide) was present early in the week and was being used by Latham's snipe to forage. Three days later the same location was visited and found to be dry, with no Latham's snipe present.

Wetlands within the Survey Area comprised both permanent or semi-permanent (i.e. Pink Lily Lagoon, Dunganweate Lagoon and Nelson Lagoon) and ephemeral systems (Lotus Lagoons and Capricorn Highway Lagoon), all exhibiting signs of disturbance. At the time of survey, the region had experienced a relatively dry start to the wet season, which impacted the amount of biomass of fringing vegetation. Low, fast-growing fringing vegetation (i.e. native and exotic grasses) had flourished after heavy rainfall in February and early March, some larger species had not recovered to previously observed heights (i.e. *Persicaria orientalis*). This late season rain also resulted in recharging of wetlands which reduced the availability of muddy margins, or in some circumstances inundated these entirely (i.e. Dunganweate Lagoon and Nelson Lagoon). The lack of suitable muddy margins limited the availability of habitat for a number of target species.

The shorebird habitat values of wetlands observed during the field survey and a summary of hydrology for each wetland are provided in Table 4 below.



**DRAFT****Table 4 Hydrology and shorebird habitat suitability of wetlands within the Survey Area**

Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
Pink Lily Lagoon	<p>A large wetland complex, containing a permanent waterbody and fringing sedgeland, located south of the Fitzroy River and intersected by the Project Area.</p> <p>Associated permanent waterbodies include those located directly east of Von Allmen road.</p> <p>Overbank flow that occurs at the Pink Lily Meander during flooding recharges this wetland.</p>	<p>Of wetlands surveyed, Pink Lily held the largest area of potential habitat, despite significant contraction of the wetted area observed in the 2019 surveys. Moderate to dense fringing vegetation was noted with 95% groundcover, typically from 0.5m to 1.5m tall. Fringing groundcover species included <i>Persicaria orientalis</i>, <i>Cyperus exaltus</i>, <i>Sida rhombifolia</i>, <i>Sesbania cannabina</i>. This was noted to provide suitable refuge/roosting opportunities for Latham's snipe.</p> <p>Although muddy margins were present, they were very narrow (typically &lt;1m). Depth varied throughout the lagoon, however the gradient of the banks was slight and significant areas of shallow water (&lt;5cm) was present. The conditions observed during the March 2020 survey would provide only marginal habitat for wading shorebirds with the exception of Latham's snipe. Latham's snipe require the fringing vegetation for refuge/roosting and were observed foraging in similar conditions in the Survey Area in March 2020. No listed migratory species were recorded in Pink Lily Lagoon during this survey event</p> <p>Wide muddy margins with shallow sloping banks suitable for the foraging requirements of a number of migratory shorebirds were observed during several surveys throughout 2019. Under these conditions several migratory shorebird species were observed including one marsh sandpiper and 14 Latham's snipe. Notably a group of approximately 15 Caspian tern were seen roosting in shallow waters and several glossy ibis foraging in the littoral zone (both listed as migratory under the EPBC Act, although not shorebird species).</p> <p>Disturbances include weeds, cattle grazing and watering and historical clearing.</p>

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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
		
	<b>Plate 1      Condition of Pink Lilly Lagoon during 2020 survey</b>	

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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
Lotus Lagoons	<p>A large floodplain wetland complex that is highly ephemeral, although some permanent water bodies are present. It is located east and west of Nine Mile Road, north of the Rockhampton Airport.</p> <p>The Project Area directly intersects this wetland.</p> <p>Neerkol and Lion Creek as part of Rockhampton's lower catchment zone recharge this system.</p>	<p>Lotus Lagoons were characterised by a number of shallow, disconnected waterbodies ranging in size from 3m to 90m. Fringing vegetation was typically low, from 0.2m to 1m tall with cover between 30% to 100% recorded in different areas. The groundcover was dominated by exotic species included: <i>Megathyrsus maximus</i>, <i>Persecaria attenuata</i>, <i>Hymenachne amplexicaulis</i>, <i>Erinochloa sp.</i>, <i>Phragmites australis</i>, <i>Sesbania cannabina</i>. The landscape is largely cleared, however some areas are fringed by open woodland of RE 11.3.25, RE 11.3.4 or scattered paddock trees.</p> <p>Where the fringing vegetation was suitably dense surrounding water bodies, refuge/roosting opportunities for Latham's snipe exist. Three individuals were observed during flushing surveys in Lotus Lagoons.</p> <p>Muddy margins were absent or narrow throughout and as such the wetlands provided only marginal habitat for migratory shorebird species other than Latham's snipe, at the time of survey.</p> <p>The wetted area was significantly greater during this survey period compared with 2019, however historical aerial imagery shows that this area has experienced much larger flooding extents in previous wet seasons. Previous surveys did not report any suitable habitat for Latham's snipe given the very small area of standing water.</p> <p>Adjacent riparian zones were heavily impacted, especially in the northern-most section with exotic grass prevalent and ongoing grazing activity.</p>



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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
		<p><b>Plate 2      Condition of Lotus Lagoons during 2020 survey</b></p>
Dunganweate Lagoon	<p>A moderate sized wetland with an elongated crescent shaped permanent waterbody, recharged by Neerkol catchment system. The Project Area directly intersects this wetland.</p>	<p>This wetland was located within a disturbed and heavily grazed paddock, with riparian vegetation consisting of dense exotic groundcover with occasional paddock trees and shrubs (i.e. <i>Vachellia farnesiana</i>). The wetland had been recharged by recent rainfall with the wetted area significantly increased compared with the 2019 visit. Water levels had inundated any potential muddy margins and as such foraging opportunities for migratory shorebirds were very limited. Fringing vegetation however did provide potential habitat for Latham's snipe.</p> <p>During the 2019 surveys, muddy margins 1-4m wide were observed with very sparse cover of fringing vegetation or macrophytes. Habitat was generally unsuitable for migratory shorebirds due to depth of water exceeding the limits of most species ability to forage or roost.</p> <p>The wetland was heavily impacted by cattle grazing, thinning and weeds. Horses were also observed watering at the lagoon.</p>

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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
		 <p data-bbox="373 1144 1043 1173"><b>Plate 3 Condition of Dunganweate Lagoon during 2020 survey</b></p>
Nelson Lagoon	<p data-bbox="373 1205 794 1420">A small wetland with a permanent waterbody, located directly south of Dunganweate Lagoon. Nelson Lagoon is recharged by Neerkol catchment system. This lagoon is likely connected to Dunganweate Lagoon during minor flooding events.</p>	<p data-bbox="826 1205 1391 1509">This wetland is also within a disturbed and heavily grazed landscape. Fringing vegetation was similar to that observed at Dunganweate Lagoon with the ground layer cover almost 100% and dominated by exotic grass species. No muddy margins exist and recent rainfall had significantly increased the wetted area such that the lagoon banks were breached and the surrounding paddocks were flooded creating a sprawling palustrine wetland between Nelson Lagoon and the Capricorn Highway.</p> <p data-bbox="826 1541 1391 1756">A recent crocodile sighting ruled out flushing surveys in this area, however two Latham's snipe were observed in the flooded paddock/palustrine wetland (Figure 4). The lagoon and surrounding area was considered to be potential habitat for Latham's snipe in the current condition, however unsuitable for other migratory shorebird species.</p> <p data-bbox="826 1787 1391 1912">The area is highly disturbed by historical clearing and thinning as well as current cattle grazing. Where the flooded paddock is adjacent the Capricorn Highway traffic noise can be clearly heard.</p> <p data-bbox="826 1944 1391 2092">During the 2019 surveys, wetted area was restricted to the defined banks of the wetland where muddy margins (2-5m) were present, however no migratory shorebirds were observed. The paddocks south of the lagoon were also dry on previous visits.</p>




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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
		
		<p><b>Plate 4</b>      <b>Habitat condition at Nelson Lagoon during 2020 survey</b></p>
		
		<p><b>Plate 5</b>      <b>Habitat condition in flooded paddock south of Nelson Lagoon during 2020 survey</b></p>



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Wetland	Hydrological Summary	Shorebird Habitat Suitability During 2020 Survey
Capricorn Highway Lagoon	A small elongated permanent waterbody located south of the Capricorn Highway, connected to Neerkol Creek. The Project Area overlaps a small proportion of the northern mapped extent of this lagoon.	<p>This wetland had similar habitat value to Dunganweate and Nelson Lagoons with similar dense fringing ground cover of exotic terrestrial and aquatic grasses and native sedges. The wetland permanently/semi-permanently holds pooled water however during this survey event, the wetted area was much larger than previous visits as was observed in all southern lagoons. Muddy margins were absent due to inundation from recent rainfall and hence no foraging opportunities for most shorebird species existed. The condition of the wetland did however provide suitable habitat conditions for Latham's snipe, although the species was not observed.</p> <p>No migratory shorebirds were observed during previous survey events however surveying has been limited to habitat assessment from the adjacent public road. One public database record exists for Latham's snipe at this wetland.</p> <p>Current land use is cattle grazing and the area is disturbed by weeds, historical clearing and thinning and noise levels were also elevated due to the proximity to the Capricorn Highway</p>
	 <p><b>Plate 6</b>      <b>Habitat condition at Capricorn Highway Lagoon during 2020 survey</b></p>	

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## 4.4 Waterbird Diversity

Waterbird diversity within the Survey Area was typically low at most wetlands, with a total of 32 waterbird species (including Latham's snipe) recorded. Waterbird diversity was highest at Pink Lily Lagoon where 17 species were recorded (Table 5).

Commonly recorded species included the pacific black duck (*Anas superciliosa*), Australasian darter (*Anhinga novaehollandiae*), great egret (*Ardea modesta*), little black-cormorant (*Phalacrocorax sulcirostris*) and grey teal (*Anas gracilis*).

Caspian tern (*Hydroprogne caspia*) was recorded on two occasions within the Survey Area: once overflying the Fitzroy River and once foraging at Dunganweate Lagoon (Figure 4). This species is listed as Migratory under the EPBC Act but is not considered a migratory shorebird.

A list of waterbird species observed at each lagoon is provided in Table 5.

**Table 5 Waterbird species observed during migratory shorebird survey**

Species				Wetland				
Scientific Name	Common Name	EPBC Act Status	NC Act Status <sup>1</sup>	Pink Lily Lagoon	Lotus Lagoons	Dungan weate Lagoon	Nelson Lagoon	Capricorn Highway Lagoon
<i>Anas gracilis</i>	Grey Teal	-	LC	X	X		X	
<i>Anas superciliosa</i>	Pacific Black Duck	-	LC	X	X	X		
<i>Anhinga novaehollandiae</i>	Australasian Darter		LC	X		X	X	X
<i>Anseranas semipalmata</i>	Magpie Goose	-	LC					X
<i>Ardea ibis</i>	Cattle Egret	-	LC	X				
<i>Ardea intermedia</i>	Intermediate Egret	-	LC			X		
<i>Ardea modesta</i>	Eastern Great Egret	-	LC	X	X	X	X	
<i>Ardea pacifica</i>	White-necked heron	-	LC		X			
<i>Aythya australis</i>	Hardhead	-	LC	X				
<i>Chenonetta jubata</i>	Australian Wood Duck	-	LC	X	X	X	X	
<i>Cygnus atratus</i>	Black Swan	-	LC		X			X
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck	-	LC	X		X	X	
<i>Egretta garzetta</i>	Little Egret	-	LC	X				
<i>Elseya melanops</i>	Black-fronted Dotterel	-	LC		X			

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Species				Wetland				
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	-	LC	X				
<i>Fulica atra</i>	Eurasian Coot	-	LC					
<i>Gallinago hardwickii</i>	Latham's Snipe	Migratory (shorebird)	SLC		X			
<i>Gallinula tenebrosa</i>	Dusky Moorhen	-	LC	X	X			
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	LC		X	X		
<i>Himantopus himantopus</i>	Black-winged Stilt	-	LC	X				
<i>Hydroprogne caspia</i>	Caspian Tern	Migratory	LC			X		
<i>Irediparra gallinacea</i>	Comb-crested Jacana	-	LC			X		X
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	-	LC	X			X	
<i>Nettapus coromandelianus</i>	Cotton Pygmy-goose	-	LC			X		
<i>Pelecanus conspicillatus</i>	Australian Pelican	-	LC	X		X		
<i>Phalacrocorax carbo</i>	Great Cormorant	-	LC	X		X		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	-	LC	X		X	X	
<i>Phalacrocorax varius</i>	Pied Cormorant	-	LC				X	
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	-	LC				X	
<i>Platalea regia</i>	Royal Spoonbill	-	LC			X	X	
<i>Porphyrio porphyrio</i>	Purple Swamphen	-	LC	X				
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	-	LC		X	X		
<b>Total Species</b>				<b>17</b>	<b>11</b>	<b>15</b>	<b>10</b>	<b>4</b>

<sup>1</sup> Status under the NC Act – LC = least concern; SLC = special least concern



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## 4.5 Shorebird Diversity

Only one listed migratory shorebird species was identified during the survey, Latham's snipe. This species was recorded within the Survey Area on five occasions, once in a group of 3 individuals (Figure 4). The species was recorded at Lotus Lagoons (3 separate occasions) and Nelson Lagoon (2 separate occasions) with a total of 7 individuals observed.

Latham's snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. This species has been recorded along the east coast from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland.

In Australia, the Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) (Department of Agriculture Water and the Environment, 2020).

Behaviours and habitats for Latham's snipe do tend to differ to many of the coastal migratory shorebird species, with occurrence linked to availability of fringing vegetation for refuge rather preference of open areas of tidal flats or muddy margins. Suitable habitat was widely available for this species as recent rainfall had recharged wetlands, significantly increasing the wetted area at many of the wetlands, particularly in the south of the Study Area and also resulted in increased cover of fringing vegetation.

The lack of records for other migratory shorebird species may be influenced by the habitat condition during this survey period, with lack of foraging habitat, characterised by muddy margins, in the majority of the lagoons.

## 4.6 Other Species of Significance

A single squatter pigeon (southern) (*Geophaps scripta scripta*) was recorded along Von Allmen Road (Figure 4). This species is listed as Vulnerable under the EPBC Act and the Queensland *Nature Conservation Act 1992* (NC Act).

Additionally, two flocks of glossy black-cockatoo (*Calyptorhynchus lathamii*) were recorded: one flock of three were seen flying over Lotus Lagoons and one flock of six flying over an unnamed wetland just south of Lotus Lagoons (Figure 4). This species is listed as Vulnerable under the NC Act.

Neither species has been recorded during previous survey events, however the squatter pigeon (southern) was considered as highly likely to occur based on suitable habitat and recent records in the area.

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## 5.0 Discussion and Summary of Findings

### Wetland conditions and utilisation by migratory shorebirds

The targeted migratory shorebirds survey was conducted between 16 and 20 March 2020 by four AECOM ecologists. This survey was preceded by significant rainfalls in February and March which influenced the habitat conditions observed. These conditions were characterised by flooded wetlands with significantly large wetted areas compared with previous surveys (with the exception of Pink Lily Lagoon) and high cover of fringing vegetation dominated by exotic grasses. This flooding resulted in the banks of the southern wetlands being inundated and hence no muddy margins were present. In the Lotus Lagoons and Pink Lily Lagoon, some muddy margins were present however these were very narrow (<1m).

The wetland conditions at the time of survey did not provide suitable habitat for significant populations of migratory shorebird species with the exception of Latham's snipe. Shorebirds require a network of foraging and roosting habitat. For most shorebird species this is represented by large areas of soft substrate in exposed tidal mudflats or muddy margins for foraging on their preferred prey of invertebrates, crustaceans and small fishes and open habitat on slightly elevated ground for roosting. The availability of these types of foraging resources and roosting habitat were severely restricted during the field survey, due to inundation of muddy wetland margins and high cover of fringing vegetation.

These conditions were however favourable for Latham's snipe which rely on fringing vegetation for refuge and shallow waterbodies or mudflats for foraging on worms, insects, molluscs, isopods and plant material. A total of seven individuals of the species were recorded throughout the survey. Four were flushed from the surrounding vegetation at one small lagoon at Lotus Lagoons and three were observed foraging amongst flooded tussocks in low land areas between Nelson Lagoon and the Capricorn Highway.

Habitat was considered to be suitable for this species at all of the surveyed wetlands. This varied from previous surveys which found that the southern lagoons (i.e. Nelson Lagoon, Dunganweate Lagoon and Capricorn Highway Lagoon) did not provide suitable habitat for the species. The survey demonstrated the temporal variation in habitat availability and quality and how this impacts the presence of and utilisation by Latham's snipe in the Study Area. These southern lagoons only become suitable for Latham's snipe when they are fully inundated and fringing vegetation is present. This will generally occur later in the wet season or if there is an early above average rainfall event.

It should also be noted that two Latham's snipe were recorded in close proximity to areas of high levels of anthropogenic noise associated with roadworks and traffic noise on the Capricorn Highway. In the Latham's snipe section of HANZAB (Vol 3) (Higgins and Davies, 1996) it states "Disturbed by people and grazing cattle (Naarding 1983), though sometimes recorded in wetlands prone to disturbance, e.g. near industrial complexes, next to roads, railways, airfields, and within school grounds (Gill 1970; Naarding 1982, 1982; M.A Weston)". These observations provide further evidence that the species is able to habituate to this level of disturbance.

### Important habitat

'Important habitat' as defined under the *Significant impact guidelines 1.1: Matters of National Environmental Significance* (Department of the Environment, 2013) is a key concept in determining the likelihood of significant impact from a proposed action. Important habitat for migratory shorebirds is outlined in the *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Department of the Environment and Energy, 2017) and refers to areas which are nationally or internationally important.

Wetland habitat should be considered **internationally important** if it regularly supports:

- 1% of the individuals in a population of one species or subspecies of waterbird; **or**
- A total abundance of at least 20,000 waterbirds.

Wetland habitat should be considered **nationally important** if it regularly supports:

- 0.1% of the flyway population of a single species of migratory shorebird; **or**

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- 2,000 migratory shorebirds; **or**
- 15 migratory shorebird species.

Based on these definitions and guidance, the habitat within the Survey Area at the time of survey was not considered to be nationally or internationally important for migratory shorebirds with the exception of Latham's snipe. Specifically, in response to the criteria provided by the Commonwealth for assessing important habitat for migratory shorebirds the following is provided.

- The Project Area is not located adjacent to, nor contained within any sites identified as internationally important for migratory shorebirds.
- The Project Area is not located adjacent to, nor contained within any sites that support 0.1% or more of the flyway population of any migratory shorebird species, given the very low densities of birds recorded during the surveys.
- The Project Area is not located adjacent to, nor contained within any sites that were observed to support 2,000 or more individual migratory shorebirds.
- The Project Area is not located adjacent to, nor contains any sites that were observed to support 15 or more migratory shorebird species, with the total number of migratory shorebird species recorded for the entire Project Area being one during this survey event (two species have been recorded across all survey events).

Latham's snipe does not commonly aggregate in large flocks or use the same habitats as other migratory shorebird species. Consequently, habitat important to Latham's snipe cannot be identified using the process outlined above and different criteria are necessary. Important habitat for Latham's snipe occurs at sites that have previously been identified as internationally important for the species, or sites that:

- Support at least 18 individuals of the species (ecologically significant proportion of the population), and
- Are naturally occurring open freshwater wetland with vegetation cover nearby (for example, tussock grasslands, sedges, lignum or reeds within 100m of the wetland).

Based on the locations and habitat types in which Latham's snipe were observed during the survey, there are likely to be extensive areas in the broader Rockhampton floodplain area where Latham's snipe may potentially occur. These extensive areas would range from areas that have been previously heavily disturbed (i.e. wet paddocks trodden over by cattle) to less disturbed areas such as the vast Fitzroy delta downstream from Rockhampton. In that context, the ~ 7ha of wetlands potentially disturbed by the Project would likely comprise a very small proportion of the habitat available in the Rockhampton area.

Regardless, based on the threshold criteria detailed above and outlined in the *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Department of the Environment and Energy, 2017), important habitat for Latham's snipe was present within the Project Area at the time of both the current survey and the previous surveys conducted in 2019.

As the extent and habitat quality fluctuates, the Project is unlikely to have the same consistent direct and indirect impacts throughout the construction and operation phases and appropriate timing of Project activities can reduce the potential impact to this species.



AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.



DATUM GDA 1994, PROJECTION MGA ZONE 56  
0 450 900 1,800  
Metres

1:38,000 (when printed at A3)

**LEGEND**

- Highways
- Major watercourse
- Minor watercourse
- Mapped wetlands
- ▭ Project Area
- ▨ Survey Area
- Migratory Shorebird Records**
  - ★ Latham's snipe
- Migratory Bird Records**
  - ★ Caspian tern
- EVNT Records**
  - ▲ Glossy black cockatoos
  - ▲ Squatter pigeon (southern)



Data sources:  
Base Data: (c) State of Queensland (Department of Natural Resources, Mines and Energy) 2019.  
Baseline Roads and Tracks, Railway Network.  
Aecom 2019, Corridor and RRR Data

ROCKHAMPTON RING ROAD

**FIELD RESULTS**

PROJECT ID 60593305  
CREATED BY McKeeJ2  
LAST MODIFIED 25-Apr-2020  
VERSION 1

Figure  
**4**



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## 6.0 References

Bureau of Meteorology (2019) *Climate Data Online*. Available at:  
<http://www.bom.gov.au/climate/data/index.shtml>.

Department of Agriculture Water and the Environment (2020) *Species Profile and Threats Database*. Canberra. Available at: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.

Department of the Environment (2013) *Significant Impact Guidelines 1.1: Matters of National Environmental Significance*. Available at:  
[http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines\\_1.pdf](http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf).

Department of the Environment (2015) *Wildlife Conservation Plan for Migratory Shorebirds*. Commonwealth of Australia. Available at: [www.environment.gov.au/resource/wildlife-conservat](http://www.environment.gov.au/resource/wildlife-conservat).

Department of the Environment and Energy (2017) *EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*. Commonwealth of Australia. Available at:  
<http://www.environment.gov.au/system/files/resources/67d7eab4-95a5-4c13-a35e-e74cca47c376/files/bio4190517-shorebirds-guidelines.pdf>.

Department of the Environment Water Heritage and the Arts (2010) *Survey guidelines for Australia's threatened birds: guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, ACT: Australian Government. Available at:  
<http://www.environment.gov.au/system/files/resources/107052eb-2041-45b9-9296-b5f514493ae0/files/survey-guidelines-birds-april-2017.pdf>.

Higgins, P. J. and Davies, S. J. J. F. (1996) *Handbook of Australian, New Zealand and Antarctic Birds. Volume 3: Snipes to Pigeons*. Melbourne, Victoria: Oxford University Press.